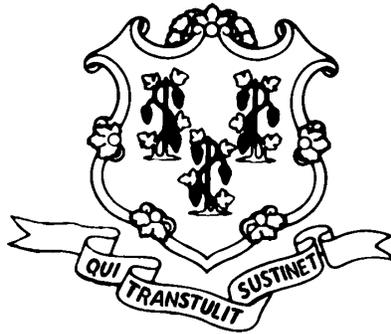


Occupational Disease In Connecticut: Data for Action



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EXECUTIVE SUMMARY

Progress in Connecticut since 1990 toward a comprehensive approach to occupational health. Since 1990, when the Connecticut Departments of Public Health and Labor published the baseline report entitled *Occupational Disease in Connecticut*, Connecticut has developed a coordinated approach for recognition and evaluation of occupational diseases. The vision underlying this integrated activity is that the use of data pertaining to occupational diseases leads to action to prevent these conditions. Thus, knowledge of occurrence and causes of occupational diseases provides the basis for creating intervention and education programs to reduce those diseases in the work force.

This present 2000 report, *Occupational Disease in Connecticut: Data for Action*, serves to update descriptions of the Connecticut work force and what is known about occupational diseases in Connecticut from the 1990 baseline report. It documents milestones in Connecticut's occupational health history, reviews the National Institute for Occupational Safety and Health (NIOSH) guidelines for minimum and comprehensive state-based activities in occupational safety and health, and highlights progress made in Connecticut. These include such advances as the establishment of a network of clinics, the establishment of the Ergonomics Technology Center of the University of Connecticut in Farmington, and the Workers' Compensation Commission requirement for Health and Safety Committees in workplaces. Connecticut's efforts are discussed in light of national initiatives in occupational safety and health surveillance, which focus on selected target conditions. To date, there is no national system of comprehensive occupational disease surveillance based on physician diagnoses. This 2000 report serves to illustrate how the coordinated system of comprehensive occupational disease reporting in Connecticut places the state in a unique position. The cooperative approach can enable Connecticut to solve existing problems which are factors in occupational disease in the state, and can also contribute to the development and implementation of a national occupational health surveillance system.

Comprehensive approach made possible by Occupational Health Clinics Bill. Although there has been a requirement for physicians to report occupational diseases for many decades in Connecticut, it was only with the passage of specific legislation, the *Occupational Health Clinics Bill* in 1990, that a coordinated approach was made possible. This legislation provides funding for a network of occupational medicine and auxiliary clinics, and for the three state agencies in Connecticut which are involved in occupational disease surveillance (the Department of Public Health, the Department of Labor, and the Workers' Compensation Commission). An explicit goal for the occupational medicine clinics is to improve recognition of occupational diseases throughout the state by providing education and assistance to physicians in identifying and evaluating occupational diseases. As part of the coordinated system in Connecticut, collaborative relationships have been formally established among several state and federal agencies, occupational medicine clinics, and private sector groups in both industry and labor.

This collaboration has enabled the Connecticut Department of Public Health to create an occupational disease surveillance system, which is based upon diseases reported by *physicians*.

Physician reporting of occupational disease complements other employer-based reports. Other systems for collecting information about occupational disease and injury do exist, but these are based on *employers'* reporting. The Bureau of Labor Statistics' annual survey of occupational injuries and illnesses yields aggregate data from a statistical sampling of OSHA 200 logs completed by employers. The Workers' Compensation Commission (WCC) produces occupational disease and injury data, which are based on *employer* first reports of injury. For some conditions, there is little overlap in persons reported between DPH's physician-based and WCC's employer-based systems, indicating that there is some amount of under-reporting of occupational diseases. Therefore, data presented in this 2000 report should be viewed as suggestive of the types of occupational diseases found in Connecticut, but not necessarily reflective of the extent of such diseases.

Connecticut's changed work force and implications for occupational disease and injury. Connecticut's work force is comprised of 1.57 million persons 16 years of age and older and is nearly evenly divided by gender. Over the past decade, the distribution of workers among industries has changed. The service sector now employs the largest number of workers (31%), followed by manufacturing (18%), and retail (17%). This contrasts with 1980, when 32% of the work force was engaged in manufacturing, and only 20% was employed in the service sector. Currently, employer-based reports of work-related diseases and injuries show that the manufacturing (25%), service (24%), and government (18%) sectors have the largest percentages of such diseases and injuries. Cumulative trauma disorders represent the disease category with the largest percentage of reports from employers (62%). As the distribution of workers in industry changes and new technologies are introduced, different patterns of occupational diseases may be expected.

Despite the changes in distribution of workers among industries, a large number of Connecticut workers continue to be exposed to five well recognized hazards described in the 1990 report: asbestos, lead, silica, solvents, and noise. These were initially chosen because they are among the most frequently occurring exposures, and they cause some of the most readily diagnosed occupational diseases. Over 195,300 workers, or 13% of the 1997 work force, are conservatively estimated to be exposed to one of these specific agents alone, compared to 15% (227,144 workers) of the 1985 work force.

The number of occupational fatalities (55) from traumatic events rose significantly in 1998 compared to the average number (32) during the previous six years. The majority of these involved transportation-related incidents (35%) and assaults (29%).

Need for a physician-based occupational disease surveillance system. Employer-based reports present a less than comprehensive picture of occupational disease and injury in the Connecticut work force, but they are illustrative of the nature and demographic impact of these conditions. A lack of awareness on the part of the public and of some physicians, as well as a

failure in identifying work-relatedness of diseases, has led to under-reporting. Occupational diseases often reflect chronic exposures over a long period of time, and may be difficult to identify. In addition, there are a number of economic disincentives for employers to report occupational diseases and injuries.

DPH, in conjunction with DOL, established the Occupational Disease Surveillance System (ODSS) in 1991 and completed its first full year of surveillance in 1992. The ODSS is the only system in Connecticut that utilizes reporting by physicians as a mechanism to collect occupational disease data. The majority of the reports are from occupational medicine clinics (approximately 80%), particularly those funded by the Department of Labor through the grant-in-aid occupational clinics program. These reports from physicians are used to better understand the nature and scope of occupational diseases and to identify hazards in workplace settings that cause these diseases. The data in the ODSS support prevention efforts, occupational disease investigations and interventions, and the development of educational materials.

Summary of characteristics of workers affected by occupational diseases in

Connecticut. The ODSS contains 11,407 reports by physicians for occupational diseases in Connecticut workers (1992 through 1998). More males (61%) than females (39%) have been reported with an occupationally-related disease. The workers are relatively young: 76% of the workers with disease reports are between 20 and 49 years of age. Thirty-eight percent of the disease reports come from workers in manufacturing, 21% from the service industry, 13% from the construction industry, and 10% from retail trade. The occupations with the greatest number of disease reports (not including lead poisonings) are service occupations (13%), administrative support (11%), machine operators and tenders (11%), and fabricators, assemblers, and handworking (9%).

Top four occupational disease categories reported by physicians in Connecticut. Since 1992, the top four disease categories have been cumulative trauma disorders, poisonings, skin diseases and disorders, and respiratory diseases and disorders.

Cumulative trauma disorders. Cumulative trauma disorders (CTDs) account for 40% (4,593) of the disease reports in the ODSS. Carpal tunnel syndrome and tendonitis are the most frequently reported types of CTDs. Women account for 60% of the CTD reports. Manufacturing (44%), services (20%) and retail trade (14%) are the three industry sectors with the most CTD reports. The occupation groups with the most CTD reports include administrative support (16%), fabricators, assemblers, and handworking (12%), and machine operators and tenders (11%).

Information about prevalence of cumulative trauma disorders, or work-related musculoskeletal disorders, was developed through a survey conducted by the Ergonomics Technology Center of the University of Connecticut (ErgoCenter). A representative sampling of 3,200 Connecticut residents found that 292 persons (9% of those sampled) reported experiencing a CTD which

was work-related in the preceding 12 months. Of these, 50% reported receiving a physician's diagnosis of a work-related musculoskeletal disorder.

Poisonings by lead and other agents. Poisonings and suspected poisonings account for 27% (3,039) of the occupational disease reports. The majority of the poisonings reported, 83%, are due to lead exposure, primarily in the construction sector. Most other poisonings occurred in the construction (46%) and manufacturing (29%) sectors. Suspected agents for these poisonings were mercury, carbon monoxide, solvents, and other chemicals.

Skin diseases and disorders. Skin diseases and disorders account for 16% (1,861) of the occupational diseases reported. Occupational dermatitis and burns, including chemical burns, are the most frequently reported types of occupational skin diseases and disorders reported. Chemical burns are considered disease disorders in the OSHA guidelines, and DPH collects reports on all occupational burns which may be amenable to public health prevention efforts. Connecticut is one of five states in the Northeast participating in a multistate pilot demonstration project funded by NIOSH to address burns in restaurant workers.

Respiratory diseases and disorders. Respiratory diseases and disorders account for 5% (611) of the occupational diseases reported. Occupational asthma (including reactive airway dysfunction syndrome) (33%), asbestosis (17%), and pleural plaques (17%) are the most frequently reported respiratory diseases and disorders. Other respiratory conditions include silicosis, hypersensitivity pneumonitis, and bronchitis.

Occupational asthma can be very disabling. The causes of occupational asthma most frequently reported to the ODSS are indoor air pollution (20%), isocyanates (12%), and latex (6%). Many workers have had to change jobs or careers because of this condition. DPH regards every case of occupational asthma, which is reported by physicians, as a sentinel condition and follows up with a patient survey and other activities.

Asbestos-related conditions continue to be reported to the ODSS and the Workers' Compensation Commission even after the exposure has ended. This reporting lag is related to the long latency period before disease is evident (often 15-20 years). Many fatalities due to asbestos exposures continue to occur in Connecticut. UCONN conducted a study of fatalities due to occupational diseases in Connecticut. Of 93 occupational disease fatalities in 1995 and 90 in 1994 which were identified using reports from the Workers' Compensation Commission, CONN-OSHA, Vital Statistics, and the Connecticut Tumor Registry, the predominant occupational disease fatalities in Connecticut were asbestos-related: 74 (40%) due to mesothelioma and 47 (25%) due to asbestosis, which are almost universally recognized as being work-related. The number of occupational disease fatalities may be an underestimate, since other categories of occupational disease fatalities are not routinely identified on death certificates as work-related.

Socio-economic consequences of workplace diseases. The social and economic consequences of workplace diseases and injuries are emergent areas for research, and little

information is available specific to Connecticut workers. However, findings are available from a UCONN Division of Occupational and Environmental Medicine (DOEM) population-based telephone survey of CTDs. The persons in this survey who had a CTD reported much higher levels of difficulty in performing daily tasks. A variety of severe social consequences were also more likely to be experienced by respondents with CTDs, such as loss of home or car, losing health insurance, having to move for financial reasons, and divorce. Only 21% of individuals in this study who had had medical visits or procedures for CTDs reported that these visits were paid for by workers' compensation. An average of \$489 per affected individual was spent annually for CTD-related medical expenses on an out-of-pocket basis.

Assessment of structures to assist workers. There are a number of structural barriers noted in the Connecticut 1990 baseline report that continue to prevent workers and employers from using available occupational health services. These include systems of payment for medical services, availability of medical services, workers' perceived risks to job security, liability of employers, and language and literacy skills of workers. Workers with no health insurance are less likely to access any health care until emergency services are needed.

There has been a structural improvement with the passage of the Occupational Health Clinics Bill, in that resources now exist to perform health and safety evaluations of worksites for workers with occupational disease. Industrial hygiene recommendations can be made to management to prevent ongoing exposures to the worker, as well as to co-workers.

Certain populations more at risk for occupational diseases: Connecticut DPH has a commitment to insuring that resources are dedicated to underserved or high-risk populations. Looking at particular occupational disease disorders for the period 1992 - 1998, physicians reported higher percentages of cases of cumulative trauma disorders in women (60%) than in men. There are approximately twice as many reports in female workers versus male workers of carpal tunnel syndrome (68%) and tendonitis (63%). This is reflective of the types of industries that women work in and how many physician reports are received from those industries. There is a higher percentage of physician reports for women in the retail (60%), finance (83%), and services sector (66%) than men in those sectors.

Race and ethnicity demographics on physician reports are often incomplete, but to the extent that this information is recorded, the majority of workers with disease reports are White (85%). When comparing the figures from the ODSS from the period 1990 - 1998 to the percentages of employed persons in Connecticut in 1997, Asian, "other" workers, and those of Hispanic origin appear to be over-represented. Black workers do not appear to be over-represented overall in the ODSS, but they may be for certain occupational disease conditions. These results need to be interpreted with caution, given incomplete recording of these variables in the ODSS.

An important factor to be considered, when assessing the occurrence of occupational diseases in populations whose primary language is other than English, is the availability of appropriate health and safety training, as well as access to medical care. Occupational health and safety training is required to be given by employers for all hazards to be encountered on the job. As

noted in the Connecticut 1990 baseline report, health and safety training and education programs for workers, whether at the worksite or in other settings, may encounter language and/or literacy barriers.

There is little information in the ODSS regarding adolescent workers, age 14 - 17, but in a recent 18-month period, there were about 300 WCC claims for this age group. Many of these involved cuts and lacerations (18%), back injuries (10%), and burns (9%). Because young workers lack training, work experience, maturity, and knowledge about their rights, they are at high risk of injury and disease. These injuries and diseases may disable them or continue to cause symptoms in adulthood. DPH is currently involved in a multistate pilot project to address adolescent injuries (the Adolescent Worker Project).

Older workers may also be at risk for occupational diseases and injuries, particularly if they experience sight or hearing impairments, or engage in heavy lifting on the job. As the average age of the working population rises, there are greater numbers of older workers in the work force.

Action based on data from the Occupational Disease Surveillance System. Each year a wide range of activities are conducted by DPH and collaborators utilizing data from the Occupational Disease Surveillance System. These activities include: analysis of the occupational disease surveillance system to monitor trends in occupational disease; identification and investigation of sentinel cases; identification and investigation of reported occupational disease clusters in specific workplaces; development and implementation of industry-wide surveillance and prevention activities; development of disease-specific educational materials for physicians, employers and workers; collaboration with other agencies, clinics and states to develop prevention programs; and sharing of information through professional education, statewide and regional conferences.

Education. Providing continuing professional education has been a focus of DPH. DPH initiated a thrice yearly publication in 1995, *Occupational Airways*, which is sent to 5,000 physicians and other health professionals in the state to apprise them of issues, findings, and resources regarding occupational respiratory diseases in Connecticut. DPH has developed fact sheets for physicians and workers on occupational exposure to latex; workplace lead exposure; and cumulative trauma disorders in manufacturing, construction, and office settings. DPH, in collaboration with the academic occupational medicine programs and DOL, has conducted a series of workshops and seminars on such themes and topics as: *Turning Diagnosis Into Prevention, Investigating Indoor Air Problems in Schools, and Metalworking Fluid Hazards: State of the Art Control Strategies*. Other educational trainings have been undertaken by the Labor Education Center at UConn and the ErgoCenter.

Intervention. The Connecticut Road Industry Surveillance Project (CRISP), a major lead exposure intervention project in Connecticut which was initially funded by NIOSH under the auspices of Yale University, was also a national pilot demonstration project. This program included centralized medical monitoring coordination, a network of CRISP clinics, and industrial

hygiene oversight. The CRISP program worked with the Connecticut Department of Transportation (DOT) to include medical examinations, blood lead level testing, and industrial hygiene activities as part of the Lead Health Protection Program in its bridge construction contract specifications. Since DOT provides funding for all contract elements, including a mandatory lead health protection plan, this has enabled significant worker protection. This program has been highly successful in reducing lead exposure risks to Connecticut bridge construction workers. Evaluations of the CRISP program (now entitled CLINIC - Connecticut Lead Intervention Network in Construction) have shown twofold reductions in blood lead levels of workers in different at-risk job categories.

Evaluation of effectiveness of intervention. In another assessment, UConn DOEM evaluated the effectiveness of conducting industrial hygiene worksite visits (which are specifically funded under the Occupational Health Clinics bill) for patients with suspected occupational diseases. They found that patients were 10 times more likely to remain employed if their employers implemented any one of the recommendations from the site visit and 13 times more likely if the priority recommendation was adopted. Employers were nearly four times more likely to implement the priority intervention: (1) if they believed a worker's illness was work-related, which highlights the importance of the physician's role in working with the patient's employer; or (2) if there was a Health and Safety Committee at the worksite. This study demonstrates that industrial hygiene worksite intervention can be beneficial to workers and employers and result in health and safety changes in workplaces.

Conclusions and recommendations. DPH is guided by its priority to reduce occupational injury when assessing occupational disease surveillance and intervention activities in Connecticut. DPH concludes that:

- Occupational diseases are preventable. However, analysis of Connecticut data shows that occupational diseases still continue to affect Connecticut workers. The major categories of occupational diseases reported by physicians in Connecticut are cumulative trauma disorders, poisonings, skin diseases and disorders, and respiratory diseases and disorders.
- Connecticut workers continue to be exposed to key hazardous substances. Estimates of exposure were calculated for asbestos, lead, silica, solvents and noise, based upon data from NIOSH's National Occupational Exposure Survey (NOES). Over 195,300 workers, or thirteen percent of the 1997 work force, are estimated to be exposed to one of these specific agents alone. This is considered to be a very conservative estimate, and actual numbers are likely to be higher.
- Barriers and disincentives to appropriate reporting of occupational diseases and injuries by employers and physicians lead to under-recognition and underestimation of the magnitude and distribution of workplace-related diseases and injuries. Efforts to address these barriers need to be made in order that interventions may lead to a lessening

of the burdens for workers and their families. Social and economic impacts of cumulative trauma disorders, occupational asthma, and other diseases are significant.

- Utilizing occupational disease and injury data for education and intervention is key to the prevention of these conditions. Industry-wide efforts which involve partnerships with state, local and federal agencies and trade and union groups can be successful in reducing the burden of occupational disease and injury. Those concerned with the health and safety of Connecticut workers need to build upon and expand industry-wide education and intervention.
- The coordinated interagency approach has yielded significant improvements for workers and employers over the past decade, but much work needs to be done in order to insure a healthful workplace for all. The network of occupational medicine and auxiliary clinics needs to continue, with sufficient resources to offer evaluation, intervention, and prevention benefits to *all* Connecticut workers. The goal of reducing occupational disease and injury needs to be of the highest priority as Connecticut moves into the twenty-first century.

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LIST OF ABBREVIATIONS

Abbreviation	Term
ABLES	Adult Blood Lead Epidemiology and Surveillance
BIH	Bureau of Industrial Hygiene
BLL	Blood Lead Level
BLS	Bureau of Labor Statistics
CCP	OSHA Cooperative Compliance Program
CDC	Centers for Disease Control and Prevention
CGS	Connecticut General Statutes
CLINIC	Connecticut Lead Intervention Network in Construction
CONN-OSHA (Occupational Division	Connecticut Department of Labor, OSHA Safety and Health Administration)
CPS	Current Population Survey
CRISP	Connecticut Road Industry Surveillance Project
CSTE	Council of State and Territorial Epidemiologists
CTD	Cumulative Trauma Disorder
CT	Connecticut
CTS	Carpal Tunnel Syndrome
DEP	Department of Environmental Protection
DHS	Department of Health Services
DOL	Department of Labor
DOT	Department of Transportation
DPH	Department of Public Health
EPA	Environmental Protection Agency
EDC	Educational Development Center
EEOH	Environmental Epidemiology and Occupational Health Division
ErgoCenter	University of Connecticut Ergonomics Technology Center
HP	Hypersensitivity Pneumonitis
IH	Industrial Hygiene, Industrial Hygienist
LAUS	Local Area Unemployment Statistics
LSS	Lead Surveillance System
MA	Massachusetts
MMWR	<i>Morbidity and Mortality Weekly Report</i>
MOU	Memorandum of Understanding
NEC	Not Elsewhere Classified
NIOSH	National Institute for Occupational Safety and Health
NORA	National Occupational Research Agenda
OHP	Occupational Health Program

ODSS	Occupational Disease Surveillance System
OHSWG	Occupational Health Surveillance Working Group
OSHA	Occupational Safety and Health Administration
OSHAct	Occupational Safety and Health Act (US Congress)
RADS	Reactive Airways Dysfunction Syndrome
SENSOR	Sentinel Event Notification Systems for Occupational Risk
SFY	State Fiscal Year
SIC	Standard Industrial Classification
SPRAY	Survey of Painters and Repairers of Autobodies by Yale
SPSS™	Statistical Package for the Social Sciences
SST	Site Specific Targeting (Plan)
UCONN	University of Connecticut
UCONN DOEM	University of Connecticut, Division of Occupational and Environmental Medicine
WCC	Workers' Compensation Commission
YOEM	Yale Occupational and Environmental Medicine Program
µg/dL	Micrograms per deciliter

DEFINITIONS OF OCCUPATIONAL DISEASE AND INJURY¹

The Connecticut Department of Public Health adapted the definition of *occupational disease* and *occupational injury* from the U.S. Occupational Safety and Health Administration (OSHA) and the U.S. Department of Labor, Bureau of Labor Statistics (BLS). OSHA uses the term *illness* rather than *disease*, but the two terms are synonymous. For consistency, the term *disease* will be used throughout this document. The phrase *occupational disease* explicitly includes disorders such as chemical burns; noise-induced hearing loss; and disorders associated with repeated trauma, vibration, or pressure.

Occupational Disease:	Any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment; it includes acute and chronic illnesses or diseases which may be caused by inhalation, absorption, ingestion, or direct contact with substances causing disease.
Occupational Injury:	Trauma or damage to some part of the body, such as a cut, fracture, sprain, amputation, etc., which results from a work accident or from an exposure involving a single incident in the work environment.

The following is a categorical listing of occupational diseases and disorders utilized by OSHA for classification of recordable diseases. Typical examples given by OSHA for each category are listed in the table below. This should not be considered a complete listing of the types of diseases and disorders that OSHA counts in each category.

Disease Category	Examples
Occupational skin diseases or disorders	Contact dermatitis, eczema, or rash caused by primary irritants and sensitizers or poisonous plants; oil acne; chrome ulcers; chemical burns or inflammations; etc.
Dust diseases of the lungs (Pneumoconioses)	Silicosis, asbestosis and other asbestos related diseases, byssinosis, siderosis, and other pneumoconiosis.
Respiratory conditions due to toxic agents	Pneumonitis, pharyngitis, rhinitis or acute congestion due to chemicals, dusts, gases or fumes, farmer's lung, etc.
Poisoning (systemic effects of toxic materials)	Poisoning by heavy metals (lead, mercury, cadmium arsenic, etc.); carbon monoxide,

	hydrogen sulfide or other gases; organic solvents (benzol, carbon tetrachloride, others); and insecticide sprays (parathion, lead arsenate, others); poisoning by other chemicals such as formaldehyde, plastics, resins, etc.
Disorders due to physical agents	Heatstroke, sun stroke, heat exhaustion, and other effects of environmental heat; frostbite, freezing, and effects of exposure to low temperatures; caisson disease; and ionizing (isotopes, x-rays, radium) and nonionizing (welding flash, ultraviolet rays, microwaves, sunburn, etc.) radiation.
Disorders associated with repeated trauma (cumulative trauma disorders)	Musculoskeletal disorders (carpal tunnel syndrome, synovitis, bursitis, and tenosynovitis, etc.); noise-induced hearing loss; Raynaud's phenomenon; other conditions due to repeated motion, vibration or pressure.
All other occupational diseases	Anthrax, brucellosis, malignant and benign tumors, food poisoning, infectious hepatitis, histoplasmosis, coccidiomycosis, etc.

¹ Instructions for OSHA No. 200, US Department of Labor, OSHA Division

DEFINITIONS OF INDUSTRY SECTORS¹

Industry Sector	Description
Agriculture, Forestry and Fishing	Includes Agricultural Production-Crops, Livestock And Animal Specialties; Agricultural Services; Forestry, Fishing And Trapping
Mining	Includes Metal Mining; Coal Mining; Oil And Gas Extraction; Mining And Quarrying Of Nonmetallic Minerals, Except Fuels
Construction	Includes Building Construction-General Contractors And Operative Builders; Heavy Construction Other Than Building Construction-Contractors; Construction-Special Trade Contractors
Manufacturing	Includes Food And Kindred Products; Tobacco Products; Textile Mill Products; Apparel And Other Finished Products Made From Fabrics And Similar Materials; Lumber And Wood Products; Furniture And Fixtures; Paper And Allied Products; Printing, Publishing And Allied Industries; Chemicals And Allied Products; Petroleum Refining And Related Industries; Rubber And Miscellaneous Plastics Products; Leather And Leather Products; Stone, Clay, Glass, And Concrete Products; Primary Metal Industries; Fabricated Metal Products; Industrial And Commercial Machinery And Computer Equipment; Electronic And Other Electrical Equipment And Components; Transportation Equipment; Measuring, Analyzing, And Controlling Instruments; Photographic, Medical And Optical Goods; Watches And Clocks; Miscellaneous Manufacturing Industries.
Transportation, Communication, Electric, Gas, And Sanitary Services	Includes Railroad Transportation; Local And Suburban Transit And Interurban Highway Passenger Transportation; Motor Freight Transportation And Warehousing; United States Postal Service; Water Transportation; Transportation By Air; Pipelines; Transportation Services; Communication; Electric, Gas, And Sanitary Services.
Wholesale Trade	Includes Wholesale Trade-Durable Goods; Wholesale Trade-Nondurable Goods

Retail Trade	Includes Building Materials, Hardware, Garden Supply And Mobile Home Dealers; General Merchandise Stores; Food Stores; Automobile Dealers And Gasoline Service Stations; Apparel And Accessory Stores; Home Furniture, Furnishings, And Equipment Stores; Eating And Drinking Places; Miscellaneous Retail.
Finance, Insurance, And Real Estate	Includes Depository Institutions; Nondepository Credit Institutions; Security And Commodity Brokers, Dealers, Exchanges, And Services; Insurance Agents, Brokers, And Service; Real Estate; Holding And Other Investment Offices.
Services	Includes Hotel, Rooming Houses, Camps, And Other Lodging Places; Personal Services; Business Services; Automotive Repair, Services, And Parking; Miscellaneous Repair Services; Motion Pictures; Amusements And Recreation Services; Health Services; Legal Services; Educational Services; Social Services; Museum, Art Galleries, And Botanical And Zoological Gardens; Membership Organizations; Engineering, Accounting, Research, Management, And Related Services; Private Households; Miscellaneous Services.
Public Administration	Includes Executive, Legislative, And General Government, Except Finance; Justice, Public Order, And Safety; Public Finance, Taxation, And Monetary Policy; Administration Of Human Resource Programs; Administration Of Environmental Quality And Housing Programs; Administration Of Economic Programs; National Security And International Affairs.
Nonclassifiable Establishments	Includes All Other Establishments Not Represented As Above.

¹ From *Standard Industrial Classification Manual, 1987*. Executive Office of the President, Office of Management and Budget.

Chapter I

INTRODUCTION: PROGRESS IN REDUCING OCCUPATIONAL DISEASE AND INJURY

Purpose of report

The 1990 publication of the baseline report, *Occupational Disease in Connecticut*, by the Departments of Public Health (DPH) and Labor (DOL),¹ along with the passage of the 1990 Occupational Health Clinics Bill² initiated a new era of integration of resources among Connecticut's state agencies with responsibilities for worker health and safety. These efforts are directly related to the health status priorities listed in the Connecticut DPH State Health Assessment, 1999, which cites reduction of factors associated with unintentional injuries, including occupational injury, as a main health status priority.³

The purpose of this 2000 report, *Occupational Disease in Connecticut: Data for Action*, is to:

- (1) describe progress in implementing the recommendations of the previous report and subsequent legislation;
- (2) provide an updated description of the Connecticut work force and its profile relative to occupational diseases, injuries, and fatalities;
- (3) assess progress in determining the magnitude and distribution of occupational disease;
- (4) describe how occupational disease surveillance data are used to prevent and/or reduce the occurrence of occupational disease, which continues to be of concern in Connecticut; and
- (5) examine possibilities for extending and improving the effectiveness of current efforts in conjunction with national occupational health and safety initiatives.

This report presents current data on employment in Connecticut and on health conditions related to work which have been monitored in DPH's Occupational Disease Surveillance System (ODSS) and other available data sources. The data reflected in this report are the most significant conditions (most prevalent and/or most serious) in the occupational disease surveillance database, or the most serious preventable conditions. Although there are various data sources in Connecticut, *there is no one single source of occupational disease information which captures all cases of such disease.* (See definitions of occupational disease and injury.)

This report addresses the question as to how occupational disease surveillance data are used to prevent workplace-related diseases, through investigation, intervention, coordination, and educational activities.

This 2000 report also describes the occupational health context at the national level. The national activities provide a framework which assists Connecticut's surveillance activities for workplace-related disease conditions. This state's efforts to expand occupational disease and injury surveillance have taken place with Connecticut playing a leadership role in the Northeast region, initiating a major national demonstration project with lead surveillance in bridge construction workers, and participating in other regional and national initiatives.

Since the passage of the Occupational Health Clinics bill in 1990, a number of programmatic activities have been implemented in Connecticut. A system for surveillance of occupational diseases and injuries, conducted jointly by the Departments of Public Health (DPH) and Labor (DOL) has been established; an Occupational Health Surveillance Working Group (OHSWG) has been initiated, including participation by DPH, DOL, the Workers' Compensation Commission (WCC), and by occupational and auxiliary clinics which are funded to improve the implementation of the surveillance system; Connecticut has hosted an annual Northeast Regional Occupational Surveillance Conference; and an annual report about occupational diseases has been prepared by the Workers Compensation Commission (WCC). The Occupational Disease Surveillance System (ODSS) has become the core of activities designed to reduce the occurrence of workplace-related diseases and to educate employers, workers, and health care providers.

The 1990 Connecticut baseline report addressed the question of what health risks faced workers in Connecticut workplaces and presented available information on the number of workers becoming ill because of their work and the nature of those illnesses. The report pointed to a new public health model to approach the problem of occupational disease, i.e., considering each report as a "sentinel event", which can lead to evaluation of causes and prevention of further episodes of disease. Exposures to risks for occupational disease are large and diverse, requiring considerable work for follow-up. The report noted that an integral aspect of occupational disease surveillance is feedback of information to employers, workers, and physicians.

The recommendations from the 1990 report called for:

- A central role of the State in conducting occupational disease surveillance, analyzing the resultant information, and coordinating responses;
- A network of occupational health clinics that would provide assessments of work-relatedness of disease, and diagnostic and treatment services for ill workers; and

- Coordination of existing resources to develop teams of occupational physicians and industrial hygienists which could effectively evaluate outbreaks of occupational disease in specific worksites.

These recommendations have been implemented. The resulting coordinated program has been quite successful to date, but would benefit from increased resources, particularly for preventive work.

Connecticut Background: Milestones In Connecticut Occupational Health History

Significant improvements in workplace health and safety have taken place nationally and in Connecticut since the early days of the twentieth century. Remarkably high risks of occupational fatality had been faced by workers at that time, with the Bureau of Labor Statistics documenting a rate equivalent to 61 deaths per 100,000 workers in 1913.⁴ In Connecticut, a 1922 *Hartford Times* account reported a *drop* of 4,000 occupational deaths in Connecticut per year between 1915 and 1922.⁵ Despite improvements since then, however, there is still a substantial need to reduce the toll of workplace disease and injury. The National Institute for Occupational Safety and Health (NIOSH) reports that currently, *each day* an average of 9,000 United States workers sustain disabling injuries on the job, 16 workers die from an injury sustained at work, and 137 workers die from work-related diseases.⁶ In Connecticut in 1994 and 1995, the number of documented occupational *disease* fatalities (the majority of which were asbestos-related) were approximately three times the number of occupational fatalities due to traumatic injuries.⁷ Although these figures are almost certainly an underestimate of occupational disease, they provide a basis in comparison to other causes of death.

Progressive Program in the Early Decades: History of Significant Events.

The 1990 Connecticut baseline report discussed the rich history in regard to workplace health in Connecticut. Highlights included:

- 1922. Dr. Stanley Osborn appointed Commissioner of Health. Authority granted by Legislature so that reports of workplace diseases were to be sent to the Department of Health (now called the Department of Public Health). Fee of 50 cents to be given for each report. No enforcement authority provided.
- 1927. Legislature appropriated funds for full-time physician in Occupational Health. Dr. Albert S. Gray hired and Division of Occupational Diseases created.
- 1928. Industrial hygiene engineer hired and DPH Laboratory opened. Philosophy of cooperation with industry - inspect and make recommendations - versus enforcement authority.

- 1938-1940. Special studies conducted of hat industry. Resulted in banning of use of mercury in felt processing.
- 1940-1945. DPH's occupational health program, then known as the Bureau of Industrial Hygiene (BIH), had peak of 28 employees, including physicians, nurses, chemists and industrial hygiene engineers. In 1940, 25 studies of potential hazards, 367 site visits, 455 investigations of cases of disease, and 1,066 requests for information were listed in department report.

Occupational Disease Reporting.

- 1949. Legislation codified the requirement for reporting of *all* occupational diseases to DPH, with fine for non-reporting (CGS 31-40a). Physicians were required to report such diseases within 48 hours of diagnosis; this allows for public health interventions.

Impact of the Federal Occupational Safety and Health Act on Connecticut

- 1970. The federal Occupational Safety and Health Act (OSHAct) enabled the creation of two agencies: (1) the National Institute for Occupational Safety and Health (NIOSH) in the Department of Health and Human Services for research and health recommendations; and (2) the Occupational Safety and Health Administration (OSHA) in the Department of Labor for enforcement.
- 1970-1973. In Connecticut, DPH responsible for workplace health. Department of Labor (DOL) responsible for workplace safety.
- 1973. Connecticut Legislature adopted Public Act 73-379 (later recodified to CGS 31-368), creating a state plan modeled after the federal OSHAct. This established the Connecticut DOL's OSHA Division. CONN-OSHA took over enforcement activities from federal OSHA for private and public sector, and established their Consultation Program for Connecticut employers. DPH's BIH transferred to DOL, and disease reporting requirement transferred from DPH to DOL.
- 1977. Connecticut Legislature returned private sector enforcement authority to the federal OSHA. CONN-OSHA retained public sector enforcement, and all of the Consultation Program activities for private and public sector employers.
- 1978-1983. OSHA funded *New Directions* program to conduct worker education in health and safety.
- 1983- present. Worker Education Unit became part of the Workers' Compensation Commission. Health and Safety Committees became a WCC requirement for many workplaces.

The Current Decade: Coordination of Resources

1990 Connecticut Baseline Report: Occupational Disease in Connecticut

- 1988. DPH Commissioner called for interagency report on status of occupational disease in Connecticut. Working group comprised of DPH, DOL, WCC staff and physicians and industrial hygienists from UCONN and Yale Occupational Medicine Programs.
- 1990. Baseline report, *Occupational Disease in Connecticut*, published jointly by DPH and DOL. Report emphasized “sentinel event” model of disease recognition, investigation, and prevention.
- 1990. Connecticut Legislature passed Occupational Health Clinics Bill (CGS 31-396 - 31-402). Legislation: (1) provided funding to the three state agencies for occupational disease surveillance; (2) provided funding to occupational medicine clinics for occupational disease investigation and training of other physicians in the state; (3) provided funding to auxiliary clinics to assist in occupational disease reporting; (4) granted authority to DPH, DOL and local health departments to investigate occupational diseases and conduct industry-wide interventions; (5) established an Occupational Health Clinics Advisory Board. Allowed development of a coordinated system of response in Connecticut. (A list and map of occupational medicine clinics and auxiliary clinics that are currently funded are in the appendix.)

Occupational Disease Surveillance System

- 1991. Occupational Disease Surveillance System (ODSS) established: Coding of reports of occupational diseases conducted by DOL; maintenance of ODSS, analysis and follow-up of diseases by DPH, with DPH confidentiality provisions.
- 1991. Occupational Health Surveillance Working Group (OHSWG) established to aid in development and implementation of ODSS. Quarterly meetings hosted by DOL and chaired by DPH. OHSWG consists of representatives from DPH, DOL, WCC, UCONN Labor Education Center, as well as members from each of the funded occupational medicine primary clinics and the auxiliary clinics.
- 1991 - present. WCC prepares annual reports to analyze data from all available sources on impact of occupational disease in Connecticut.
- 1989- present. DPH, DOL, and WCC, in conjunction with UCONN Division of Occupational and Environmental Medicine, host annual Northeast Regional Occupational Surveillance Conference to allow for sharing of resources among states.

- 1993. An Ergonomics Technology Center (ErgoCenter) was established at the UCONN School of Medicine to serve as a state of the art resource for training, consultation, and applied research in evaluating and developing prevention strategies for cumulative trauma disorders.

¹ Storey E, ed. *Occupational Disease in Connecticut*. Connecticut Departments of Health Services and Labor, February, 1990.

² Connecticut General Statutes, 31-396 - 31-402.

³ Office of Policy, Planning, and Evaluation. *Looking Toward 2000: An Assessment of Health Status and Health Services*. State of Connecticut Department of Public Health, 1999.

⁴ Centers for Disease Control and Prevention. *Improvements in Workplace Safety -- United States, 1900-1999*. Morbidity and Mortality Weekly Report, 48:22, June 11, 1999.

⁵ Cowan DB. *Worker's health in Connecticut: an historical analysis of the Uretek outbreak*. Thesis. Yale University, 1988.

⁶ National Institute for Occupational Safety and Health. *National Occupational Research Agenda Update: 21 Priorities for the 21st Century*. U.S. Department of Health and Human Services, May, 1999.

⁷ Morse T and Storey E. *Fatalities from Occupational Disease in Connecticut*. Connecticut Medicine, August, 1999.

Chapter II NATIONAL CONTEXT FOR OCCUPATIONAL HEALTH

Healthy People 2000/2010 Objectives

Connecticut DPH has been guided in its priority setting over the past decade by the *Healthy People 2000 Objectives*¹ as described in *Healthy Connecticut 2000: Baseline Assessment Report*. In the occupational health area, DPH explicitly adopted objectives: (1) to reduce occupational disorders or diseases, particularly skin diseases; and (2) to eliminate lead exposures which result in workers having excessive blood lead concentrations ($\geq 25 \mu\text{g/dL}$).²

The National Institute for Occupational Safety and Health (NIOSH), under the Centers for Disease Control and Prevention (CDC), has reviewed the national progress toward these objectives.³ NIOSH notes that the toll of workplace injuries and diseases continues to harm this country. Compilations based on a variety of data sources indicate that an estimated 50,000 to 70,000 workers die each year from work-related diseases, in addition to approximately 6,000 workers who die from workplace traumatic injuries. The National Safety Council estimated in 1996 that on-the-job injuries alone cost society \$121 billion, including lost wages, lost productivity, administrative expenses, health care, and other costs. The work force of the nation is changing and becoming increasingly diverse. Workers are experiencing new ways of organizing work and new technologies, which could result in new or different exposures to harmful conditions.

Progress has been made nationally toward meeting Healthy People 2000 objectives for work-related injury deaths and non-fatal injuries, particularly for construction and mining. However, there have been increases over baseline rates in occurrence of some conditions pertaining to occupational diseases. These include skin diseases, hearing loss, and blood lead concentrations. Cumulative trauma disorders have not been tracked effectively.

For the Healthy People 2010 objectives, NIOSH has proposed a reduction goal on the order of 30% for most objectives. These include such areas as reducing injuries (30%); reducing workplace deaths by homicide (30%) and pneumoconioses (36%); reducing assaults (30%), skin diseases (46%), repetitive trauma (50%), and hepatitis B (75%); and reducing hearing loss and latex allergy by yet unspecified amounts. Connecticut prevention and intervention efforts toward the reduction of workplace diseases, injuries, and deaths will be enhanced by incorporating strategies to achieve the *Healthy People 2010* objectives, as described in the national programs below.

National Context: Minimum and Comprehensive State-Based Activities in Occupational Safety and Health

During the decade of the nineties, occupational disease surveillance became increasingly recognized as an important public health priority. The magnitude of risk for occupational diseases and injuries is high, being measured in cases per hundred, rather than cases per 10,000, which is the unit of measurement for many other conditions. Yet, the degree of funding nationally is only a few percent of that devoted to other conditions.

To address this deficiency, in 1995, the Council of State and Territorial Epidemiologists (CSTE) adopted *guidelines stating minimum and comprehensive state-based activities in occupational safety and health*. CSTE cited the 1990 Connecticut baseline report, among others, as a model. These guidelines were subsequently published by NIOSH.⁴ The minimum activity sections of the guidelines were written with the intent that they could be performed at a minimal cost using existing staff and databases. The more comprehensive guidelines were written to suggest areas for expansion as resources become available. As Connecticut state agencies and others seek to address the problems which remain for workers who continue to be affected by occupational diseases and risks of exposure to unsafe conditions, the CSTE/NIOSH Guidelines can help serve as a yardstick and as a planning tool in developing policies.

With the implementation of the Occupational Health Clinics Bill, the minimum guidelines have already been implemented in Connecticut. Many of the comprehensive guidelines have been implemented to some degree as well, as will be described below. The guidelines address four separate areas: (1) surveillance of occupational disease and injury data; (2) policy development; (3) intervention; and (4) infrastructure and resources.

Surveillance

The foundation for public health activity in prevention of occupational injuries and diseases depends upon a comprehensive and integrated approach to the collection and analysis of data. The CSTE/NIOSH guidelines recommend approaches for state agencies, with interagency collaboration as appropriate:

- **Minimum:**

Assure that existing data systems include core variables recommended by the Centers for Disease Control and Prevention (CDC) so that data may be used: (1) to target interventions and public health programs; (2) to share aggregate data with NIOSH and other states; and (3) to compile and distribute annual reports on magnitude of occupational injuries and diseases identified in existing data sources.

- Comprehensive: In addition to above:

(1) Mandate lab reporting of heavy metals and implement physician reporting of occupational injuries and diseases; (2) collect/code occupation and industry in all data sources; (3) maintain computerized registries of all individuals with occupational illness or injury; (4) conduct periodic hypothesis generating analyses of relevant data sets; and (5) compile and distribute annual report on magnitude and distribution of occupational injuries, diseases and hazards.

- Progress in Connecticut:

The Occupational Disease Surveillance System (ODSS), based on required physician reports of occupational diseases, is maintained by DPH. DPH also maintains the Connecticut Tumor Registry and Vital Statistics, which have been used for occupational disease cluster and mortality studies. The ODSS captures variables relating to industry, occupation, workers and their disease(s). In Connecticut, physicians and clinical laboratories are required to report blood lead results, toxic levels of carbon monoxide, and mercury in blood or urine. Reporting is mandated by the DPH Commissioner through the Annual List of Reportable Diseases (CGS 19a-215; Connecticut Public Health Code Sec. 19a-36-A2 through 19a-36-A5, inclusive). Additionally, physicians are required to report all conditions that they believe may be due to occupational exposure (CGS 31-40a).

The ODSS serves as a computerized database repository for all individuals who have been *reported by physicians* as having an occupational disease. To the extent that there is under-recognition and under-reporting of occupational disease, the ODSS is not a comprehensive system. Additionally, no single entity maintains a database of *all* individuals with an occupational *injury*. Only Occupational Health Clinics funded through the DOL are required to report occupational injuries. For reasons discussed later in this report, there are also limitations of Workers' Compensation data which are *reported by employers* (rather than physicians). WCC data are collected separately from DPH's ODSS data.

The Occupational Health Program (OHP) uses reports from the ODSS to conduct follow-up with cases, to identify clusters of occupational disease, and to initiate investigation and intervention activities, as described in Chapter VIII. Although resources in DPH to conduct interventions are limited, recommendations are made to employers to encourage them to utilize Connecticut OSHA's (CONN-OSHA) Consultation Program, which offers advice to small businesses about how to correct health and safety hazards in the workplace.

Data are shared with physicians via a number of publications, including the thrice yearly newsletter, *Occupational Airways*, and special issues of *The Connecticut Epidemiologist*,

which are mailed to 5,000 physicians. Additional communication is maintained with those physicians who report occupational diseases to DPH.

DPH shares data with WCC and DOL as part of the integrated system of occupational disease surveillance in Connecticut. Data from the Workers' Compensation System and the Department of Labor are reviewed annually by WCC in conjunction with DPH data, and a report is published in accordance with the provisions of the Occupational Health Clinics Bill.

DPH also shares data and information on occupational disease and intervention initiatives with the Northeast regional states, as part of an annual surveillance conference.⁵ NIOSH uses Connecticut Vital Records data to report on the extent of respiratory disease mortality in Connecticut⁶, and aggregate numbers of elevated blood lead level reports are shared with NIOSH⁷. A system has not been established for sharing data about other occupational diseases with NIOSH, since a national occupational disease surveillance system does not yet exist.

Policy Development

The CSTE/NIOSH guidelines note that public health policies in occupational health are often intertwined with complex legal and regulatory issues, so institutionalized communication with constituencies is essential. The guidelines recommend:

- Minimum:

Establish working relationships with state and federal agencies conducting occupational health activities and establish an advisory group meeting semi-annually with DPH officials.

- Comprehensive: In addition to above:

Conduct a statewide needs assessment and compile and disseminate a planning document in conjunction with state and federal health priorities. Disseminate prevention-oriented materials as part of education program.

- Progress in Connecticut:

Connecticut's 1990 baseline report, *Occupational Disease in Connecticut*, served as a planning document for the integrated occupational health activities reported here. Formal working relationships have been established among DPH, DOL, and WCC, through the mechanism of the Occupational Health Clinics Bill. DPH has two Memoranda of Understanding with Federal OSHA in Connecticut.

An Occupational Health Surveillance Working Group (OHSWG), meeting quarterly, serves as an advisory group to the three agencies for practical implementation matters pertaining to occupational disease surveillance. In addition, an Occupational Health Clinics Advisory Board, which meets annually and provides advice on clinic funding, was established by the Legislature as part of the Occupational Health Clinics Bill.

The Connecticut DPH State Health Assessment Plan, 1999, cites reduction of factors associated with unintentional injuries, specifically including occupational injury, as a main health status priority.⁸

Collaborative working relationships with the academic occupational medicine programs include: (1) the Training Institute for Occupational Health and Safety at UCONN DOEM, which also involves the Labor Education Center at UCONN in Storrs; (2) the field placement of UCONN and Yale occupational medicine fellows or Master of Public Health students in DPH EEOH; and (3) the professional training provided by UCONN DOEM to practicing physicians.

Prevention-oriented materials on priority occupational diseases are developed by DPH and disseminated as part of an information and education program. DPH publishes *Occupational Airways* thrice yearly for health professionals. The Worker Education Unit of WCC provides information packets to injured workers. CONN-OSHA has educational pamphlets and fact sheets designed to teach employees about workplace health and safety, and also publishes *CONN-OSHA Quarterly*.

Intervention

The CSTE/NIOSH guidelines describe approaches to assure that needs and problems in occupational health are identified and addressed, with an awareness of procedures to access federal consultation assistance when necessary.

- Minimum:

Distribute annual Occupational Health Surveillance report. Have expertise to respond to inquiries from employees, employers, health professionals and others about the nature, causes, and control of occupational hazards

- Comprehensive: In addition to above:

(1) Develop and implement necessary regulations and statutes. (2) Compile a comprehensive library, with access to computerized medical and toxicological data bases. (3) Conduct follow-back to worksites to assess exposure and hazardous conditions. (4) Screen co-workers of reported cases, where appropriate. (5) Develop educational strategies for high-risk industries. (6) Develop programmatic linkages with academic medical centers.

- Progress in Connecticut.

The legislation which was enacted in Connecticut to provide for reporting of occupational diseases also enabled investigation of serious occupational diseases and the conduct of industry-wide investigations by DPH, DOL, and local departments of health; funding for a network of occupational medicine and auxiliary clinics to enable recognition, investigation, and reporting of occupational diseases; and extension of federal Occupational Safety and Health Act (OSHAct) regulations to public employees.

The DPH Occupational Health Program fields inquiries from the public concerning occupational health hazards. The CONN-OSHA Consultation Program is available to employers that request assistance. The Workers Compensation Worker Education Unit provides assistance to injured workers. The Yale and UCONN Occupational Medicine Programs provide assistance to physicians in assessing workplace diseases under the Occupational Health Clinics Program. In State Fiscal Year (SFY) 1999, the DOL funded five occupational health clinics and seven auxiliary clinics. In SFY 2000, the number of auxiliary clinics increased to thirteen. The occupational health clinics provide comprehensive care to workers, which includes return to work strategies, industrial hygiene evaluations, and consultative services for physicians in Connecticut.

The WCC produces and distributes the Annual Report of Occupational Diseases. DPH prepares annual summaries of occupational diseases, which are published in the *Connecticut Epidemiologist*, *Occupational Airways*, and other sources.

A comprehensive medical library of up-to-date technical resources is available to the public at the UCONN Health Center. Yale also has an extensive medical library. The public is increasingly being served by medical and toxicological databases available on the internet, as well as websites for the several state agencies, which are in varying stages of development.

Follow-back to worksites is handled primarily by the occupational medicine clinics on behalf of individual patients. The resources of the occupational clinics program are utilized to enable industrial hygiene evaluations of problematic cases. When clusters of occupational disease are recognized and reported to DPH, DPH may initiate an investigation, although resources are limited to do so. Employers are encouraged to utilize CONN-OSHA's Consultation Program for advice about correcting health and safety hazards in the workplace.

Some significant educational strategies for high-risk industries identified from the ODSS have been developed. These include strategies for lead in the bridge construction and lead abatement sectors, as well as metalworking fluids in the manufacturing sector, and latex allergy in the health care and other sectors. As each of these involves a multiagency effort, additional resources would be helpful in expanding such activities.

Programmatic linkages with Yale and UCONN Schools of Medicine are a vital part of the occupational health clinics network in Connecticut. Both Yale and UCONN Divisions of Occupational and Environmental Medicine have been involved at the request of DPH in evaluating workplace exposures during cluster investigations. Both Yale and UCONN have placed occupational medicine fellows at DPH for rotations of two to three months. Both institutions have provided expertise to DPH in developing protocols for priority diseases. Sharing of special activities takes place at the quarterly meetings of the Occupational Health Surveillance Working Group.

The establishment of the Ergonomics Technology Center (ErgoCenter) of Connecticut at the UCONN School of Medicine represents a unique resource in Connecticut which is able to service both public and private sectors. This academic program possesses state of the art diagnostic tools for clinical evaluation and workload stress analysis, as well as resources to develop both engineering and psychosocial approaches to ergonomic interventions. It provides training and consultation, as well as conducting applied research.

Infrastructure and Resources:

The CSTE/NIOSH guidelines recommend that state-based occupational health programs should be established, with at least a foundation of epidemiological and statistical expertise. The guidelines additionally list a number of other disciplines which would be needed as the program expands in scope.

- Minimum resources:

An occupational health epidemiologist with clerical support; software and hardware for computer analysis of existing data, with statistical consultation support; and sufficient discretionary funds to access databases, print and mail reports, and attend annual meeting with other state occupational epidemiologists.

- Comprehensive: In addition to above:

(1) One or more professionals in disciplines of industrial hygiene, health education, engineering safety, occupational medicine, occupational health nursing, and toxicology; (2) data entry and data management support to process data from existing sources and disease and injury data generated by reporting regulations; and (3) necessary support staff and discretionary funds for staff to conduct field investigations and participate in professional activities.

- Progress in Connecticut:

An Occupational Health Program has been established in DPH with four occupational disease epidemiologists and a half-time clerical support person. Two of these epidemiologists are state-funded, one with industrial hygiene expertise; additionally, one-half FTE epidemiologist (who

has a background in health education) and the half-time clerical person are supported by the Occupational Health Clinics Program. Federal grants support the remainder. DPH maintains important linkages with CONN-OSHA and WCC staff, as well as with the occupational medicine and auxiliary clinics.

National Initiatives in Occupational Health Surveillance

Currently a national surveillance system for occupational diseases, injuries, or hazards does not exist. National surveillance for particular disease conditions, primarily infectious diseases, is conducted through the CDC, with input from the various state disease surveillance systems. Although NIOSH is part of CDC, its primary charge is not surveillance but *research*: to identify the causes of work-related diseases and injuries, evaluate the hazards of new technologies and work practices, create ways to control hazards so that workers are protected, and make recommendations for occupational safety and health standards. Because of the recognition of the need to better understand the burden of work-related disease, injury, and death, NIOSH has undertaken three major initiatives to move toward the development of a national occupational health surveillance system.

Sentinel Event Notification System for Occupational Risk (SENSOR)

The first of these initiatives, the Sentinel Event Notification System for Occupational Risk (SENSOR), inaugurated in 1987, provided funding to selected states to develop, pilot test, and implement several approaches to obtaining data for select occupational disease or injury conditions. These have included such conditions as occupational asthma, silicosis, burns, and pesticide poisonings, as described in the Connecticut 1990 baseline report. NIOSH has just begun its third five-year round of funding for SENSOR activities.

National Occupational Research Agenda (NORA)

The second initiative, which NIOSH undertook in preparation for the new millennium, was to develop a National Occupational Research Agenda (NORA) to provide a framework to guide occupational safety and health research in the next decade, not only for NIOSH, but for the entire occupational safety and health community. Approximately 500 organizations and individuals outside NIOSH provided input into the development of the Agenda. There are 21 research priorities which NIOSH highlighted, grouped into three categories: Disease and injury, Work environment and work force, and Research tools and approaches (including surveillance).

The priority disease and injury research areas selected were: dermatitis, asthma and chronic obstructive pulmonary disease, fertility and pregnancy abnormalities, hearing loss, infectious diseases, low back disorders, musculoskeletal disorders of the upper extremities (i.e., cumulative trauma disorders), and traumatic injuries.⁹ Of these priority research areas, the Connecticut ODSS includes data on dermatitis, asthma, hearing loss, infectious diseases, and

CTDs. For a more comprehensive picture of these conditions, there is need for an increase in the number of physicians reporting to the ODSS, as well as use of additional data sources.

State-Based Surveillance of Work-related Diseases, Injuries, and Hazards

NIOSH included development of a surveillance system for major occupational diseases, injuries, and hazards as one of the agency's four goals in its strategic plan for 1997 - 2002 prepared in response to the Government Performance and Results Act (GPRA).¹⁰ This plan included a specific 1999 objective - to undertake a comprehensive surveillance planning process with NIOSH partners at the state and federal levels to establish surveillance priorities and define roles for various agencies.¹¹ Members of the NIOSH-States Surveillance Planning Group included participants in the Northeast Regional Occupational Health Surveillance Work Group hosted by Connecticut. These brought knowledge of the perspectives of Connecticut and the other Northeast states from the past decade of sharing at these seminars.

The NIOSH-States group noted that since state health agencies are vested with the legal authority to require disease reporting and collect other health data, they can play a central role in public health surveillance. Interagency collaboration is critical, since jurisdiction for data collection and surveillance typically overlap between state agencies. The NIOSH-States group noted that state public health agencies are in a unique position to:

- Provide critically needed data on occupational diseases;
- Generate information necessary to evaluate the conventional occupational injury data sources;
- Actively link surveillance findings with intervention efforts at the state and local levels; and
- Integrate occupational health into mainstream public health practice.

Through the coordinated system which has been put in place in Connecticut during the past decade, Connecticut is well poised to contribute to the development and implementation of a national occupational health surveillance system.

¹ National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives. Occupational Safety and Health.* U.S. Department of Health and Human Services, September, 1990.

² Connecticut Department of Public Health and Addiction Services. *Healthy Connecticut 2000: Baseline Assessment Report.* Undated.

³ U.S. Department of Health and Human Services. *Healthy People 2010 Objectives: Department of Public Comment.* U.S. Department of Health and Human Services, September 15, 1998.

⁴ Stanbury M, Rosenman KD, and Anderson HA. *Guidelines: Minimum and Comprehensive State-Based Activities in Occupational Safety and Health.* U.S. Department of Health and Human Services, June, 1995.

⁵ Storey E. Executive Summary. *State-Based Surveillance for Occupational Disease, Northeastern U.S. Regional Conference.* Series, 1991 - 1998.

⁶ Kim JH. *Atlas of Respiratory Disease Mortality, United States: 1982-1993*. U.S. Department of Health and Human Services, August, 1998.

⁷ Connecticut Department of Public Health Occupational Health Program. Adult Blood Lead Epidemiology and Surveillance (ABLES) quarterly reports to NIOSH. 1992 - 1998.

⁸ Office of Policy, Planning, and Evaluation. *Looking Toward 2000: An Assessment of Health Status and Health Services*. State of Connecticut Department of Public Health, 1999.

⁹ National Institute for Occupational Safety and Health. *National Occupational Research Agenda*. U.S. Department of Health and Human Services, April, 1996.

¹⁰ NIOSH Strategic Plan, 1997 - 2002, DHHS (NIOSH) Publication No. 98-137.

¹¹ NIOSH-States Surveillance Planning Work Group. *State-Based Surveillance of Work-Related Diseases, Injuries, and Hazards*. Report submitted to NIOSH Surveillance Coordinating Group, March, 1999.

Chapter III COMPARISON OF DATA SOURCES

This report focuses on occupational disease data, with note of occupational injury and fatality data, in Connecticut through 1998. The main sources of occupational disease data which are utilized in this report are the U.S. Bureau of Labor Statistics/Connecticut Department of Labor (CONN-OSHA) survey data (referred to here as the “BLS Survey”), Workers’ Compensation Commission (WCC) data, and the Occupational Disease Surveillance System (ODSS) data. There are strengths and limitations of each system, and no one source is complete and representative in itself.

The report is divided into primary sections based on the source of the data. It begins with a description of the work force, including information about what types of industries workers are employed in; demographics about workers’ gender, race and ethnicity in the various industry sectors; and lost time from work due to occupational injuries and diseases. These data come from information supplied by *employers* to the Department of Labor’s BLS survey. Data derived from reports of occupational injuries and diseases made by *physicians* to the Occupational Disease Surveillance System (ODSS) are also presented and analyzed in this report (See *Physician’s Report of Occupational Disease* form in Appendix). Finally, data supplied by *employers* via the Workers’ Compensation Commission are compared with physician reports captured in the ODSS, to demonstrate under-reporting. The comparison also allows for extrapolations to estimate a truer extent of occupational disease. This extrapolation has been performed for cumulative trauma disorders of the upper extremities.¹

Overview of BLS Survey and Workers’ Compensation Commission Data

CONN-OSHA, in cooperation with the U.S. Bureau of Labor Statistics, conducts an annual survey of *employers* for job-related injuries and diseases. The injury and disease data come from records (OSHA 200 logs) that employers are required by OSHA to keep. CONN-OSHA issues an annual report that focuses on the injuries, acknowledging that the survey under-counts occupational diseases, particularly chronic diseases. Since the BLS survey is part of a national system, it provides comparability with national statistics. These data are *aggregate* reports, hence not useful for individual case follow-up, but they provide information on occurrence of disease and injury in particular industry sectors.

The Connecticut Workers’ Compensation Commission (WCC) uses *Employer’s First Reports of Injuries* to evaluate lost-work-time or modified duty cases. This is what the WCC uses to generate their statistics. *Physician’s First Reports of Injuries* are **not** routinely filed with WCC. These are sent to the insurance carrier. The reports made by physicians are only sent to the WCC if there is a hearing pertaining to a claim for Workers’ Compensation benefits. Limitations of the WCC data are that *cases are reported by employers*, and therefore may not include cases that: (1) workers did not report to their employer; (2) were undiagnosed and therefore not counted; or (3) did not result in lost work time. Previous experience examining these data sources has demonstrated little overlap with data reported by physicians in the ODSS.² The WCC data have been extensively analyzed in Connecticut

through the series of reports called for under the Occupational Health Clinics Bill, and thus only highlights will be presented here.^{3,4,5,6,7}

Overview of Occupational Disease Surveillance System (ODSS)

With the passage of the 1990 Occupational Health Clinics Bill, the Department of Public Health (DPH) established the Occupational Disease Surveillance System (ODSS) in the fall of 1991 and completed its first full year of surveillance in 1992. The purpose of the surveillance system is:

- to monitor work-related diseases in Connecticut's work force;
- to identify clusters of disease;
- to monitor trends over time;
- to target public health education efforts;
- to identify the need for workplace interventions;
- to conduct workplace and industry-wide interventions; and
- to provide feedback to reporters and those who need the information.

Surveillance data are gathered through information recorded on the **confidential** *Physician's Report of Occupational Disease* form (see appendix). Title 3, Sec. 31-40a of the Connecticut General Statutes, codified in 1949, requires physicians to report *any known or suspected cases* of occupational disease. In addition, the DPH Commissioner issues an annual list of reportable diseases. Reports of selected occupational diseases and laboratory analyses which require immediate public health follow-up are sent directly to DPH. This is in accordance with the Public Health Code of the State of Connecticut, sec. 19a-36-A2 through A5, inclusive, and the Connecticut General Statutes, sec. 19a-215.

The ODSS is managed by the Environmental Epidemiology and Occupational Health Division (EEOH) of the DPH in collaboration with the Connecticut Department of Labor (DOL) and the Connecticut Workers' Compensation Commission (WCC). The ODSS is the only system that utilizes *physician reporting* as a mechanism to collect occupational *disease* data in Connecticut. By statute, the occupational disease reports, which currently number approximately 2000 per year, are to be sent to DOL, which codes the reports for part of body, occupation and industry, and assigns identification numbers to the reports. The DOL also maintains an *injury* database based on physician reporting from clinics funded under the Occupational Health Clinics Bill which are required to report occupational injuries as well as occupational diseases.

At DPH, the reports are entered into the surveillance system where the data are analyzed for follow-up investigations and intervention activities. DPH prepares annual summaries, which are published in the *Connecticut Epidemiologist*, *Occupational Airways*, and other publications. WCC each year analyzes the ODSS data to compare the ODSS *physician-reported* data to the WCC *employer-reported* first report of injury data, and to produce an annual report.

A major source of occupational disease reporting in Connecticut is the network of occupational health clinics and auxiliary clinics which are funded under the occupational health clinics bill. Each year the Department of Labor distributes funding to these clinics through their "grant-in-aid" program to support occupational health services and surveillance. For FY 2000, 5 occupational health clinics (6 sites) and 13 auxiliary occupational health clinics (14 sites) sought and obtained funding. The clinics are located in industrial areas around the state (see map in appendix). Currently, the clinics supported under the Occupational Health Clinics Bill grant-in-aid program provide approximately 80% of the physician reports in the ODSS.

An occupational health clinic differs from an auxiliary clinic in that it provides more comprehensive services. These include activities involved in occupational disease evaluation, treatment and prevention, particularly when these activities are not compensated by other sources. Other criteria to qualify as an occupational health clinic include having a board certified or board eligible occupational medicine physician as director, having industrial hygiene services available to visit patient workplaces, providing assistance and medical consultative services to Connecticut OSHA, working with DPH and DOL to reduce the burden of occupational disease in the state, and willingness to provide training to occupational health professionals. Funding is provided to the auxiliary clinics primarily to assist them with occupational disease reporting and surveillance.

Physician reports of occupational disease provide a valuable source of data that assist DPH, physicians, and other interested parties in understanding the nature and scope of occupational disease in Connecticut and in identifying problems in industries. By identifying problems in workplaces through physician reports, the DPH can work with companies to improve the health and safety conditions in the workplace. ODSS data also drive prevention efforts, occupational disease investigations and interventions, and the development of educational materials.

Occupational Disease Data Sources Compared

As seen in Table III-1, all three data sources provide somewhat different information. For example, the Connecticut OSHA/BLS Survey provides time trend data, but is based on a survey of employers, rather than all reports. The Workers' Compensation data include all lost-time cases which have filed for workers' compensation for all employers, but do not have physician diagnoses. The ODSS physician reporting system has more precise diagnosis than the WCC employer first reports, but a number of physicians do not report into the system. Prior studies of cumulative trauma reports in Connecticut have found that there is only a small overlap between the Workers' Compensation reports and the physician reports. In order to gain a more comprehensive picture regarding incidence and prevalence of occupational disease in Connecticut, it is important to utilize each of these three data sources.

Table III-1

Differences in Occupational Disease Data Collection in Connecticut, by Source			
	BLS Survey - OSHA 200 Logs	Workers Compensation	ODSS Physician Reports
Who reports	<i>Employers</i>	<i>Employers</i>	<i>Physicians, Labs</i>
Source of Reports	<i>OSHA 200 Logs</i>	<i>First Report of Injury Forms</i>	Reports to DOL; DPH Commissioner
Physician diagnosed only	No	No	Yes
Federal Workers included	No	No	Yes
Self-employed included	No	No	Yes
Non-lost time cases	Yes	Mainly no	Yes
Personal identifier data	No	Yes	Yes
Total cases included	No (sample only)	Yes	Yes
Time delay of reports	Up to two years	1 - 3 years	48 hours - 2 months
Trend data	Yes	Yes	Yes
Comparable national data	Yes	Yes	No
Injury data	Yes	Yes	No
Includes chronic diseases with long lag time for symptoms	No	Poor	Better
Calculation of rates	Yes	Yes	Yes*
Physician participation with reporting	Not required	Needed for disputed claims	Required by statute
Extent of physician reporting	Not applicable	All	Mainly physicians in DOL funded occ. med. clinics
Data used for follow-up, intervention, education	Used for industry-wide targeting and enforcement	Used for education only	Used for follow-up, education, intervention

*Data from the ODSS may be used for calculation of rates. Since there is still under-reporting by physicians, rates have not been calculated to date.

¹ Morse T, Dillon C, and Warren N. *Under-reporting of Work-related Musculoskeletal Injuries (WRMSD) in Connecticut: A Comparison of Population and Surveillance Estimates*. Submitted for publication, 1999.

²Ibid.

³ Morse T. *Wheezing from Work: Occupational Asthma in Connecticut*. Connecticut Workers' Compensation Commission, February, 1994.

⁴ Morse T. *Occupational Disease in Connecticut, 1994*. Connecticut Workers' Compensation Commission, September, 1994.

⁵ Morse T. *Ergonomics and Repetitive Strain Injuries of the Arms and Hands at Work: A Connecticut Report*. Connecticut Workers' Compensation Commission, September, 1996.

⁶ Morse T. *Occupational Disease in Connecticut, 1995*. Connecticut Workers' Compensation Commission, (undated), 1998.

⁷ Morse T. *Occupational Disease in Connecticut, 1999*. Connecticut Workers' Compensation Commission, 1999.

Chapter IV
A DESCRIPTION OF CONNECTICUT'S WORK FORCE
Using Employer Generated Reports To Describe The Distribution Of Disease And Injury

The Bureau of Labor Statistics Survey (BLS) for 1997 reported that Connecticut's work force consisted of an annual average employment of 1.57 million women and men. This figure does not include self-employed persons, farms with fewer than 11 employees, and federal employees. Eighty-nine percent of workers who reside in Connecticut work in the private sector, which consists of agriculture, construction, manufacturing, transportation and public utilities, wholesale trade, retail trade, finance, insurance and real estate, and the service sector. State and local governments employ the balance of workers (11%) in Connecticut.¹ According to the Connecticut Department of Labor (DOL), Office of Statistics, there are approximately 94,000 employers in Connecticut. Some employers have multiple sites, resulting in approximately 100,000 employment establishments.²

The Connecticut DOL, in cooperation with the BLS, collects and annually publishes data on employment and workplace diseases and injuries. These data are derived from reports that OSHA requires employers to file. BLS calculates incident rates for occupational diseases and injuries per 100 full time workers according to the following formula:

Incidence of Occupational Illness [or Injury] = (N/EH) x 200,000
N = number of illnesses and injuries
EH = total hours worked by all employees during the calendar year
200,000 = base of 100 equivalent full time workers (working 40 hours per week, 50 weeks per year).

Data from the BLS are survey-based, and are a representative sample. The most recent BLS survey describes 1997 employment data. The 1997 survey consisted of responses from approximately 3,700 establishments (private sector, state and local government).³

Where People Work: Employment by Sector

The service sector is Connecticut's largest employer (31%). In 1997, 24% of reported disease and injuries came from this sector. While the manufacturing sector employed 18% of Connecticut's work force, 25% of reported diseases and injuries came from manufacturing. The 1997 data show that the retail sector and government, both local and state, represent 17% and 11% of the work force, respectively. The retail sector represents 14% of reported diseases and injuries, while 18% of injuries and diseases come from the government sector. Further details may be seen in Table IV-1.

Table IV-1

Employment and Cases by Employment Sector, Connecticut, 1997 Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Data, Connecticut Department of Labor			
Employment Sector	1997 Annual Average Employment* (thousands)	Percent Employed	Percent of Disease and Injury Cases
All Industries including State and Local Government**	1,570.5	100%	100%
State and Local Government	176.9	11%	18%
Private Industry**	1,393.6	89%	82%
Agriculture, Forestry and Fishing**	15.6	1%	1%
Construction	56.4	4%	5%
Finance, Insurance, Real Estate	130.0	8%	2%
Manufacturing	275.5	18%	25%
Retail	270.0	17%	14%
Service	487.4	31%	24%
Transportation and Public Utilities	73.1	5%	6%
Wholesale	83.3	5%	5%
Other	2.3	<1%	<1%

*Employment in private households is excluded

**Excludes farms with fewer than 11 employees

Where People Work: Size Class of Establishments and Effects on Employer Reports

As seen in Table IV-2, the majority of Connecticut work establishments are small. Establishments employing fewer than 20 people comprise 88% of businesses, with 95 % employing fewer than 50 people. However, these smaller establishments together employ a relatively smaller percentage of the work force: 26% work in businesses employing fewer than 20 persons, and 42% in businesses with fewer than 50 persons. This profile is similar to figures for the United States.

Researchers have recognized that there is a greater likelihood of under-reporting of occupational diseases and injuries among smaller companies. It is difficult to discern the extent of this under-reporting. Acute injuries are typically easier to recognize, and are therefore more likely to be reported. Chronic conditions are more difficult to ascertain. Even if the worker receives a diagnosis from his/her doctor, it may be hard to determine work-relatedness. NIOSH reports that BLS survey data have consistently shown lower disease rates for smaller establishments with fewer than 50 employees. This seems to be especially true for chronic occupational diseases. Therefore, estimates of prevalence of occupational disease in the private sector should be viewed with some degree of suspicion.⁴

Table IV-2

Connecticut and United States Employment by Size of Establishments, 1997 Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Data, Connecticut Department of Labor				
Number of Employees	Percent of Establishments		Percent of Total Employment	
	Connecticut	United States	Connecticut	United States
<5	60.2	57.9	7.3	6.6
5-9	17.4	18.0	8.3	8.3
10-19	10.8	11.4	10.5	10.8
20-49	7.1	7.9	15.5	16.7
50-99	2.4	2.7	11.9	12.9
100-249	1.6	1.6	17.3	16.4
250-499	0.4	0.4	9.1	9.5
500-999	0.1	0.15	7.1	7.2
1000 and Over	0.1	0.08	13.0	11.7

Who Works: Worker Demographics

The Connecticut work force is almost evenly divided between genders (51% male, 49% female in 1997). Occupational demographic data pertaining to race are sometimes incomplete on employer reports. However, DOL has figures for Black and White workers, and persons of Hispanic origin. The sources of these data, the Current Population Survey and the Local Area Unemployment Statistics, represent slightly different totals and percentages from the BLS survey, because of different survey techniques. The 1997 data show that of a Connecticut work force of 1,635,000, 87% of workers were White and 11% were Black. Six percent of the work force was of Hispanic origin. Table IV-3 shows further breakdowns by employment sector.

Table IV-3

Percent Distribution Of Employed Persons By Sex, Race, Hispanic Origin, And Industry Connecticut Annual Averages, 1997 Current Population Survey and Local Area Unemployment Statistics, Connecticut Department of Labor^{5, 6}						
Totals, Connecticut, 1997		Men	Women	White	Black	Hispanic
Total Employed	1,635,000	835,000	800,000	1,426,000	185,000	101,000
Construction	4.2%	7.5%	0.7%	4.7%	0.4%	2.9%
Total Manufacturing	17.7%	23.1%	12.1%	18.5%	10.6%	26.6%
Transportation, Communication and Public Utilities	5.1%	6.6%	3.6%	4.6%	9.6%	3.5%
Trade	17.2%	17.3%	17.1%	16.8%	20.7%	18.2%
Finance, Insurance	8.1%	5.9%	10.4%	8.3%	6.3%	4.2%
Services	29.3%	20.2%	38.7%	28.4%	34.4%	28.8%
Government	10.7%	9.8%	11.8%	10.3%	14.4%	11.3%
Agriculture	1.2%	1.6%	.8%	1.2%	1.2%	1.0%
Unknown	6.5	7.9%	4.5%	—	—	—
Totals	100%	100%	100%	92.8%*	97.6%*	96.5%*

*Details for race and Hispanic origin groups will not add to 100% because data for “other races” group are not presented and Hispanics are included in both of the White and Black population groups.

Although the total number of workers in Connecticut has remained relatively stable since 1985, there has been a shift in the percentages of employment in various job sectors. Data available from 1980, 1985, and 1997 show these shifts (Table IV-4). When looking over time from 1980 through 1997, one can see the decline in employment in manufacturing (32 % in 1980 vs. 18% in 1997), while the employment in the service sector shows the reverse trend (20% in 1980 vs. 31% in 1997). Government employment has remained stable at 11% throughout this time period. There has also been little change in the percentage of retail employment (16-17%) during this time period.

Table IV-4

Connecticut Employment - Percent Distribution, A Comparison of Selected Sectors Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Data, Connecticut Department of Labor			
	1980	1985	1997
Government*	11%	11%	11%
Manufacturing	32%	27%	18%
Retail	16%	17%	17%
Service	20%	22%	31%
Total Employment	1,394,200	1,528,200	1,570,500

* State and Local Government

Who is Exposed: Estimated Occupational Exposure to Selected Substances

In the 1990 baseline report, asbestos, lead, silica, solvents, and noise were chosen as agents for which estimates of exposure would be calculated, based upon data from NIOSH's National Occupational Exposure Survey (NOES). They were initially chosen because they are among the most frequently occurring exposures, and they cause some of the most readily diagnosed occupational diseases. Table IV-5 shows the comparison of risk of exposure from these agents in the 1997 Connecticut workforce compared with the 1985 workforce. **Over 195,300 workers, or 13% of the 1997 workforce, are estimated to be exposed to at least one of these five agents.** Fifteen percent of the 1985 workforce (227,144 workers) were estimated to be occupationally exposed to at least one of these five agents. Some workers may be exposed to more than one of these agents. However, these estimates are very conservative, as data were not available from all of the industry sectors. Actual numbers are probably higher.

Table IV-5

Estimated Risk of Exposure to Specific Agents For Connecticut Employees ^{†*}		
Agent	1985 Estimated No. of Employees with Potential Exposure	1997 Estimated No. of Employees with Potential Exposure
Asbestos	17,542	19,919
Lead	21,870	19,012
Silica	8,793	7,053
Solvents	92,863	79,910
Noise	86,076	69,465
Total**	227,144	195,359

[†]Multiple exposures are difficult to measure, and are not reflected in this table

*Method described in: Storey, et al. *Occupational Disease in Connecticut*. Connecticut Departments of Health Services and Labor. February, 1990.

**Data were not available from some industries, therefore, total estimates are conservative. Actual numbers are likely to be higher.

The shift in Connecticut's economy from primarily manufacturing-based in 1985 to more service-oriented in 1997 is reflected in the types of exposures workers might receive on the job. This is illustrated by the apparent drop in exposures to solvents and noise, as fewer manufacturing companies exist in Connecticut today, where these exposures would be likely. A slight drop in lead exposure may be due, in part, to more stringent controls and personal protective equipment required by the OSHA Lead in Construction Standard (29 CFR 1926.62) enacted in 1993, and the Connecticut Road Industry Construction Project (CRISP), a project initially funded by NIOSH, designed to lower construction workers' exposure to lead by including a mandatory lead health protection plan in the contract specifications.

The slight increase in asbestos exposure may be due to the increasing demolition and renovation of old buildings and factories which contain asbestos, due to a building boom resulting from an economic upswing. There has been a more concerted effort by municipalities to demolish blighted buildings in Connecticut's inner cities in recent years. The federal government has not banned certain types of asbestos-containing materials from use in this country, such as floor tiles containing asbestos, many of which come from overseas. Finally, there have been declining activities in the ship building industry in Connecticut, which formerly exposed many workers to asbestos.

Who Gets Sick: Gender, Occupational Diseases and Injuries, and Lost Work Time According to Employer Survey Data

As mentioned previously, DOL reports a fairly even gender distribution among Connecticut's work force. Despite these statistics, the percentage of occupational injuries and diseases involving lost work time varies by gender among industry sectors. Some of the differences can be explained by employment patterns by gender among professions. For example, the 1997 BLS representative survey data show that 98% of the employees with lost work time due to occupational diseases and injuries in the construction trades were men. Males make up 92% of the workers in this sector, while 8% of the construction workers are females. Table IV-6 shows lost work time by gender and industry sector.

Table IV-6

Numbers Of Workers With Lost Work Time Due To Occupational Diseases And Injuries By Gender And Industry, 1997			
Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Data, Connecticut Department of Labor			
Industry Type	Men	Women	Total
Private Industry	16,447 (65%)	8,971 (35%)	25,418 (100%)
Agriculture, Forestry, Fishing	397 (73%)	150 (27%)	547 (100%)
Construction	1,939 (98%)	41 (2%)	1,980 (100%)
Manufacturing	4,594 (76%)	1,422 (24%)	6,071 (100%)
Transportation and Public Utilities	1,949 (78%)	546 (22%)	2,495 (100%)
Wholesale Trade	1,778 (82%)	383 (18%)	2,161 (100%)
Retail Trade	2,514 (62%)	1,548 (38%)	4,062 (100%)
Finance, Insurance, Real Estate	243 (34%)	473 (66%)	716 (100%)

Who Gets Sick: Distribution of Occupational Diseases by Category of Disease in the BLS Survey

According to the 1990 Connecticut baseline report, there were 4,600 occupational diseases recorded from the 1987 BLS employer survey. In 1997, the BLS survey recorded 5,419 cases of occupational disease, an 18% increase (Table IV-7). There has been an increase in the numbers of cumulative trauma disorders (CTDs) over that period.⁷ This increase may be due to increased awareness about CTDs, better reporting, and/or more workers with diseases. CTDs represent the largest category of occupational diseases in Connecticut.

Although there was an increase in occupational disease reports in the BLS survey from 1987 through 1997, a downward trend in numbers of employer recordable disease cases was observable from 1994-1997⁸. Over this period, by contrast, there was an increase in Connecticut Workers' Compensation System occupational disease claims: from 1,500 in 1995, to 1,621 in 1996, to 1,921 in 1997.⁹ The decrease in BLS survey reports could be due to decreasing workplace diseases, but could also reflect a growing list of disincentives for employers to report occupational diseases. Employers have been less inclined to complete OSHA logs (from which BLS obtains its data), for fear of being targeted for OSHA inspections or programs since the inception of OSHA in the early 1970s, but two recent OSHA initiatives may also be having an impact: (1) The OSHA Cooperative Compliance Program (CCP)¹⁰ would have targeted those employers, with occupational disease and injury rates over the median for their respective industrial grouping, for additional inspections, although court orders prevented the CCP from actually being implemented; and (2) OSHA replaced the CCP with the new Site Specific Targeting (SST) Plan¹¹. The SST initially covers about 2,200 worksites nationwide, including some in

Connecticut, with a lost workday injury and disease rate (LWDII) above 16.0 per 100 full time workers. The national average LWDII rate for private industry in 1997 was 3.3 per 100 full time workers.

Rising insurance costs and Workers' Compensation costs add to the reasons why employers may be less likely to report occupational diseases and injuries. As mentioned previously, NIOSH recognizes the problems with under-reporting, and has written about the economic disincentives to reporting faced by small businesses¹². In one example, NIOSH cites a study of work-related cumulative trauma disorders (CTDs) by Nelson, et al., 1992, showing a 60 % undercount, based upon disease reporting by private industry¹³. It is also important to remember that self-employed workers and farms with fewer than 11 employees are not included in the BLS survey, making the numbers an incomplete picture of Connecticut's true employment and occupational disease burden.

Table IV-7

Distribution of Occupational Disease by Disease Category, 1997 Bureau of Labor Statistics Survey of Occupational Injuries and Illnesses Data, Connecticut Department of Labor		
Occupational Disease	1997 BLS Survey*	% Distribution in 1997 BLS Survey*
All Diseases (Public and Private Sectors Combined)	5,419	100%
Cumulative Trauma Disorders	3,335	62%
Dust Diseases Of The Lung	21	1%
Respiratory Conditions Due To Toxic Agents	287	5%
Poisonings	70	1%
Disorders Due To Physical Agents	150	3%
Skin Diseases And Disorders	620	11%
All Other Diseases	936	17%

*BLS survey data come from *employer* reports

Who Dies: Traumatic Occupational Fatalities in Connecticut

The Department of Labor's Census of Fatal Occupational Injuries (CFOI) uses data from multiple sources to identify, verify, and profile fatal work injuries. The verification process includes examining data from the DPH's Vital Records. The distribution of occupational fatalities by category and the number of Connecticut deaths were fairly stable in Connecticut from 1992 through 1997 (averaging 32 deaths per year). However, there was a dramatic increase in 1998, when 55 people died as a result of traumatic occupational injuries in Connecticut. This is a 72% increase from 1997.^{14,15} This increase would be expected to happen by chance fewer than 1 in 1,000 times.¹⁶ Part of the increase was due to

a large rise in deaths in the construction industry. Another single incident affecting the statistics was the shooting at the Connecticut Lottery Headquarters building, where five workers were killed.

The largest category of events leading to 1998 deaths was that of *transportation incidents* (19 fatalities), which include highway incidents (collisions between vehicles as well as vehicles striking stationary objects) and workers struck by vehicles or other mobile equipment on roadways. The other major categories were *assaults and violent acts* (16 fatalities, including homicides, shootings, and suicides), *falls* (9 fatalities), *exposure to harmful substances or environments* (7 fatalities, consisting of electrocutions and asphyxiations), and *contact with objects and equipment* (3 fatalities).

Forty-three of the 55 deaths in 1998 were among wage and salary workers, while 12 deaths were among self-employed individuals. Forty-nine fatalities (89%) were among men vs. 6 fatalities (11%) among women; 46 fatalities (84%) were among White workers vs. 7 fatalities (13%) among Black workers; 7 fatalities (13%) were among workers of Hispanic origin. The largest age group with fatalities was the age group of workers from 35 - 44 years (17 fatalities, or 31%).

Forty-seven of the 55 fatalities (85%) occurred in private industry, while 8 fatalities (15%) occurred in the government sector. Seventeen fatalities (31%) occurred in the construction industry; 8 fatalities (15%) occurred in the retail trade sector; 6 fatalities (11%) occurred in the transportation and public utilities sector; 6 fatalities (11%) also occurred in the service sector; 3 fatalities (5%) occurred in the manufacturing sector; and 3 fatalities (5%) also occurred in the agriculture, forestry and fishing sector.

Eighteen fatalities (33%) were among precision production, craft and repair workers; 12 fatalities (22%) were among operators, fabricators and laborers; 11 fatalities (20%) were among managerial and professional workers; 7 fatalities (13%) were in technical, sales, and administrative support personnel; 4 fatalities (7 %) were among workers in the service occupations; and 3 fatalities (5 %) were in personnel working in farming, forestry and fishing.

¹ *Occupational Injuries and Illnesses in Connecticut in 1997*. Connecticut Department of Labor, June, 1999.

² Connecticut Department of Labor, Office of Statistics. Personal communication from Joe Weber to Marian Heyman, 1999

³ *Occupational Injuries and Illnesses in Connecticut in 1997*. Connecticut Department of Labor, June, 1999.

⁴ NIOSH. *Identifying High-Risk Small Business Industries: The Basis For Preventing Occupational Injury, Illness, And Fatality*. National Institute for Occupational Safety and Health, May, 1999.

⁵ Annual data on the labor force, employment, and unemployment in States and sub-State areas are available from two major sources: the Current Population Survey (CPS) and the Local Area Unemployment Statistics (LAUS) program. The CPS is a sample survey of about 50,000 households conducted by the US Bureau of Labor Statistics (BLS). The LAUS program is a Federal-State cooperative endeavor, in which State employment security agencies prepare estimates using concepts, definitions, and estimation procedures prescribed by BLS.

⁶ Definitions of Race: *White, Black, and other* are terms used to describe the race of persons. Included in the "other" group are American Indians, Alaskan Natives, and Asians and Pacific Islanders. Because of the relatively small sample size in most areas, data for "other" races are not published. In the enumeration process, race is determined by the household respondent CT Department of Labor.

⁷ Storey E, ed. *Occupational Disease in Connecticut*. Connecticut Departments of Health Services and Labor, February, 1990.

⁸ Table 6, Recordable Occupational Illnesses, by Category and Type, Connecticut, 1994-1997. *Occupational Injuries and Illnesses in Connecticut in 1997*. Connecticut Department of Labor, June, 1999.

⁹ Morse T. *Occupational Disease in Connecticut*. Workers' Compensation Commission, August, 1999.

¹⁰ The CCP was announced by OSHA, but implementation was halted by an April 9, 1999 District of Columbia Court of Appeals finding in a law suit brought by the US Chamber of Commerce and other organizations.

¹¹ OSHA Trade News Release. US Department of Labor, Office of Public Affairs, April 19, 1999.

¹² NIOSH. *Identifying High-Risk Small Business Industries: The Basis For Preventing Occupational Injury, Illness, And Fatality*, May 1999.

¹³ Nelson NA, Park RM, Silverstein MA, and Mirer FF. *Cumulative trauma disorders of the hand and wrist in the auto industry*. American Journal of Public Health, 82 (11):1550-1552, 1992.

¹⁴ Connecticut Department of Labor. *Census of Fatal Occupational Injuries in Connecticut, 1992-1996*. CONN-OSHA, 1999.

¹⁵ Connecticut Department of Labor. *55 People Die In Work-Related Incidents In State In 1998*. Press Release, August 12, 1999.

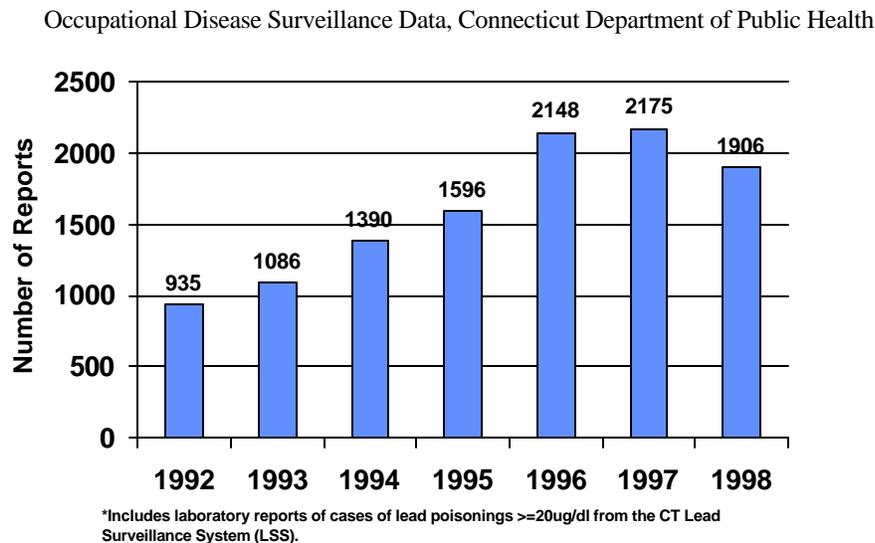
¹⁶ Test for statistical significance, two-tailed *t* distribution. Colton, T. *Statistics in Medicine*. Little, Brown and Company. Boston, 1974.

Chapter V
CONNECTICUT OCCUPATIONAL DISEASE SURVEILLANCE SYSTEM (ODSS)

Occupational Disease Surveillance System (ODSS) Data

The first full year of surveillance was completed in 1992. However, the initial 171 physician reports of occupational disease occurring during 1990 - 1991, the period of development of the system, have also been entered into the Occupational Disease Surveillance System (ODSS). As of December 31, 1999, there were 8,883 occupational disease reports from physicians in the ODSS from 1990 - 1998, with an additional 2,524 cases of blood lead poisoning ≥ 20 $\mu\text{g/dL}$ from 1992 to 1998, primarily from laboratories, for a total of 11,407 disease reports. Figure V-1 depicts the trend in the number of occupational disease reports for the period 1992 - 1998.

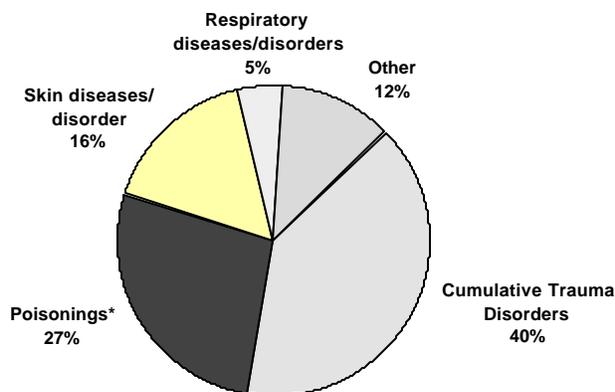
**Fig. V-1 Number of Occupational Disease Reports*
1992-1998**



In the ODSS, the number of disease reports has steadily increased from 1992 through 1997 with a slight decrease in 1998 (Figure V-1). The top four disease categories, cumulative trauma disorders (CTDs), poisonings, skin diseases and disorders, and respiratory diseases and disorders, have remained constant. Since 1992, CTDs have accounted for 40% of the physician reports; poisonings, 27%; skin diseases and disorders, 16%; respiratory diseases and disorders, 5%; and other, 12%.(Figure V-2). The other conditions include nervous system and sense organs diseases; circulatory system diseases; digestive system diseases and disorders; effects of environmental conditions; musculoskeletal system and connective tissue diseases and disorders; other systemic diseases and disorders; infectious and parasitic diseases; neoplasms, tumors, and cancer; and ill-defined conditions.

Fig.V-2 Percent Distribution of Disease Categories, 1992-1998

Occupational Disease Surveillance Data, Connecticut Department of Public Health



*Includes laboratory reports of cases of lead poisonings $\geq 20\mu\text{g}/\text{dl}$ from the CT Lead Surveillance System (LSS).

Since 1994, reports have been submitted from approximately 100 physicians each year. The majority, approximately 80%, of the disease reports are from occupational disease clinics around the state, particularly those funded by the Department of Labor through the occupational clinics grant-in-aid program (see appendix for clinic map). Since the data are mostly from a small group of providers, many of whom are employed at a clinic which receives some funding from DOL, it is difficult to generalize results to the state as a whole.

Demographics in the ODSS

As seen in Table V-1, more males (61%) than females (39%) have been reported with an occupationally-related disease. The majority of workers are young: over 50% are between the ages of 20 and 39, and over three quarters of the workers are between the ages of 20 and 49. The majority of the workers with reported diseases are White (84.7%), followed by Black (10.9%), Asian (2.6%), American Indian (0.1%), and other (1.7%) (Table V-2). Among all the races, 16.2% were of Hispanic origin. When comparing the figures from the ODSS to the percentages of employed persons in Connecticut in 1997, Asian and other workers and those of Hispanic origin appear to be over-represented. Black workers do not appear to be over-represented in the ODSS. However, the variables for *race* and *Hispanic origin* were only completed on 58% and 40% of the disease report forms, respectively. It has been difficult to acquire this information, because some health care providers either do not collect race and

ethnicity information or do not report it. The incomplete reporting of these demographic variables hampers our ability to gain a true sense of the distribution of occupational disease in Connecticut across racial and ethnic lines.

Table V-1

Number of Workers with Disease Reports* by Gender and Age, 1990 - 1998 Occupational Disease Surveillance Data, Connecticut Department of Public Health			
Gender (%)		Age (%)	
Male	6,899 (61.1)	< 20	151 (1.5)
Female	4,391 (38.9)	20-29	2,105 (19.1)
		30-39	3,496 (31.7)
		40-49	2,779 (25.2)
		50-59	1,820 (16.5)
		60 +	666 (6.0)
TOTAL	11,290 (100)	TOTAL	11,017 (100)

*Includes laboratory reports of cases of lead poisonings $\geq 20 \mu\text{g/dL}$ from the CT Lead Surveillance System (LSS).

Table V-2

Number and Percent Distribution of Workers with Disease Reports* by Race and Hispanic Origin, 1990 - 1998, with comparisons to Percent Distribution of Employed Persons, CT Annual Averages 1997 Occupational Disease Surveillance Data, Connecticut Department of Public Health and Current Population Survey and Local Area Unemployment Statistics, Connecticut Department of Labor					
Race (%)		% of Connecticut Employed Persons	Hispanic Origin (%)		% of Connecticut Employed Persons
White	5,627 (84.7)	87.0	Yes	743 (16.2)	6.0
Black	727 (10.9)	11.0	No	3,849 (83.8)	94.0
Asian	175 (2.6)	2.0			
American Indian	4 (0.1)				
Other	113 (1.7)				
TOTAL**	6,646 (100)	100	TOTAL**	4,592 (100)	100

*Includes laboratory reports of cases of lead poisonings $\geq 20 \mu\text{g/dL}$ from the CT Lead Surveillance System (LSS).

**Totals less due to incomplete data.

Physicians have reported occupational diseases in workers from over 2,700 of the 94,000 employers in CT. Manufacturing accounts for 37.5% of the occupational disease reports (Appendix T-1). The service industry accounts for 20.5%; construction, 12.9%; and retail trade, 9.6%. In terms of gender, men in the manufacturing sector have a slightly higher percentage of occupational disease reports than do women in manufacturing (61.8% vs. 38.2%). The genders are equally split in terms of percentages of reports in the agriculture sector. In other industries, there are a larger proportion of disease reports among men than among women in the mining (100%), construction (98.2%), transportation (85.5%), wholesale (78.0%), and public administration (73.4%) sectors. On the other hand, there are higher percentages of reports for women in the retail (59.5%), finance (82.6%), and services (65.7%) sectors.

The types of occupations with the greatest number of disease reports (excluding lead poisonings) are the service occupations (12.7%); administrative support (11.2%); machine operators and tenders (11.2%); and fabricators, assemblers and handworking (8.9%) (Appendix T-2). Lead poisonings are excluded because they are primarily reported by laboratories which do not provide occupation.

Cumulative Trauma Disorders

Cumulative trauma disorders (CTDs), also known as repetitive strain injuries, are the largest cause of occupational disease in the United States and the type of occupational disease most frequently reported by physicians in Connecticut. CTDs are repeated injuries to the body's tendons, nerves, muscles and blood vessels caused by overuse. CTDs are classified as an occupational disease disorder instead of an injury because they result from cumulative exposures over time and not a one time occurrence.

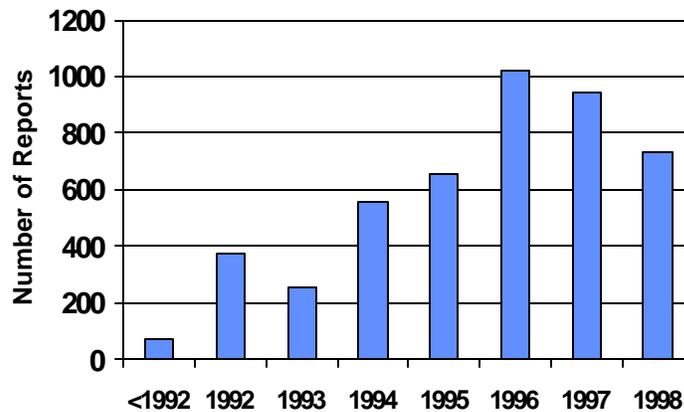
CTDs most often occur in the upper body but also may affect the lower limbs and back. CTDs are preventable. Recognition of risk factors for CTDs is an important part of the intervention process. CTDs often are a result of poor design of tools, workstations, work processes and work organization, as well as psychosocial factors. Work processes that involve repetition, force requirements, awkward and/or static postures, velocity/acceleration of body parts, and vibration cause trauma to the body. Other personal characteristics, such as physiological and cultural characteristics, may serve as cofactors which confound attempts to fully understand etiology and/or to design ergonomic interventions in the workplace.¹ If unrecognized and untreated, CTDs can result in permanent disability.

From 1990 through 1998, 4,593 reports of CTDs were recorded in the ODSS, which is 40% of all occupational disease reports. As seen in Figure V-3, the number of CTD reports increased from 1992-1996 and decreased somewhat during 1997-1998. Carpal tunnel syndrome (27%) and tendonitis (26%) account for the majority of CTD reports. Other CTDs include thoracic outlet syndrome, hand and arm vibration syndrome, vibration white finger, epicondylitis, myositis, bursitis, synovitis, tenosynovitis, ganglion/cystic tumor, DeQuervain's Syndrome, other musculoskeletal system and connective tissue disease and disorders, and other disorders of the peripheral nervous system reported as caused by repeated trauma.

More females (60.3%) than males (39.7%) have been reported with a CTD. The largest proportion of workers were between the ages of 30 and 49 (58.9%). The majority of workers affected are White (81.1%), followed by Black (14%), Asian (3.4%), other (1.4%), and American Indian (0.1%). Fifteen percent of the workers were reported to be of Hispanic origin.

Fig. V-3
Number of Cumulative Trauma Disorders,
1990 - 1998

Occupational Disease Surveillance Data, Connecticut Department of Public Health



Manufacturing (43.5%), services (19.6%), and retail trade (14.0%) are the three industries with the most CTD reports in the ODSS (Appendix T-3). The occupation groups that have been reported the most frequently include administrative support (15.7%), fabricators, assemblers and handworking (12.4%), and machine operators and tenders (10.8%) (Appendix T-4).

Table V-3

Number of Companies in ODSS with ³ 2 Cumulative Trauma Disorder Reports, 1990 - 1998		
Occupational Disease Surveillance Data, Connecticut Department of Public Health		
Number of CTD reports	Number of Companies	Percent (%)
2	159	38.6
3-5	136	33.0
6-9	51	12.4
10-19	42	10.2
20-49	15	3.6
50-99	5	1.2
100+	4	1.0
TOTAL	412	100.0

As seen in Table V-3, there are more than 400 companies in the ODSS that have two or more physicians' reports of CTDs. The majority of the companies, 71.6%, have five or fewer reports. Currently, DPH is working on a protocol to follow-up on CTDs. Massachusetts, for example, follows-up on companies with three or more workers with Carpal Tunnel Syndrome who perform the same or similar job tasks. Finite resources require the prioritization of investigations in Connecticut. DPH has investigated companies with large numbers of physician reports of CTDs or other companies with CTD problems upon request by the reporting physician. The UCONN ErgoCenter is also available to assist companies with identification, intervention, and clinical follow-up for workers with ergonomics-based problems.

Rates of CTDs in Connecticut appear to exceed the Centers for Disease Control's *Healthy People 2000* goals for both the categories of "all employers" (29.8 vs. 6 per 10,000 workers) and "manufacturing" (100.8 vs. 15 per 10,000 workers). These rates are calculated using BLS Annual Survey of Occupational Injuries and Illnesses data.² However, for CTDs, rates cannot be tracked against the original baseline or Year 2000 target, since the BLS survey was redesigned in 1992 to capture more detailed information on injury and illnesses and the related risk factors for musculoskeletal disease. It is unknown whether the apparently higher reported rates in Connecticut are due to better recognition and reporting, changed definitions, or such factors as industry mix, more educated employees, higher production rates, or more extensive introduction of new technology.

UCONN ErgoCenter Prevalence Survey

An additional source of data in Connecticut regarding CTDs comes from a special survey conducted by UCONN. In 1998, the UCONN ErgoCenter conducted a population-based prevalence survey funded by NIOSH, to develop estimates of the magnitude and distribution of Connecticut's CTD problem, and to improve state-based CTD surveillance. It sought to

estimate the proportion of workers with specific workplace risks for CTDs, and to estimate the proportion of CTDs captured by Connecticut reporting systems. This would help develop population-based data to benchmark, supplement, or modify existing surveillance systems. It would also estimate population- and industry-specific rates for CTDs as referents for the future.

Phase I of the population-based prevalence survey involved telephone surveys of randomly selected residents of Connecticut, of which 3,200 surveys were completed. In Phase I of the survey, population-based industry and job specific prevalence odds ratios were calculated, based on a case definition that is formulated as follows: *self reports of significant pain in the arm, shoulder, hand or neck for 5 or more consecutive days, or 20 or more total days in the preceding year, that was not due to sudden injury, and was caused by work or made worse by work.*

The prevalence survey found that 292 (9.1%) of the 3,200 residents reported a work-related CTDs. Of these, 41% (119 cases) said that they had received a physician's diagnosis of a CTD. Overall, only 10.6% (31 cases) had filed a WCC claim; 21% (25 cases) of those with a physician's diagnosis of work-related CTD filed a claim.³

The study looked at the various industry sectors and job classifications, or occupations. Preliminary results showed that 11.9% of workers surveyed in the construction industry had self-reported, work-related CTDs, followed by 9.4% of workers in manufacturing, 11.5% of workers in transportation, 7.5% in finance and insurance, and 9.0% in the service sector. Six point six percent (6.6%) of workers in wholesale and retail reported CTDs.⁴

The occupations with the highest prevalence rates were clerical (10.5%), crafts (12.4%), machine operators (15.5%), laborers (9.8%), and service workers (9.9%). Workers categorized as "professionals" had a self-reported, work-related CTD prevalence rate of 6.4%.

An attempt was made by Morse, *et al* to estimate the true prevalence of CTDs in Connecticut using capture-recapture methods linking cases reported through the Workers' Compensation system and cases identified by physician reports through the DPH ODSS database. This approach used the degree of overlap between the two different databases to estimate the number of cases which have *not* been captured by either system. As described below, *there is very little overlap between these two systems.* This estimate was compared to a second estimate using the physician-called cases from the UCONN population-based survey described above.⁵ Utilizing Workers' Compensation data for 1995 and 1995 ODSS data, Morse, *et al* estimated 13,285 cases of CTDs [range: 8,332 - 17,052] in Connecticut. This estimate provided useful information for directing efforts towards increasing physician reporting, and outreach and education to physicians, employees, and employers with respect to CTDs. The UCONN survey, demonstrating people's perceptions about the work-relatedness of their own CTDs, estimated 13,775 cases [range: 8,800 - 18,800]. This showed that the UCONN population-based survey from 1998 corresponds closely with the 1995 estimate. This also demonstrates that the ODSS captured only slightly more than 5% of CTD cases, based upon

the number of cases reported by physicians to the ODSS, in 1995 and 1998 when compared with Morse's average estimate of 13,500 cases in Connecticut.

Carpal Tunnel Syndrome (CTS)

Carpal Tunnel Syndrome (CTS) is an inflammatory disease of the tendons and/or their protective coverings (sheaths) which affects the wrist, hand, and forearm. The wrist has a small narrow tunnel through which the tendons and the median nerve pass. With repetitive movements, the swollen tendons and sheaths cause crowding and compression of the median nerve, causing a variety of symptoms which include pain, numbness, tingling, swelling, and burning sensations in the hand.

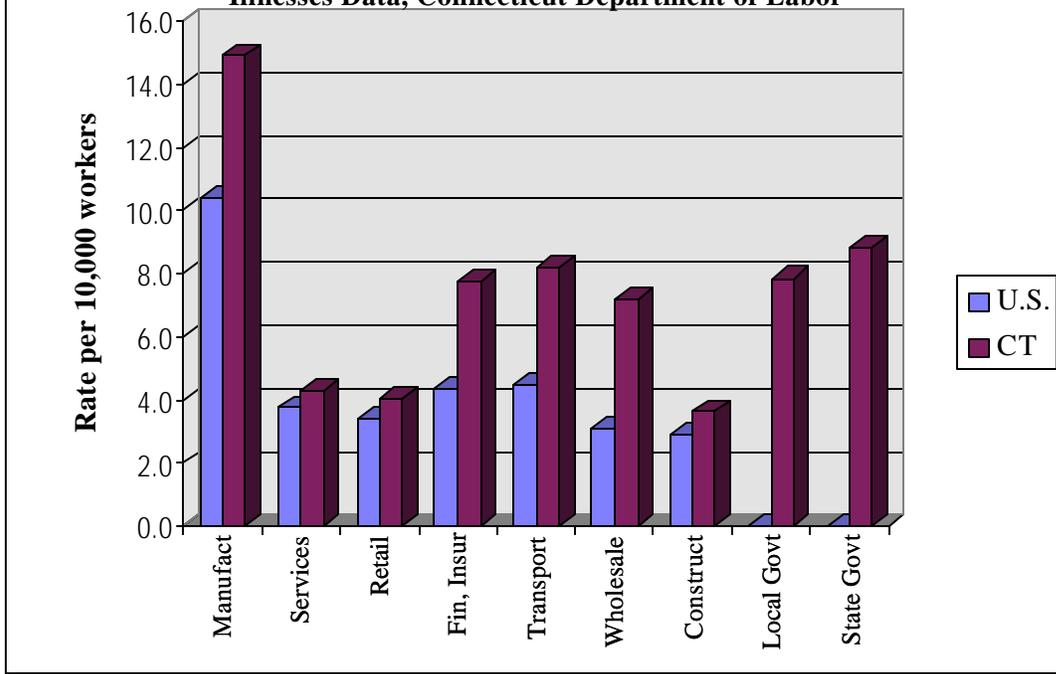
There are 1,256 reports of CTS, which account for 27% of the occupational disease reports in the ODSS. Women (68%) were reported with CTS over two times more frequently than men (32%). Sixty percent of the workers are between 30-49 years of age. The majority of workers were White (81.2%), followed by Black (16.0%), Asian (1.9%), and other (0.9%). Eleven percent of the workers were reported to be of Hispanic origin.

Manufacturing (40.4%) accounts for the largest percentage of the Carpal Tunnel Syndrome reports, followed by services (18.0%) and retail trade (14.2%). The occupation groups with the largest numbers of CTS reports are in administrative support (23%). The next two largest occupation groups are machine operators and tenders (8%) and fabricators, assemblers and handworking (8%).

Connecticut rates of reported CTS are higher than national averages for virtually every industrial sector. Figure V-4 compares 1993 data of CT and US rates of Carpal Tunnel Syndrome per 10,000 workers by industry, using BLS Annual Survey of Occupational Injuries and Illnesses data.⁶

Fig. V-4. Carpal Tunnel Syndrome, CT & US, 1993

Bureau of Labor Statistics Survey of Occupational Injuries & Illnesses Data, Connecticut Department of Labor



Tendonitis

Tendonitis is an inflammation of the tendon caused by repeated muscle/tendon use. The tendon and enveloping sheath are inflamed in tenosynovitis. Normally, fibers which make up tendons are exposed to "micro-traumas", or small tears that are easily repaired by the body. Continued over-use and lack of recovery time prevent the tears from healing fully. The wrists, elbows, shoulders, thumb, and fingers are commonly affected areas.

There are 1,202 reports of tendonitis, which accounts for 26% of the CTD reports in the ODSS. Rate comparisons between Connecticut and the U.S. for tendonitis are similar to the CTS pattern in Figure V-4. As with CTS, more women than men are reported with this disorder, 63% vs. 37%. Approximately 79% of the workers are between 20 - 49 years of age. The majority of workers reported with tendonitis are White (80.2%), followed by Black (13.2), Asian (4.5%), American Indian (0.1%), and other (1.9%). Sixteen percent of workers were reported to be of Hispanic origin.

The greatest proportion of tendonitis reports come from the manufacturing sector (41.9%), then services (23%) and retail trade (15.3%). The occupation groups with the largest percentages of tendonitis reports are administrative support (13.3%) and fabricators, assemblers, and handworking (13.3%). The next two largest occupation groups are machine operators and tenders (11.6%) and service occupations (10.6%).

Poisonings

A poison, by definition, is any substance that is taken internally or externally that is injurious to health or dangerous to life.⁷ Poisonings can occur by inhalation, ingestion, or through dermal and/or mucous membrane absorption.

Since 1990, there are 3,039 (26.6%) reports of poisonings and suspected poisonings among workers in the ODSS. The majority (83%) of the poisonings reported are due to lead exposure. DPH defines lead poisoning in an individual as a blood lead level (BLL) $\geq 20 \mu\text{g/dL}$. Lead poisoning is a targeted condition of DPH and will be discussed in the next section. The other 17% of the reported poisonings are due to mercury, carbon monoxide, or a variety of specified and unspecified agents (Table V-4). Lead, mercury, and carbon monoxide are on the DPH Commissioner's *Annual List of Reportable Diseases*, which requires physicians to report *all* causes, both occupational and non-occupational.

Table V-4

Occupational Poisonings: Selected Reported Agents , 1990 - 1998		
Occupational Disease Surveillance Data, Connecticut Department of Public Health		
Acids	Formaldehyde	Mercury
Adhesives (vapors)	Freon	Nickel
Ammonia	Gas/diesel	Smoke
Cadmium	Gluteraldehyde	Solvents (i.e., xylene, acetone, benzene)
Carbon monoxide	Herbicides/pesticides	
Chlorine	Lead	

For the poisonings, nine times as many reports for male workers (90.0%) than for female workers (10.0%) were submitted. Seventy-five percent of workers were between 20 - 49 years of age. Eighty-seven percent of the reported poisoned workers were White, 9.0% were Black, 2.0% were Asian, and 2.0% were other races. Hispanic workers represented 31.3% of the poisoning reports.

As seen in Appendix T-5, the greatest number of poisonings occurred in construction (45.5%) and manufacturing (28.7%). The most common occupation groups (excluding lead data) reported are service occupations (12.0%), machine operators and tenders (11.5%) and administrative support (9.8%) (Appendix T-6). Lead poisonings are primarily reported by laboratories and the worker's occupation is rarely provided.

Lead Poisonings

Lead Reporting Protocols

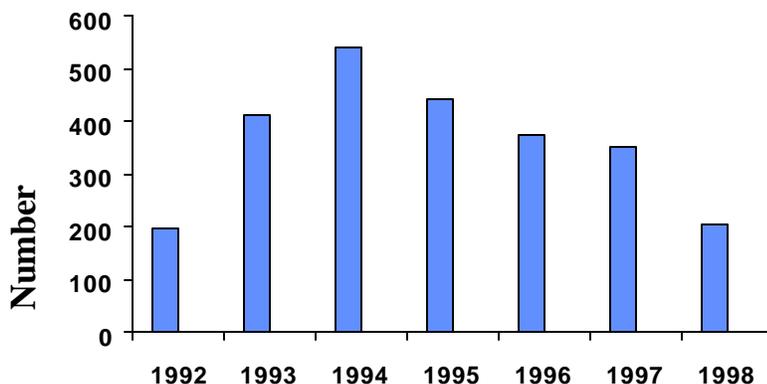
In Connecticut, lead poisoning has been reportable since 1971. Physicians and laboratories send reports directly to the Occupational Health Division of the DPH. The required reportable level for blood lead (BLL) has decreased several times, from 40 micrograms per deciliter ($\mu\text{g}/\text{dL}$), to 25 $\mu\text{g}/\text{dL}$, to 10 $\mu\text{g}/\text{dL}$ (for laboratories) in 1992. As of October 1, 1998, all blood lead results ≥ 0 $\mu\text{g}/\text{dL}$ are required to be reported by laboratories at least monthly to the Connecticut Department of Public Health. This requirement includes reports for any Connecticut resident, regardless of age.

Lead Poisoning Data

At the time of the 1990 Connecticut baseline report, nearly 24,000 workers in Connecticut were estimated to be at risk of exposure to lead in the workplace⁸, primarily in manufacturing. Since then, the number has increased by about 1,600 workers involved in bridge repair and construction work in Connecticut. The number also continues to increase because of ongoing federal- and state-funded efforts to conduct lead abatement activities in Connecticut and the increasing needs of repairing and restoring both the nation's and Connecticut's transportation infrastructure.

The number of affected adults (cases) per year is displayed in Fig. V-5. A case is defined as an adult, age 16 or greater, with lead poisoning, i.e., $\text{BLL} \geq 20$ $\mu\text{g}/\text{dL}$. A case can have more than one blood lead level test [or report] over a period of time. A BLL of 10 $\mu\text{g}/\text{dL}$ is considered elevated and reflects lead exposure which, if unchecked, can quickly rise if occupational exposure continues.

**Fig.V-5 Number of Connecticut Adult Blood Lead Cases*
 ≥ 20 $\mu\text{g}/\text{dL}$ ** by Year
 Connecticut Lead Surveillance Program
 1992-1998**



* Reports of persons living and/or working in Connecticut

Figure V-5 shows that the number of cases peaked in 1994 and 1995. This was the period when the Connecticut Department of Transportation (DOT) was highly engaged in bridge repair and construction. A special program called the Connecticut Road Industry Surveillance Project (CRISP) was put in place to address lead exposure issues for the workers engaged in these construction projects. A key feature of CRISP (now CLINIC) is the DOT's requirement for bridge construction contractors to have a lead health and safety plan for workers, in order to be considered during the job bidding process. The lead health and safety plans include on-site monitoring of lead exposure in workers who remove old lead paint and do general repair work on Connecticut bridges.

Although the numbers of cases and reports have dropped since 1995, there is a continuing problem of under-reporting in many industrial sectors. Additionally, many contractors have minimal or no medical insurance, which may have an effect on the workers' ability to access and effectively use the health care system. Generally, these workers wait until they are symptomatic before seeing a doctor, which reduces the ability of DPH to engage in primary prevention.

DPH conducted a Lead-Use Census in 1992 to guide the selection of industries with high lead usage and poor compliance with monitoring requirements for targeted educational and intervention activities. DPH identified 1,272 potential lead-using companies in 36 Standard Industrial Classification (SIC) codes, which were selected on the basis of National Occupational Exposure Survey (NOES) data generated by NIOSH, as well as through review of OSHA inspection records. A "Lead Use Survey" form was mailed to the targeted companies. Responses were received from 511 companies (40%), of which 177 (35% of the respondents) said they used lead. The responses indicated that only 24 companies (5% of the respondents) conducted BLL testing for their employees, which represented 14% of those companies reporting lead use.⁹

The Occupational Health Program analyzes the reports in the Lead Surveillance System (LSS) in order to conduct case and company follow-up. An analysis by two-digit Standard Industrial Classification Codes (SICs) of the companies which have had at least one worker with a BLL \geq 40 $\mu\text{g}/\text{dL}$ since the beginning of 1992 can be seen in Table V-5. Follow up for all of these cases was handled by the DPH Occupational Health Program. There have been 84 such companies, with an estimated 194 workers with BLLs \geq 40 $\mu\text{g}/\text{dL}$. The construction industry, including painting contractors, had the greatest number of companies, 38, and also the greatest number of workers with elevated BLLs, 119.

Table V-5

Summary Of Employers By SIC Reporting BLLs \geq 40 $\mu\text{g/dL}$ To Connecticut DPH, 1992 - 1999			
Lead Surveillance Data, Connecticut Department of Public Health			
2 Digit SIC Code	Description	# Companies	# Workers*
15-17	Contractors/Construction	38	119
23-39	Manufacturing	20	38
40-49	Transportation and Public Utilities	3	3
50-59	Wholesale and Retail Trade	6	10
75-79	Automotive Repair/Other Repair	5	7
80-99	Other, not elsewhere classified	12	17
Total		84	194

* This column may include a worker more than once if, within the selected time frame, that worker had multiple employers of different SIC codes.

Some of the cases of occupational lead poisoning are complicated by additional exposures due to hobbies where lead is used. Hobbies such as home renovations (i.e., scraping and removing leaded paint), pottery, ceramics, stained glass making, and hunting and target shooting (with ammunition containing lead) expose the public to lead dust and/or fumes. DPH has noted that many of the workers with elevated BLLs in the database are self-employed painters, home renovators, “do-it-yourselfers,” and companies with fewer than five employees doing similar work. Often, these workers are overexposed to lead because of unsafe work practices.

NIOSH requested that the states which it funds under the ABLES program perform analyses of workers with blood lead levels greater than or equal to 50 $\mu\text{g/dL}$, using 1998 data. DPH’s analysis of the 1998 Connecticut data showed seven workers with BLLs \geq 50 $\mu\text{g/dL}$. All seven were from the SIC codes 15-17, construction and renovation.¹⁰ All were self-employed or worked for small companies (with fewer than 5 employees). The Connecticut Department of Public Health created an educational program in response to the elevated BLLs seen in this group of workers. This educational effort, the “Keep it Clean” campaign, provides information about lead-safe painting and home improvement for self-employed and small contractors, and do-it-yourself home renovators and painters. In June, 1999, the EPA, under Section 406(b) of the Toxic Substances Control Act, required all compensated renovators to distribute a pamphlet, “Protect Your Family From Lead In Your Home” to owners and occupants of all pre-1978 residential housing before beginning renovations.

Skin Diseases and Disorders

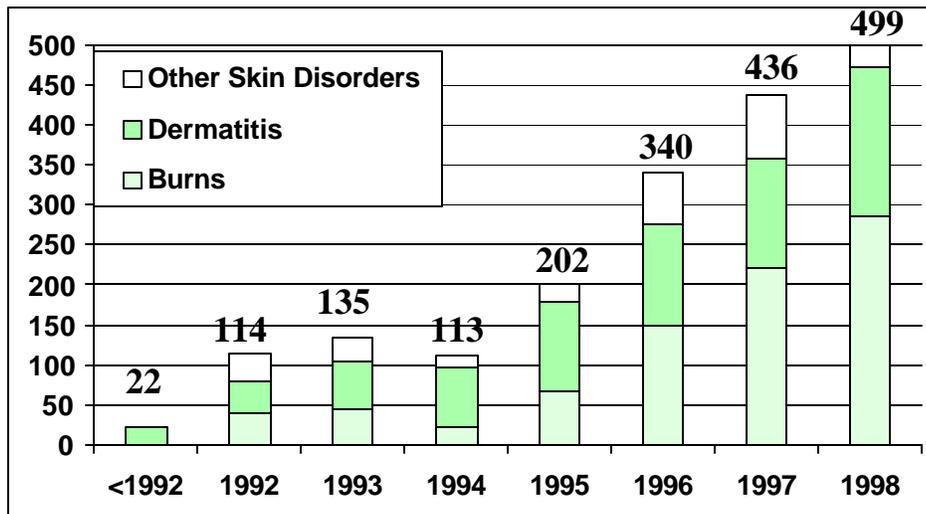
The skin is the largest organ of the body, constituting approximately 15% of the total body weight. Its size and exposure to the environment has made it vulnerable to occupational disease and injury. Occupational skin disease has been defined as 'any abnormality of the skin induced or aggravated by the work environment'. Occupational skin diseases accounted for

approximately half of all occupational disease in the United States during the 1980s, and was one the leading causes of lost work days. Occupational skin diseases and disorders can also result in permanent disability.¹¹

Since December 1989, 1,861 (16%) reports of occupational skin diseases and disorders were recorded in the ODSS. Within the last four years, the number of reports has increased dramatically (Fig. V-6). There was an increasing number of reports in the service and manufacturing industry sectors reported by the auxiliary clinics during this period. Occupational dermatitis (41%) and burns (42%) account for the majority of reports in the category of “occupational skin diseases and disorders”. The remaining reports in this category, 17%, are a variety of skin diseases and disorders, some of which include cellulitis and abscess, diseases of the nail, diseases of hair and hair follicles, urticaria (hives), and infections of the skin and subcutaneous tissue, not elsewhere classified.

Fig. V-6 **Number of Reports of Skin Diseases and Disorders, 1990 - 1998**

Connecticut Occupational Disease Surveillance Data
Connecticut Department of Public Health



The ODSS data for 1996 and 1997 included 192 and 216 disease reports, respectively, of dermatitis, latex allergy, poison ivy, and other skin conditions (excluding burns). These data may be compared with Workers’ Compensation system data, for which there were 136 skin conditions (excluding burns) reported for 1996, and 202 in 1997.¹² Even though the ODSS does not yet capture reports from all physicians in the state, it had a greater number of reports than the Workers’ Compensation system data. One can surmise that the prevalence of occupational skin disease is most likely greater than can be discerned by looking at cases in either of the two systems separately.

Over half the workers with reported skin diseases and disorders in the ODSS are employed in manufacturing (34.4%) and services (29.1%) (Appendix T-7). Since the manufacturing sector accounts for only 18% of the work force, it appears as if manufacturing workers are over-represented in the percentage of skin disease and disorder reports received. This may be due to manufacturing sector workers having greater opportunities for exposure to a wide variety of chemicals capable of causing skin disorders, and/or more severe exposures requiring medical attention. The occupation groups with the greatest proportion of disease reports are the service occupations (23.0%) and machine operators and tenders (13.0%) (Appendix T-8).

Burns

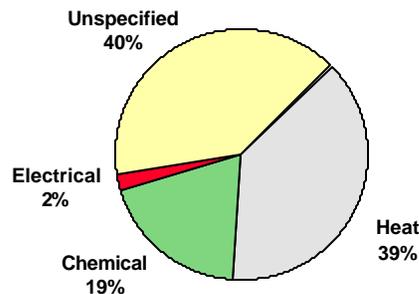
Burns are characterized as skin disorders, and can result from heat, chemicals, and electricity. They can be very mild, to disfiguring and disabling, to life threatening. Burns are preventable. When working in an environment where burns are possible, it is important to adhere to safe work procedures and wear appropriate protective equipment.

Since 1992¹³, there are 777 disease reports in the ODSS relating to occupational burns, which is 42% of all occupational skin diseases and disorders. Heat burns accounted for over a third, 39%, of the burn reports, while chemical burns accounted for 19%; electrical, 2%; and unspecified, 40% (Fig. V-7).

Fig. V-7

Percent Distribution of Types of Burns, 1990 - 1998

Occupational Disease Surveillance Data, Connecticut Department of Public Health



Occupational burns were reported more frequently in male than female workers (63.3% vs. 36.7%). The majority of the reported cases are in White workers, 90.8%. Reports in Black workers accounted for 6.4% of cases, Asians, 0.8%, American Indian, 0.5%, and other 1.5%.

The variable *Hispanic origin* was only completed in 29% of the dermatitis disease reports. Of these, 20% were of Hispanic origin. The 20-39 years age range had 60.1% of the reports.

The greatest percentage of burn reports came from the manufacturing (32.3%), services (25.0%) and retail trade (22.9%) industry sectors. Almost a third of the reports, 30.9%, were from workers in the service occupations. The next three highest occupation groups are machine operators and tenders (11.4%), fabricators, assemblers and handworking (6.1%) and handlers, equipment cleaners, helpers, laborers (5.4%).

Occupational Dermatitis

Occupational dermatitis is inflammation of the skin. It can be caused by many different agents in the workplace such as solvents, acids, cutting fluids, metals, latex, and physical agents like heat and cold. There are different types of dermatitis, including irritant contact dermatitis, allergic contact dermatitis, and atopic dermatitis.

There are 761 reports of occupational dermatitis, which comprise 41.0% of the skin disease and disorder reports in the ODSS. The number of reports has steadily increased since 1992 (Fig. V-6). The different types of occupational dermatitis reported include contact dermatitis (55.3%); allergic dermatitis (24%); dermatitis, unspecified (16.7%); irritant dermatitis (3.4%); atopic dermatitis (0.3%); and "other" contact dermatitis (0.3%). Table V-6 shows some of the more common suspected agents that have been reported by physicians and recorded in the ODSS.

Table V-6

Occupational Dermatitis - Selected Reported Agents, 1990 - 1998		
Occupational Disease Surveillance Data, Connecticut Department of Public Health		
Acids	Degreasing compounds	Hand soap
Acrylates	Detergents	Latex/latex gloves
Alcohol	Disinfectants	Metals
Boxes	Fiberglass	Paints
Chemicals	Gloves	Plants
Cleaning products	Glue/adhesives	Solvents
Coolants/Cutting oils	Hair products-dyes, perms	Water

Many different causes of occupational dermatitis were reported to the ODSS, but a few types stand out. Over 26% of the occupational dermatitis cases were due to plant material: poison ivy, poison oak, poison sumac, and various flowering bulbs, to name a few. Other suspected causes included latex (9.8%) and coolants/cutting oils, also known as metal working fluids (9.1%).

For comparison, in 1996 and 1997, sources of occupational skin problems reported by *employers* to the Workers' Compensation Commission included cleaning chemicals, tulip bulbs, tobacco leaves, hay, fiberglass, polish, degreasers, solvents, oil, coolants, caustics, washing dishes, sodium sulfate, paper mites, wood dust, printing ink, pesticides, shrimp, and epoxies. WCC data from 1997 revealed 20 cases that specifically mentioned gloves or latex as the possible cause of the condition. There were 12 such cases in 1996. Cases from poison ivy/poison oak numbered 39 in 1997, and 27 cases in 1996.¹⁴

The ODSS contains more physician reports for occupational dermatitis cases among male workers (63.8%) than among female workers (36.2%), and the majority of workers (60.5%) were between 20-39 years of age. In terms of race, 88.6% of reports where dermatitis was diagnosed and reported by a physician were White, 32.0% Black, 13.2% Asian, and 1.9% other. Fourteen percent of workers with dermatitis were reported to be of Hispanic origin.

The greatest number of dermatitis reports came from those persons working in the service sector (35.8%), manufacturing (35.8%), and public administration (12.7%). Almost a fifth of the reports, 18.4%, were from workers in service occupations. The next highest occupation groups with dermatitis cases were machine operators and tenders (14.6%) and farming, forestry and fishing (11.0%).

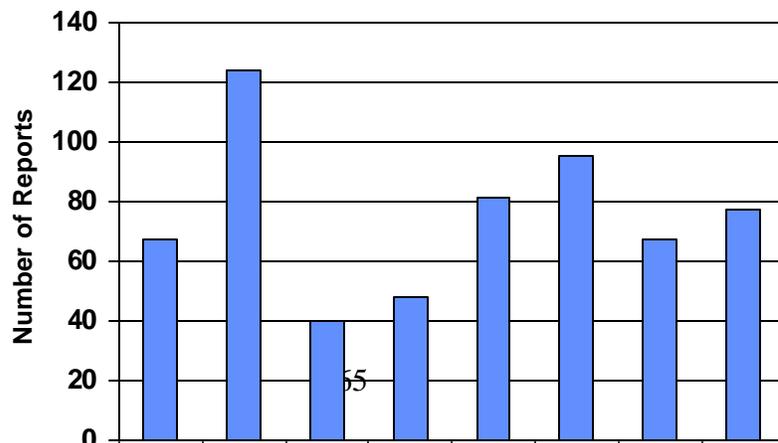
Respiratory Diseases and Disorders

Since December 1989, there have been 611 reports of occupational respiratory disease, representing 5% of all occupational disease reports in the ODSS. This figure also includes cancers of the respiratory system. The number of respiratory disease reports increased during the period 1993 to 1996, with a little fluctuation in 1997 and 1998 (Fig. V-8). The large number of reports in 1992 and earlier are due to reports from physicians for existing patients with occupational respiratory diseases and disorders when the surveillance system was initiated.

Fig. V-8

Number of Respiratory Disease Reports, 1990 - 1998

Occupational Disease Surveillance Data, Connecticut Department of Public Health



Occupational asthma, asbestosis, and pleural plaques are the most frequently reported respiratory diseases and disorders (Table V-7).

Table V-7

Number of Selected Respiratory Disease Reports, 1990 - 1998 Occupational Disease Surveillance Data, Connecticut Department of Public Health	
Respiratory Disease	Number of Reports (%)
Asbestosis	105 (17.2)
Bronchitis	61 (10.0)
Extrinsic Allergic Alveolitis and Pneumonitis	27 (4.4)
Occupational Asthma	173 (28.3)
Pleural Plaques	102 (16.7)
Reactive Airway Dysfunction Syndrome	27 (4.4)
Rhinitis	21 (3.4)
Silicosis	13 (2.1)
Various cancers (lung, larynx)	13 (2.1)
Other	69 (11.4)
TOTAL	611 (100)

Seventy percent of the respiratory disease and disorder reports in the ODSS were among male workers, while 30% were among female workers. Seventy-six percent of the reported cases were among workers over 30 years of age. The over 60 age group was the single age group which had the largest proportion of respiratory disease and disorder reports (27.8%). The majority of reported cases are in White workers (88.4%), followed by Black (8.7%), Asian (2.1%), and other races (0.8%). Hispanic origin was reported in 6.6% of the respiratory disease and disorder reports received by DPH.

Many of the workers with reports of respiratory diseases and disorders work in manufacturing (52%) and service industries (23.3%) (Appendix T-9). The types of occupations where workers have the greatest numbers of reports are professional specialty (13.5%), machine operators and tenders (11.7%), precision production (9.5%), and construction (9.3%) (Appendix T-10).

Occupational Asthma and Reactive Airways Dysfunction Syndrome (RADS)

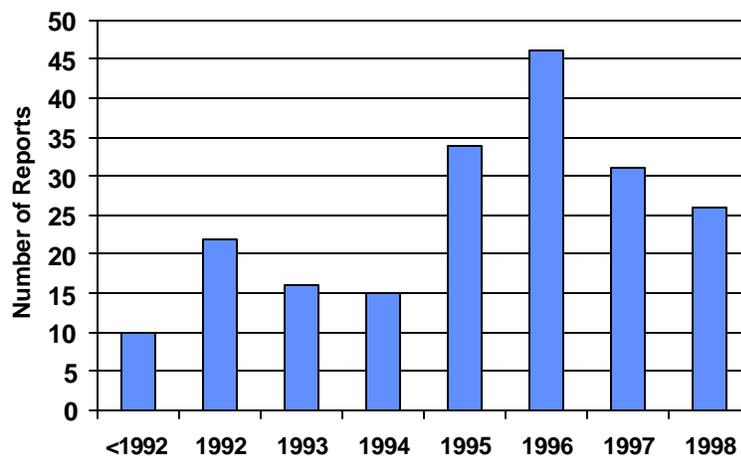
It is estimated that up to 15% of adult asthma is due to occupational exposures. Occupational asthma, as defined by Chan- Yeung and Malo, is “a disease characterized by variable airflow limitation and/or nonspecific bronchial hyper-responsiveness due to causes and conditions which are attributable to a particular occupational environment and not to stimuli encountered outside the workplace”. When occupational asthma develops after a single inhalation exposure to high levels of irritant gases, fumes or vapors, eliciting a nonimmunological response, it is referred to as Reactive Airways Dysfunction Syndrome, or RADS.¹⁵

Occupational asthma may be caused by both immunological and nonimmunological mechanisms. Occupational asthma is triggered by a number of substances (plant, animal or chemical) which are found in a variety of work settings. There are over two hundred documented agents implicated in work-related asthma. Occupational asthma can be very disabling; many workers have had to change jobs or careers because of this condition.¹⁶

There are 173 reports of occupational asthma and 27 RADS reports in the ODSS from 1990 through 1998, totaling 200 reports. These reports account for approximately a third of all the respiratory diseases and disorders. As seen in Fig. V-9, the number of occupational asthma reports has fluctuated over the years.

Fig. V-9 **Number of Occupational Asthma Reports, 1990 - 1998**

Occupational Disease Surveillance Data, Connecticut Department of Public Health



The Workers' Compensation System data had notably fewer reports for asthma in the most recent years available. There were 23 cases in 1997 and 17 in 1996 that specifically mentioned

asthma as the chief complaint, compared with 46 and 32 reports to the ODSS for those years, respectively. Specific causes in the WCC *Employer First Reports of Injury* are generally not described, but include chemical fumes, chlorine, mold, paint fumes, carpeting, isocyanates, and cigarette smoke.¹⁷ In contrast, *physicians* do record suspected agents causing occupational asthma/RADS when reporting cases to the ODSS (Table V-8).

Table V-8

Occupational Asthma/Reactive Airways Dysfunction Syndrome - Selected Reported Agents, 1990 - 1998			
Occupational Disease Surveillance Data, Connecticut Department of Public Health			
Adhesives	Cutting oils/coolants	Hydrochloric acid	Mold
Bioaerosols	Dust/dust mites	Indoor air pollution	Paint vapors
Buffing compounds	Epoxy compounds	Isocyanates/diisocyanates	Smoke
Chlorine	Formaldehyde	Lab animals	Solvents
Construction/ renovation work	Gluteraldehyde	Latex	Welding fumes

Analysis of ODSS data revealed that the most frequently reported cause of occupational asthma by physicians is indoor air pollution (20%), which includes mold, dust and dust mites, bioaerosols, cigar/cigarette smoke, poor ventilation, and renovation activities. Many of the cases were reported in office workers. Other suspected agents that are often reported as a cause of occupational asthma are isocyanates (12%) and latex (6%). The Connecticut finding regarding indoor air pollution is in line with findings of a recently published four-state survey (Massachusetts, New Jersey, Michigan, and California) of physicians reporting occupational asthma. In that report, indoor air pollution was the most frequently reported putative agent associated with cases of work-related asthma, both new-onset and work-aggravated, 7.8%. The diisocyanates comprised 7.0% of the reports, the third highest cause after mineral and inorganic dusts.¹⁸

The majority of occupational asthma/RADS reports in the ODSS are for workers between the ages of 30 and 59 years. Both men and women are almost equally reported with this respiratory disease, 51% and 49%, respectively. The majority of reports are for White workers (85.8%), followed by Black (12.5%) and Asian (1.7%). Twelve percent of the cases are among workers of Hispanic origin.

The industries with the highest numbers of occupational asthma/RADS reports are in manufacturing (43.0%) and services (28.3%). The types of occupations where workers have the highest number of reports of respiratory disease are professional specialty (16.8%), administrative support (11.0%), precision production (11.0%), and machine operators and tenders (9.7%).

Asbestosis/Pleural Plaques

A recent analysis of the asbestos data compiled from Connecticut ODSS reports was conducted, utilizing cases reported from November 18, 1991 through February 11, 1999.¹⁹ There were 206 cases of asbestosis or asbestos-related disease (pleural plaques) in the data set, excluding mesothelioma, and lung, gastrointestinal, and laryngeal cancers identified by physicians as related to asbestos exposure.

Ages were recorded for 70 individuals, ranging from 40 through 99 years, with a mean of 62.7 years of age at the time of reporting. The mean number of years employed at the time of diagnosis reported on 28 subjects was 29.7 years. Of the 206 individuals, 1.5% were female, 98.1% were male, and gender was not identified in 0.5%. Race was distributed as follows: 81.6% White, 4.4% Black, 3% Asian, and 11.2% unknown. Most of the cases (195 cases) were reported by two occupational medicine clinics, and the remainder (11 cases) were reported by four other clinics in the state.

The primary diagnosis for 85 (41.3%) of the cases was asbestosis, while thickening of the pleura was the diagnosis for 121 cases (58.7%). Thirty-seven percent (76 cases) of all asbestos-related diseases were in shipyard workers. Symptoms/ findings/ test results were reported for 160 individuals. The predominant findings reported in these individuals were abnormal chest x-ray (84 persons, 52.5%) and shortness of breath (62 persons, 38.7%).

Occupations at the time of exposure included plumbers (30 cases), welders (14), electricians (11), construction workers (10), painters (9), sheet metal workers (9), welders (7), riggers (6), managers (6), and inspectors (6), totaling 52.4% of the cases of asbestosis and asbestos-related diseases. Other occupations accounted for 55 cases (27%). No occupation was listed for 43 (21%) of the cases.

In the ODSS data for 1996, there were 17 asbestos-related reports (10 of asbestosis and 7 of pleural plaques). For 1997, there were 5 asbestos-related reports (3 for asbestosis and 2 for pleural plaques). There were no reports in ODSS that *physicians* called “exposure to asbestos”. [The term “exposure to asbestos” is used in the WCC, but not by physicians sending reports to the ODSS.] These data were close to the number of reports sent by *employers* to the WCC data system, but the numbers were reversed for the two years. In the Workers’ Compensation system data, there were 21 reports of asbestos-related conditions in 1997. Fourteen of the 21 reports were for asbestosis (one also included lung cancer), 1 was for pleural plaques, and there were 6 reports called “exposure to asbestos”. For 1996, there were only 5 reports involving asbestos, 3 for asbestosis, and 2 reports called “exposure”. “Exposures” were mainly from demolition or remodeling of building structures containing asbestos. Note that asbestos-related diseases do not usually appear until 10 - 20 years after exposure, due to a long latency period.²⁰

The age-adjusted death rate for asbestosis in southeastern Connecticut reported by NIOSH for U.S. residents 15 years of age and older, 1982 - 1993, was in the range of 3.4 - 7.3 per million, which is twice as high as the U.S. rate.²¹ The comparable age-adjusted death rate for pleural malignancy, which may be expected to include pleural malignant mesothelioma, a tumor type that is strongly associated with asbestos exposure, was in the 3.3 - 5.0 per million range. Southeastern Connecticut is where many of the shipbuilding industries are located and from where many of the asbestosis and asbestos related disease cases have been reported.

Another recent analysis identified fatalities from occupational disease in Connecticut using reports to the Workers' Compensation Commission, CONN-OSHA, Vital Statistics, and the Connecticut Tumor Registry. Of 93 identified fatalities from 1995 and 90 such cases in 1994, the predominant occupational disease fatalities were asbestos-related: 74(40.4%) due to mesothelioma and 47 (25.7%) due to asbestosis.²² The authors noted that these data are almost certainly an undercount of occupational fatalities in Connecticut; that cautions must be applied in interpreting these data; and that under-reporting of fatal occupational diseases is a difficult problem to solve, since most chronic occupational diseases involve multiple exposures and have long latency periods.

Limitations/Barriers In Reporting

Data from the three main sources in Connecticut (ODSS, BLS, and WCC) are still not reflective of the extent of occupational disease in Connecticut. Approximately, *eighty percent* of the reports in the ODSS come primarily from the occupational medicine clinics around the state, which suggests significant under-reporting of occupational disease since all physicians are required to report. The 1996 BLS Survey recorded 6,021 cases of occupational disease reported by employers, compared with 2,148 physician reports sent to DPH's ODSS. Also, when comparing the 1995 cumulative trauma data reported by physicians in ODSS (608 cases) to the 1995 WCC's *Employer First Report Of Injury* data for cumulative trauma (740 cases), *there were only 53 cases that overlapped (reported to both systems)*.

A recent survey of Connecticut physicians in clinical settings showed that perceived barriers to reporting occupational diseases were uncertain diagnosis (78.9%), lack of time (60.5%), inconvenience (52.6%), too much paperwork involved (50.0%), fear of the possibility that ill employees may suffer negative consequences at work (26.3%), forgetting to report (23.7%), and fear of the possibility that employer may be inspected by DPH or OSHA (13.2%).²³ Other barriers that DPH has experienced with physicians are lack of knowledge about reporting requirements, lack of knowledge about occupational diseases, and the small monetary penalty for not reporting.

Electronic Reporting

A mechanism for transmitting data electronically would be beneficial to both the occupational health clinics and/or physicians who have a large volume of reporting and to the Departments of Labor and Public Health. It would eliminate filling out paperwork or printing out reports to be mailed to the DOL and would eliminate data entry of reports at DPH.

Problems encountered include: (1) lack of information system personnel at the clinics, DOL, and DPH; (2) a variety of in-place software systems that may be incapable of performing tasks to fulfill different objectives (i.e., central billing systems that cannot generate state-required disease reports); (3) lack of systems in clinics; (4) lack of funds available; and (5) lack of specific requirements. The clinics that are funded by DOL are currently not required to allocate a portion of this money to establish an electronic reporting system.

¹ U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. *Musculoskeletal disorders and workplace factors: a critical review of epidemiologic evidence for work-related musculoskeletal disorders of the neck, upper extremity, and low back*. Publication No. 97-141. Cincinnati, OH: National Institute for Occupational Safety and Health, 1997.

² Ibid.

³ Morse T, Dillon C, Warren N, Levenstein C, and Warren A. *The Economic and Social Consequences of Work-related Musculoskeletal Disorders: The Connecticut Upper-extremity Surveillance Project (CUSP)*. International Journal of Occupational and Environmental Health, 4:209-216, 1998.

⁴ Dillon CPI. NIOSH Grant #1R01 CCR 112118, "Upper Extremity Repetitive Stress Injuries [RSI]: Extent and Cost", 9/95-9/98.

⁵ Morse T, Dillon C, and Warren N. *Under-reporting of Work-related Musculoskeletal Injuries (WRMSD) in Connecticut: A Comparison of Population and Surveillance Estimates*. Report submitted for publication, 1999.

⁶ Morse T. *Ergonomics and repetitive strain injuries of the arms and hands at work: a Connecticut report*. Connecticut Workers' Compensation Commission, 1996.

⁷ *Stedman's Medical Dictionary 26th Edition*, Baltimore: Williams and Wilkins, 1995.

⁸ Storey E, ed. *Occupational Disease in Connecticut*. Connecticut Departments of Health Services and Labor, February, 1990.

⁹ Connecticut Department of Public Health Occupational Health Program data.

¹⁰ Connecticut Department of Public Health Lead Surveillance System data.

¹¹ Tucker S and Key M. *Occupational Skin Disease*, in Environmental and Occupational Medicine, 2nd edition. Ed. William Rom. Boston: Little, Brown and Company, 1992.

¹² Morse T. *Occupational Disease in Connecticut, 1999*. Workers' Compensation Commission, August, 1999.

¹³ There are no burn reports prior to 1992.

¹⁴ Morse T. *Occupational Disease in Connecticut, 1999*. Workers' Compensation Commission, August, 1999.

¹⁵ Chan-Yeung M. and Malo J-L. *Aetiological agents in occupational asthma*. EUROPEAN Respiratory Journal, 7:346-371, 1994.

¹⁶ Ibid.

¹⁷ Morse T. *Occupational Disease in Connecticut, 1999*. Workers' Compensation Commission, August 1999.

¹⁸ Jajosky RA et al. *Surveillance of Work-Related Asthma in Selected U.S. States Using Surveillance Guidelines for State Health Departments - California, Massachusetts, Michigan, and New Jersey, 1993-1995*. CDC Surveillance Summaries, Morbidity and Mortality Weekly Report, June 25, 1999.

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- ¹⁹ Hix CG. Interim report to Connecticut Department of Public Health. *Asbestos-related diseases in the Connecticut Occupational Disease Surveillance System*, 1999.
- ²⁰ Morse T. *Occupational Disease in Connecticut, 1999*. Workers' Compensation Commission, August, 1999.
- ²¹ Kim JH. *Atlas of Respiratory Disease Mortality, United States: 1982-1993*. U.S. Department of Health and Human Services, August, 1998.
- ²² Morse T and Storey E. *Fatalities from Occupational Disease in Connecticut*. Connecticut *Medicine*, 63:8, August, 1999.
- ²³ Constanzo L. Masters thesis: *Can the Health Belief Model Explain the Reporting of Occupational Illnesses by Physicians Practicing in Connecticut Occupational Health Clinics?* Southern Connecticut State University, 1999.

Chapter VI

SOCIAL AND ECONOMIC IMPACTS OF OCCUPATIONAL DISEASE

Consequences of Occupational Disease

The social and economic consequences of workplace disease and injury are emergent areas for research. This has been highlighted by NIOSH as one of the 21 priorities for the 21st century, and they have established a steering committee, including a Connecticut researcher, to guide them in this area.

In general, the study of issues facing workers who experience occupational diseases is difficult, and not much information is available specific to Connecticut workers. However, the UCONN DOEM population-based telephone survey was conducted in Connecticut to determine the social and economic impact of work-related musculoskeletal disorders (cumulative trauma disorders).¹ Findings from the UCONN study included economic and social information on 292 individuals who had a CTD during the previous year, compared with 551 respondents who did not have a CTD.

Sixty percent of the persons with CTD were the main wage earners in the household. Thirty five percent of the CTD cases had to reduce their work pace due to CTD, while 47% had cut down on home activities. Only 21% of individuals in this study who had medical visits or procedures for CTDs reported that these visits were paid for by workers' compensation. An average of \$489 per affected individual was spent annually for CTD-related medical expenses on an out-of-pocket basis.

The persons in this survey who had a CTD reported much higher levels of difficulty in daily tasks rated on a scale of activities of daily living. These results were statistically significant. They were 8 times more likely to have problems with child care, 35 times more likely to have difficulty bathing, and 23 times more likely to have difficulty driving. Other impairments included difficulties in writing, gripping, doing chores, opening jars, carrying bags, and brushing teeth and hair.

There were a number of severe social consequences experienced by respondents which were related to CTDs in the previous 12 months. They were 3.4 times more likely to lose their home, 2.5 times more likely to lose their car, 2.4 times more likely to move for financial reasons, 1.9 times more likely to lose their health insurance, and 1.9 times more likely to get a divorce. They were only half as likely to receive a promotion. This study shows substantial social and economic impact on workers.

In another study conducted by UCONN researchers, additional information on the socio-economic impact of occupational disease was evaluated.² Follow-back was made to patients with suspected occupational disease for whom an industrial hygiene worksite visit had been conducted, as well as follow-up contact with their employers. Through a cross-sectional

telephone survey of 63 employers and 52 patients, UCONN assessed a number of factors. It was ascertained that between the first clinic visit and their interview, the salaries of patients with the same employer did not change. However, their counterparts who changed employers experienced a median decrease in salary of 36 % and patients who failed to find a new job suffered a 90% decrease in income.

Barriers to Utilization of Occupational Health Resources

There are a number of structural barriers that prevent workers and employers from using occupational health services that are available, which were noted in the Connecticut 1990 baseline report.³ These include systems of payment for medical services, availability of medical services, job security of workers, liability of employers, and language and literacy skill of workers.

Current mechanisms designed to pay for medical care pose problems at several levels for those who seek occupational health services. Some issues affect ill workers and healthy exposed workers differently; others are more universal.

The ill worker with a work-related condition finds that medical insurance does not cover medical expenses because of the expectation that the worker compensation carrier will pay for these. Most occupational disease claims are contested, leaving a gap in coverage until resolution of the cause of the condition. In Connecticut, the worker is protected from not being covered by either carrier system by statute, but in fact must spend considerable time and anxiety redirecting medical bills. The ill worker with no medical insurance is in greater jeopardy when seeking medical care. Some 190,000 working people in Connecticut, 12.7% of the work force,⁴ had no medical insurance in 1989. It has been estimated that 12% of the Connecticut population under the age of 65 had no insurance in 1994.⁵ It has also been estimated that nationally, between 1987 and 1994, 19% of the privately insured population under age 65 was underinsured, if the individual were to be faced with a catastrophic illness.⁶

There has been an improvement since the 1990 Occupational Health Clinics bill in the ability of ill workers to receive an evaluation of their workplace exposures, because of the establishment of the network of occupational medicine and auxiliary clinics. Evaluations are now also possible through cluster investigations conducted by DPH, as well as through the CONN-OSHA Consultation Program. However, priority setting is still required, and universal investigations are not conducted by either the state agencies or the clinics. In a situation where there is a suspected outbreak of disease in a group of workers, the compensation carrier pays for examination and testing of symptomatic workers, but not necessarily of workers who are closely associated but who feel well. In these situations, particularly in small workplaces, sick workers seek care from a number of physicians and use several medical facilities; healthy workers with significant exposure generally are not evaluated.

Another barrier to care is the limited availability of occupational health services. At the time of the 1990 baseline report, it was noted that occupational health services were frequently located far away from where potential clients lived and/or worked, and mostly, only available during working hours. Although the network of DOL-funded occupational health clinics in Connecticut provides clinic sites in each major area of the state (see appendix for clinic list), the problem remains that workers lose income when they do take time out of their work day to use these services. Some workers do not seek medical care for work-related conditions because they fear a loss of job security. Additionally, some *employers* may also be reluctant to seek industrial hygiene consultations to identify and mitigate engineering controls and/or work practices that may cause work-related injuries/illnesses. At issue are questions of employer liability and having to pay for increased Workers' Compensation insurance premiums. DPH and the clinic providers have worked with employers during the past decade to enable them to develop a longer view, which demonstrates how increasing access to occupational health services provides measures of prevention, which leads to decreased liability and treatment costs.

The barriers to health care and appropriate occupational safety and health training which are experienced by those whose primary language is other than English are discussed in the next section.

¹ Morse TF, Dillon C, Warren N, Levenstein C, and Warren A. *The Economic and Social Consequences of Work-related Musculoskeletal Disorders: the Connecticut Upper-extremity Surveillance Project (CUSP)*. International Journal of Occupational and Environmental Health, 4: 1998.

² Bracker A, Blumberg J, Hodgson M, and Storey E. *Industrial hygiene recommendations as interventions: A collaborative model within occupational medicine*. Applied Occupational and Environmental Hygiene. 14:85-96, 1999.

³ Storey E, ed. *Occupational Disease in Connecticut*. Connecticut Departments of Health Services and Labor, February, 1990.

⁴ Rebenske WW, Jr. *A public health perspective on the uninsured*. Connecticut State Department of Health Services, June 1, 1989.

⁵ Office of Policy, Planning, and Evaluation. *Looking toward 2000. An assessment of health status and health services*. Connecticut Department of Public Health, January 1999.

⁶ Ibid.

Chapter VII

WOMEN, MINORITY POPULATIONS, ADOLESCENTS, AND OLDER WORKERS

The Connecticut DPH seeks to address the needs of underserved populations, among which are women, minorities, youth, and elderly, in its planning, assessment, and intervention programs. Systematic prevention efforts may be undertaken, as special needs are identified in these populations in the work force.

Women

Women comprised 49 % of the Connecticut work force in 1997 (see Table IV-3)¹. For particular occupational disease disorders, physicians reported higher percentages of cases in women: cumulative trauma disorders (60%) and infectious diseases (59%). For carpal tunnel syndrome (CTS), which accounts for 27% of all CTD reports in the ODSS, there are more than twice as many reports among female (68%) vs. male (32%) workers. Tendonitis accounts for 26% of the CTD reports in the ODSS. As with CTS, more women than men are affected by this disorder, 63% vs. 37%. There were lower percentages of reports in women for respiratory diseases and disorders (30%), skin diseases and disorders (37%), poisonings (10%), and hearing loss (4%).

In terms of particular industry sectors reported in the ODSS, physicians reported more occupational disease cases among women than among men for workers in the retail (59.5% women), finance (82.6% women), and services sectors (65.7% women). There were equal numbers of reports for female and male workers in the agriculture sector.

The majority of case reports from the four occupation groups with the most numbers of reports are among women: administrative support; service occupations; fabricators, assemblers, and handworking; but not in machine operators and tenders. There are higher numbers of disease reports among women vs. men in the occupation groups: professional specialty (71.3%), technicians and related support (60.8%), sales (75.2%), private household (100%), and product inspectors, testers, samplers, and weighers (80.4%).

Women's reproductive health is an area not covered in the ODSS data. This is an area where specific targeted research needs to be undertaken. A recent review identifies epidemiological research on occupational hazards and reproductive health as a strongly developing field of research.² Research on the reproductive effects of job stress and individual susceptibility to reproductive toxicants are also gaining in importance as recently developed methods of exposure assessment provide new possibilities to improve the validity of exposure data. Research on fertility and pregnancy abnormalities is one of the 21 priorities identified by NIOSH as part of the National Occupational Research Agenda.

Minority Populations

The majority of the workers with occupational disease reports in the ODSS, as noted in Chapter V, are White (84.7%), followed by Black (10.9%), Asian (2.6%), American Indian (0.1%), and other (1.7%). Of all the races, 16.2% were of Hispanic origin. These percentages may be compared with U.S. Census data for Connecticut in 1990; DOL Current Population Survey data for 1997, which represent the number of persons employed during the year; and the ODSS (Table VII-1).

Table VII-1

Comparison of Race/Ethnicity by Data Source			
Race/Ethnicity	U.S. Census 1990 (%)	% Persons Employed Current Population Survey, DOL, 1997	ODSS Reports (%)
White	87.0	87.0	84.7
Black	8.3	11.0	10.9
Asian	1.5	*	2.6
American Indian	0.2	*	0.1
Hispanic (all races)	6.5	6.0	16.2

* Individual data not available.

The percentage of Blacks employed in 1997, 11.0%, is comparable to the percentage of reports for Blacks in the ODSS overall, 10.9%, which covers the period 1990 - 1998. However, there were only 8.3% reported as Black in Connecticut in the U.S. Census figures for 1990. Comparing this percentage to the ODSS data, it appears that there could be an over-representation by Blacks in the ODSS by about 35%. However, these data should be interpreted with caution, since the variable called "race" was not completed on 42% of the disease reports. It should also be noted that barriers to health care and insurance may affect access to physicians, thereby reducing the numbers of physician-generated reports that are sent to DOL/DPH for inclusion in the ODSS.

Persons of any race may be of Hispanic origin. Hispanic origin was only reported on 40% of the ODSS reports, which again does not give a complete picture about who are affected by physician-reported occupational diseases. However, it appears that those of Hispanic origin (16.2%) may be over represented by more than a factor of two in the ODSS, whether comparison is made with the 1990 Census data (6.5%) or the 1997 survey of the working population (6.0%). This could be related to the types of exposures and working conditions experienced by that population. Another factor could potentially be related to language

barriers. The same caveats apply concerning access to care as for Blacks, as the rate of avoidable hospitalizations for those of Hispanic origin was 60% greater than that of Whites.³

For particular occupational diseases, Blacks, Asians, and those of Hispanic origin may be over-represented. The majority of workers with CTD reports are White, 81.1%, followed by Black, 14%, Asian, 3.4%, American Indian, 0.1%, and other 1.5%. Fifteen percent of the workers were of Hispanic origin. These figures may be compared to the numbers in Table VII-1. The majority of workers with CTS reports are White, 81.2%, followed by Black, 16%, Asian, 1.9%, and other, 0.9%. Eleven percent of workers were reported to be of Hispanic origin. Only 29% of the burn reports had Hispanic origin completed, but of these, 20% were of Hispanic origin. This is about three times the percent to be expected on the basis of Census or Current Population Survey data.

An important factor to be considered when assessing the occurrence of occupational disease in populations whose primary language is not English is the availability of appropriate health and safety training. Occupational health and safety training is required to be given by employers for all hazards to be encountered on the job. As noted in the Connecticut 1990 baseline report, health and safety training and education programs for workers, whether at the worksite or in other settings, may encounter language and/or literacy barriers. During the 1980 census, over 14% of Connecticut residents principally spoke languages other than English. Six hundred thousand Connecticut adults, many of whom are still in the work force, were without a high school diploma. Of these, 340,000 were considered functionally illiterate, either in English or in another language.

Failure to comprehend written and verbal training materials leaves workers at much greater risk for occupational disease and injury. Language and literacy issues similarly interfere with a worker's ability to seek and use medical care.⁴ When conducting occupational disease cluster investigations, DPH Occupational Health Program staff have noted training problems based upon non-English speaking workers receiving English-only instructions at certain Connecticut worksites, particularly if workers are recent immigrants. Besides the inadequacy of training sometimes received by workers with a primary language other than English, the workers have a lack of awareness about their right to be employed in a healthy workplace. The DPH Occupational Health Program has developed and/or provided occupational health information in Spanish and Greek to address the needs of workers whose primary language is not English.

Adolescent Workers

Adolescent workers are defined as individuals between the ages 14-17 who are employed. There are approximately 165,000 youths between the ages of 14-17 in Connecticut. According to the BLS, 51% of 16-19 year olds work and account for 6% of the civilian work force. There currently are no statistics regarding the percentage of working 14-15 year olds.

The ODSS has not received any disease reports for workers in this age group, most likely because their primary care providers are pediatricians who are unaware of the reporting laws or that they apply to all workers regardless of age. Overall, Connecticut has very little information about how or how often teens under 18 are injured or become ill from work. Besides the ODSS, two other potential sources of information about disease and injury in adolescent workers are the WCC and the BLS. Some highlights of what is known from these data sources, which are reported by employers, follow:

- 300 Workers' Compensation claims were filed from January 1997 to September 1998 by teens under 18 years of age.
- Eighteen percent of the Workers' Compensation claims were for cuts and lacerations, 10% were for back injuries, and 9% were for burns.
- The injuries recorded in Workers' Compensation claims occurred in the following types of employment categories: eating and drinking establishments (23%), general merchandise stores (21%), amusement and recreation services (6%), health services (5%), and public administration (state and local government) (5%).
- "Slips, trips, and falls" were the cause of almost a fifth of the injuries (17%), while motor vehicle accidents (2%), and assaults (0.3%) accounted for very few.
- According to the Bureau of Labor Statistics (BLS), five Connecticut youths under age 18 died on the job during the past seven years (1992-1998).⁵

Young workers in Connecticut are a very important part of the work force. In Connecticut, young workers are protected by the child labor laws, which restrict the type of work they can do and how many hours they can work. Young workers are at high risk of injury and disease, because they lack training, work experience, maturity, and knowledge of their rights. These injuries and diseases may disable them or follow them into adulthood. DPH is currently involved in a multistate pilot project to address adolescent injuries (the Adolescent Worker Project).

Older Workers

The average age of workers throughout the United States has been increasing, from 37 in 1992 to an expected age of 41 in 2005.⁶ The number of workers in the 55 to 64 year old age range is also increasing. The number of men in that bracket is expected to rise by 43%, while the number of women in that age group is expected to increase by 63%. It is expected that many older workers, aged 55 to 64, will continue working, despite a wide range of medical impairments.⁷ A requirement of the Americans with Disabilities Act, which was passed in 1991, is that employers with 15 or more employees make reasonable accommodations to allow

workers with disabilities to participate in the work force. This can be expected to affect decisions by older workers to continue in the labor force.

One consequence of the rising age of workers is that these workers, as they experience impairments, may be more prone to occupational injuries and diseases. A recent prospective study of 5,600 employed non-farmers found that poor sight and poor hearing, as well as work disabilities in general, are associated with occupational injuries among older workers.⁸ This study also found that certain occupational groups were associated with higher rates of occupational injury. These included service personnel, mechanics and repairers, operators and assemblers, and laborers. Jobs that required heavy lifting were also associated with greater degrees of occupational injury and disease (repetitive trauma).

¹ Connecticut Department of Labor, Local Area Unemployment Statistics (LAUS) program

² Lindbohm M-L. *Women's Reproductive Health: Some Recent Developments in Occupational Epidemiology*. American Journal of Industrial Medicine, 36, July, 1999.

³ *Ibid.*

⁴ Storey E, ed. *Occupational Disease in Connecticut*. Connecticut Departments of Health Services and Labor. February, 1990.

⁵ Census of Fatal Occupational Injuries Program, Bureau of Labor Statistics, Connecticut Department of Labor, 1999.

⁶ Fullerton HN. *Another look at the labor force: the American work force, 1992-2005*. Monthly Labor Review, 116, 1992. Quoted in: Zwerling C, Sprince NL, Davis CS, Whitten PS, Wallace RR, and Heeringa SG. *Occupational Injuries Among Older Workers With Disabilities: A Prospective Cohort Study of the Health and Retirement Survey, 1992 to 1994*. American Journal of Public Health, 88:11, November, 1998.

⁷ Fullerton HN. The 2005 labor force: growing, but slowly. Monthly Labor Review, 118, 1995. Quoted in: Zwerling, *op.cit.*

⁸ Zwerling C, Sprince NL, Davis CS, Whitten PS, Wallace RR, and Heeringa SG. *Occupational Injuries Among Older Workers With Disabilities: A Prospective Cohort Study of the Health and Retirement Survey, 1992 to 1994*. American Journal of Public Health, 88:11, November, 1998.

Chapter VIII

USES OF OCCUPATIONAL DISEASE DATA: INVESTIGATION, INTERVENTION, EDUCATION

Uses Of The Occupational Disease Surveillance System

A guiding principle of the Connecticut Occupational Health Program is that occupational disease is preventable. Data from the ODSS on occupational disease in the Connecticut work force are used to guide follow-up and intervention activities at multiple levels: that of the individual worker, the workplace, and the industry sector so that further disease can be prevented. Data on occupational disease occurrence and prevention are shared with physicians and other health providers, with local health departments, and with agencies and professional organizations which have expertise in occupational safety and health. Collaborative partnerships have been, and continue to be, fostered and developed which utilize the expertise of the various sectors of the economy.

Efforts of the Connecticut Occupational Health Program to educate the public about the uses of data from the Occupational Disease Surveillance System are set forth in several issues of the *Connecticut Epidemiologist*.

Protocols For Occupational Disease Recognition And Follow-Up:

Occupational History

DPH produced a videotape and accompanying physician's guide to assist health professionals in recognizing occupational and environmental factors which may be related to their patient's condition.¹ The video emphasizes the importance of taking an environmental/occupational history for patients. These materials have been widely distributed throughout the state.

Occupational Asthma

The occupational asthma interview protocol was developed in 1995 through collaborative work with the UCONN and Yale Occupational and Environmental Medicine Programs, and was implemented in 1996. It entails: (1) contacting physicians who report cases of occupational asthma and sharing an information packet; and (2) administering a telephone questionnaire to workers who are reported as cases to learn more about workplace practices and conditions leading to exposures that may cause asthma. DPH uses the information gleaned to guide specific investigations and to develop educational materials about exposures which may cause disease. One such example is a thrice-yearly newsletter, *Occupational Airways*, sent to 5,000 health care providers, which is in its fifth year of publication by DPH.

Lead poisoning: the ABLES Program.

When DPH receives a blood lead level report of 20 µg/dL or greater, a packet containing a letter generated by the LSS that notifies the adult of their blood lead result, information about lead poisoning prevention and a survey designed to elicit information about sources of the person's exposure and potential for take-home lead, along with a postage-paid envelope, are sent to the affected worker by the Adult Blood Lead Epidemiology Surveillance (ABLES) program coordinator. A copy of the worker's letter and an introductory letter are sent to the local health department where the worker lives, if they are a resident of the state of Connecticut. While all household members may be potentially poisoned by lead brought home from a job site on a worker's clothes or shoes, there is particular concern about exposure of children under 6 years of age since lead poisoning can cause developmental and neurological disorders in young children whose brains have not yet fully developed. To date, 1,455 follow-up packets have been sent, with responses received from 433 (30%) individuals.

Case management for all workers with BLLs \geq 40 µg/dL is conducted by the ABLES coordinator. Telephone contact is immediately initiated with all workers with blood lead levels \geq 40 µg/dL to educate them about their lead poisoning. This is done in addition to the written materials that are sent.

When information is obtained about the company for which a worker with BLL \geq 40 µg/dL works, the company is also sent a detailed letter about the lead overexposure. The letter requests a response about their lead health protection practices and their plans to implement changes, as well as offering options for evaluating the lead exposures in their facility. The Consultation Program of Connecticut OSHA is always suggested as one means of such evaluation. If the company is a firm working on bridge construction projects, the CRISP/CLINIC protocol is followed (See description below). If a company fails to respond adequately to letters from DPH, a referral is made to Federal OSHA, which investigates pursuant to a Memorandum of Understanding with DPH.

Disease Cluster Investigations

Silicosis: Foundries

When a case of silicosis is reported to DPH via the ODSS, the Occupational Health Program (OHP) protocol is to begin an immediate follow-up investigation. Due to the insidious nature of silicosis and the frequent misdiagnosis, OHP believes that a single case represents the "tip of the iceberg". This assumption has proven to be true, as OHP has uncovered silicosis clusters in three foundries in Connecticut. The OHP approach has been to interview the case, perform a medical records review, and to meet with foundry management and union leaders to review findings. At these meetings, OHP has worked collaboratively with partners from the University of Connecticut and/or Yale Occupational and Environmental Medicine Programs, and with the Connecticut OSHA Consultation Program. The focus of these meetings has been to assist in

design of medical surveillance programs for workers, and industrial hygiene interventions to reduce employee exposures to silica, as well as to review progress, discuss difficulties, and look for practical solutions. As a result of this work in foundries, the University of Connecticut Division of Occupational and Environmental Medicine developed a document for DPH to share with foundry management describing the necessary components of a medical surveillance program for silica. The program stresses communication with employees, and compliance with OSHA regulations.²

Mercury Poisoning: Metals manufacturing, fluorescent light bulb manufacturing

There have been several instances reported to OHP of workers who were poisoned by mercury vapor due to the use of this metal in their workplace. One instance was an acute poisoning that affected the entire work force (about 100 workers) in a metals manufacturing facility. The occupational medicine clinic involved in this investigation identified the causative agent [mercury fume and mercury vapor], diagnosed and treated workers, and medically followed them for several years subsequent to the acute incident. In conjunction with this investigation, DPH/EEOH performed a field study to analyze take-home mercury in family members of the workers.

Two other instances involved chronic mercury poisonings in two fluorescent light bulb manufacturing facilities. Using the OHP team approach with members of the University of Connecticut and Yale Occupational and Environmental Medicine Programs, management of the companies were encouraged to institute a medical surveillance program for mercury, and industrial hygiene interventions to reduce employee exposure. OHP continues to review urine mercury results from workers at these plants as a surveillance measure, to ensure that workers are not being overexposed while on the job.

Hypersensitivity pneumonitis: Metalworking fluids

A sentinel case was evaluated at an occupational medicine clinic and reported to DPH. The occupational medicine clinic then performed further evaluation of the work force and uncovered a large cluster of affected workers. They apprised DPH, CONN-OSHA, and the local health department of their continued follow-up with this company. DPH and the University of Connecticut Division of Occupational and Environmental Medicine requested a NIOSH consultation, which is ongoing. During this consultation, a “control” plant was also evaluated for possible risk factors for hypersensitivity pneumonitis.

Ergonomics: Catalog distribution center, various manufacturing facilities

By reviewing cases of CTDs reported by physicians to the ODSS, several facilities have been identified as having more than 100 workers with reported CTD cases. DPH has conducted site visits with an ergonomist from the University of Connecticut Ergonomics Technology Center

(ErgoCenter). The site visits resulted in recommendations being made to companies that would reduce the incidence of CTDs in workers.

Industry-Wide Surveillance/Intervention

Connecticut Road Industry Surveillance Project (CRISP).

CRISP was a national demonstration project funded by NIOSH in its early stages (1990-1996). It continues today through the Connecticut Department of Transportation (DOT). Contract specifications require contractors to have in place a Lead Health Protection Plan for all bridge construction projects in Connecticut. This includes on-site industrial hygiene and routine monitoring of BLLs for workers exposed to lead by DPH. This model has been described elsewhere.³

CRISP (now called “CLINIC”) was developed as a statewide health monitoring project designed to identify and limit lead poisoning and other job-related illnesses in Connecticut bridge workers. Through a NIOSH-funded subcontract from Yale University Occupational Medicine Program, DPH provided facilities and epidemiological support for the CRISP program and database. Under CRISP/CLINIC, persons working on Connecticut bridges who may be at risk for lead poisoning by burning, blasting or scraping lead paint are followed periodically with an examination and a blood test for lead. This medical monitoring is performed by certain occupational health clinics that use a uniform medical protocol developed for the CRISP program. Worksites having workers with elevated BLLs are surveyed by the industrial hygienist (required under the Lead Health Protection Program) to identify methods to lower the risk of exposure. At present, 23 clinics geographically spread throughout the state follow the CRISP/CLINIC medical protocol to examine workers

Lead abatement/home renovation workers

DPH is working proactively to increase awareness of lead monitoring requirements and reduce lead exposures to lead abatement workers. Since 1994, the Connecticut DPH has certified the training programs for lead abatement workers, and maintains a listing of licensed lead contractors and certified lead workers. On January 1, 1996, permanent regulations became effective in Connecticut making it mandatory for six classes of lead abatement contractors, consultants or workers to be either licensed or certified. All BLLs from these workers are entered into the LSS database.

The Occupational Health Program (OHP) has worked jointly with other agency units to develop materials and conduct training for the lead abatement industry sector. OHP, in conjunction with the lead licensing and certification program in DPH and the regional office of the Occupational Safety and Health Administration (OSHA), has developed two educational handouts which are provided to all lead abatement workers in Connecticut. These materials, “Personal Protective Equipment and Hygiene Practices,” and “Health Monitoring Procedures for Lead Abatement

Personnel” (Appendix) describe in tabular format: (1) the Connecticut requirements, (2) the OSHA requirements, and (3) a simple explanation of the requirements. OHP has participated in two major training workshops with the regional OSHA office and other DPH programs to present these educational materials to lead abatement workers.

DPH, in collaboration with the New England Lead Coordinating Committee, is sponsoring the *Keep it Clean Campaign* for Connecticut. The first stage was a pilot study in May 1998 conducted in the city of Manchester, Connecticut. DPH printed 75,000 brochures in English and Spanish which were distributed in a major paint product outlet, as well as all hardware stores in town. Shelf markers were placed to indicate products throughout the stores which could be used in lead-safe practices. This phase employed a 30 minute training of hardware store personnel, who in turn were able to help both renovators and homeowners to do renovation projects in a lead-safe way. The second stage, which took place during April, May, and June, 1999 in 13 towns and 61 hardware stores, emphasized educating the public, in addition to the above mentioned personnel, about lead-safe practices through both a media campaign and educational sessions. The media campaign was highlighted by a banner hung on Capitol Avenue and a billboard on Weston Street overlooking the highway. A new EPA regulation which requires all renovators to give EPA-sponsored pamphlets about lead-safe practices and lead poisoning to homeowners and/or renters, before renovations are to begin, will build upon this educational background to help the public keep themselves lead-free. The third phase of the Keep It Clean Campaign, to be held this year, will include production of a video, which will be used by all the participating states, and half-day training sessions for home renovation contractors.

Adolescent Worker Pilot Project

The Education Development Center (EDC), Inc., Newton, MA, was awarded a three- year grant from NIOSH to create a *Young Worker Resource Center* and to fund five community adolescent worker projects in five states, including Connecticut. DPH's role was to choose a community in Connecticut to conduct a pilot project utilizing materials developed by EDC in order to evaluate the materials and to educate adolescent workers (less than 18 years of age) about injury prevention and the child labor laws. The community chosen to participate in the pilot is Middletown, Connecticut. DPH staff from the Occupational Health Program, Family Health, Injury and Violence program are working closely with the health educator at the Middletown Health Department and staff at the Department of Labor, Wages and Hours Division. The pilot project, which began during the summer of 1999, targeted youth employed by the city of Middletown, utilizing a trainer from the Middletown school system. This program is currently being expanded.

Recently, EDC, along with the Harvard School of Public Health, was awarded a grant from NIOSH to prevent burn injuries in restaurant workers by reducing their exposure to hot grease burn hazards. The Workers' Compensation data showed that 23% of injuries to adolescent

workers occurred in Eating and Drinking places, and burns accounted for 9% of the claims. The project involves utilizing sanitarians at two local health departments to document workplace hazards and to deliver educational intervention. In Connecticut, Middletown Health Department will be participating in this project.

Professional Education

Northeast Regional Occupational Disease Surveillance Conference.

Connecticut has served as the host of nine regional Occupational Health Surveillance meetings over the past ten years for mutual sharing regarding the several northeast state approaches to surveillance and intervention. The purpose of the conferences has been to share information about each state's surveillance programs, to exchange successful approaches and interventions, and to discuss ideas for improvement. Discussions at the most recent conference, in May 1999, centered around taking the knowledge about occupational diseases acquired through the various surveillance systems among the states, and applying this knowledge to begin to look at industry-wide interventions. Some of the areas discussed included hypersensitivity pneumonitis associated with metal working fluids, heavy metal poisonings in certain industrial sectors, occupational asthma, and repetitive strain disorders.

Turning Diagnosis Into Prevention Conference

On June 26, 1996, DPH/EEOH sponsored a full day conference for occupational medicine providers. This was done in partnership with the Connecticut Departments of Labor and Workers' Compensation Commission, University of Connecticut and Yale Occupational and Environmental Medicine Programs, and the Occupational Medicine Auxiliary Clinics Network. Presentations were made in the *Focus on Prevention* section of the conference on investigating a silicosis cluster in a foundry; long term follow-up of chemical liver injury among fabric workers; discovering an epidemic of occupational mercury poisoning from an index case; a back injury prevention program in a Connecticut hospital; reducing latex exposure in a hospital; upper extremity repetitive strain in Connecticut; and a discussion of what has been learned through occupational surveillance in Connecticut. The afternoon consisted of concurrent workshops on a variety of topics: preventing occupational disease through use of industrial hygiene approaches in a clinic setting; a latex allergy workshop which included a section about moving a hospital towards becoming safe for employees and patients with latex allergy; managing a workplace surveillance program; evaluating industrial hygiene intervention outcomes for clinic patients; occupational asthma diagnostics, asthmagens and case studies; and intervention for repetitive strain injuries. The conference also hosted a panel discussion about workers' compensation treatment guidelines.

Indoor Air and Schools Conferences

In February 1997, DPH staff collaborated with presenters from the UCONN and Yale Occupational and Environmental Medicine Programs to present a conference for 67 local public health officials regarding investigation and evaluation of indoor environmental quality problems in schools (“School Buildings and Illness: Tools for Local Health Departments”). This was followed by a second, expanded conference with some 200 attendees. In October, 1998, DPH collaborated with the US EPA Region I, Connecticut Association of Directors of Health, Connecticut Environmental Health Association and the Connecticut Association of School Business Officials to sponsor a conference about indoor air quality in schools, highlighting the “Tools for Schools” approach. Presenters at this well-attended conference included some DPH colleagues from the Occupational Health Clinics network.

Quarterly Technical Seminars, Occupational Health Surveillance Working Group.

The Occupational Health Surveillance Work Group, a multiagency group, including the Department of Public Health (DPH), Department of Labor, Worker’s Compensation Commission and the occupational health clinics and the auxiliary occupational health clinics, convenes on a quarterly basis to discuss and address occupational health issues, many of which arise from the occupational disease clinics and the occupational disease surveillance database. In 1995, the workgroup revised the *Physician’s Report of Occupational Disease* form. The group has been working towards an electronic system for reporting data on illnesses and injuries from the clinics to reduce paperwork and data entry time. Beginning in 1997, the quarterly meetings have taken on a new format. Guest speakers have been invited to make presentations on a variety of occupational health topics at each meeting. Topics discussed thus far have been: New OSHA Reporting Guidelines; Farmington Valley Health District’s Survey Of Dentists And Nursing Home Workers Regarding Knowledge About Latex Allergy; Hypersensitivity Pneumonitis; Occupational Health and Safety for Fire Fighters; Pesticide Surveillance of Workers in a Mid-Sized Agribusiness; UCONN Ergonomic Prevalence Study Results; Surface Mining In Connecticut; Update On Low Back Disorder; Yale SPRAY Study (Isocyanate Asthma in Auto Body Shop Workers); and Noise and Hearing Loss Prevention Programs.

Local, State and National Occupational Health Dialogues.

DPH staff made presentations about occupational diseases in Connecticut and about latex allergy at a conference sponsored by the Northeast Health District (March 1998) called *Work Healthy, Work Safely*. Attendees were from the manufacturing and health care sectors. Connecticut staff have also presented workshops nationally at NIOSH-sponsored meetings on Occupational Disease Surveillance and Adult Blood Lead Epidemiology Surveillance (ABLES) programs based on Connecticut experience in setting up a lead registry surveillance and in controlling lead exposure to workers. Additionally, DPH hosted staff from the Southern California Workplace Lead Project, as well as a NIOSH-based Epidemic Intelligence Services (EIS) Officer, to share activities and approaches to controlling lead exposure to workers.

Metalworking Fluid Hazards and Disease Prevention: State of the Art Control Strategies

Another educational effort yielding interest from a national audience was a conference held under the auspices of the University of Connecticut Health Center on November 15, 1999 to address the needs of those in the manufacturing sector who use metalworking fluids. The planning and execution of this conference was carried out with the involvement of union and industry trade groups, as well as UCONN, DPH, and DOL, with participation from the National Institute for Occupational Safety and Health (NIOSH) and the U.S. Department of Labor, OSHA Division. The conference has spurred ongoing interest among small manufacturing facilities in Connecticut, and an ongoing task force has been formed.

Educational materials

Various educational activities have been targeted toward high priority diseases such as occupational asthma, lead poisoning, mercury poisoning, occupational dermatitis, and cumulative trauma disorders. Some of these are described below.

Occupational Airways

A major means of disseminating information about respiratory diseases, their causes, prevention, and resources for action, is *Occupational Airways*. The newsletter's purpose is to educate and increase awareness about occupational asthma and other work-related respiratory conditions, e.g., hypersensitivity pneumonitis and Reactive Airways Disease Syndrome (RADS), as well as being a means to encourage increased reporting and surveillance efforts. It has served as a vehicle to initiate actions around particular exposures, such as those in nail salons or autobody shops, or affecting particular worker groups, such as animal handlers. A complete list of topics is in the Appendix.

Occupational Latex Allergy.

An informational pamphlet for workers with latex allergy has been developed. The pamphlet gives some background information about latex, and describes symptoms, types of exposures, high risk groups, and an action plan for those workers who think they may have latex allergy. Copies of the pamphlet were given to local health departments with full time health directors, and to various occupational medicine clinics throughout the state. DPH has also developed a slide presentation about latex allergy targeting health care workers. DPH staff can give the presentation to groups or organizations in their own workplaces or in conference-style settings.

Occupational Lead Exposure.

A physician's education pamphlet, as well as fact sheets for lead-exposed workers, lead abatement contractors, and employers, have been developed and disseminated. These feature information about lead health effects, means of reducing exposures to lead, medical monitoring

requirements, and personal protective equipment. New fact sheets are planned targeting lead exposure in populations such as self-employed painters, and those who work in sheltered settings, such as nursing homes and mental health facilities, using pottery glazes, etc.

Cumulative Trauma Disorders.

Four fact sheets for employees and employers on cumulative trauma disorders (CTDs) were developed and completed, in conjunction with the Ergonomics Center of Connecticut. One is a general fact sheet on CTDs, their definitions, causes, and prevention. The other three are industry-sector specific fact sheets: manufacturing, construction, and office work.

¹ Connecticut Department of Public Health. *The Environmental and Occupational Exposure History: A Key To Better Care of Your Patients*. Videotape and accompanying handbook. Undated (1991).

² Storey E. Components of a medical surveillance program. Letter to Carolyn Jean Dupuy, February 20, 1996.

³ Gordon B, Maurer K, Dupuy CJ. *Coordinating federal and state lead control activities: the Connecticut model for integrated lead exposure enforcement*. Applied Occupational and Environmental Hygiene, 10(6), June, 1995.

Chapter IX INTERVENTION EFFECTIVENESS

Several analyses have taken place to evaluate the effectiveness of interventions in which DPH has had involvement. One analysis was used to review BLLs for individuals or companies which have received follow-up or interventions under the lead protocols. A current analysis is being conducted to evaluate the impact of DPH's interventions on workers with elevated BLLs and employers requesting assistance to address lead exposures in their workplaces. These evaluations will continue to be an important part of DPH efforts to assist workers and employers minimize occupational exposures that can result in negative health consequences.

Lead Protocol

In 1994, DPH assessed the effectiveness of the lead intervention protocol for workers who had a BLL ≥ 40 $\mu\text{g}/\text{dL}$ during 1993 and the first half of 1994. These workers had all been contacted by DPH, and letters sent to their companies or phone calls made to the industrial hygienist overseeing the project, if the worker was involved in CRISP. The median pre-intervention BLLs for the 57 workers in 36 companies was 48 $\mu\text{g}/\text{dL}$, while the median of the most recent (post-intervention) BLLs at the time of the analysis had decreased to 31 $\mu\text{g}/\text{dL}$.¹ This 35% decrease in BLLs demonstrates that it is possible to significantly lower lead exposure in these workers, and that industrial hygiene oversight is a necessary component of the intervention.

CRISP Protocol

Several analyses of bridge construction workers in Connecticut have been conducted in light of the CRISP project. A review of the CRISP data overall through September 1994 was published in *Morbidity and Mortality Weekly Report (MMWR)*.² This review showed that the strategies employed by CRISP resulted in a decrease by about half in the average BLLs for carpenters, iron workers/welders, painters/blasters, and laborers/groundsmen when data from 1991-1992 were compared to data from 1993-1994. The latter period represents the time during which the DOT lead health and safety specifications were first included in all relevant DOT contracts and the CRISP protocol was fully implemented.

In a separate analysis for NIOSH, DPH evaluated the impact of federal OSHA's Lead in Construction Standard, which was fully implemented as of August 2, 1993. All 499 construction workers (SIC codes 15 - 17) in the LSS were coded as CRISP (411 workers) or non-CRISP (88 workers), both for the year pre-standard and the year post-standard. The median pre-standard BLL for CRISP workers (who had had the benefit of participation in the CRISP medical monitoring and industrial hygiene protocol), 19 $\mu\text{g}/\text{dL}$, was lower than the pre-standard median for non-CRISP construction workers, 32 $\mu\text{g}/\text{dL}$. For the year post-standard implementation, the medians of both groups decreased. The CRISP workers' median BLL was

18 µg/dL, while the non-CRISP construction workers' median BLL was reduced to 22 µg/dL. The differences were statistically significant.³

Industrial Hygiene Site Visit Protocol

A recently published study by authors from the UCONN Division of Occupational and Environmental Medicine, a collaborator with DPH, evaluated the effectiveness of conducting industrial hygiene worksite visits for patients with suspected occupational disease. These worksite evaluations are specifically funded under the Occupational Clinics bill.

Through a cross-sectional telephone survey of 63 employers and 52 patients, UCONN evaluated the factors associated with the implementation of recommended interventions. According to the employers, 78 percent had implemented at least one recommended intervention, and 52 percent had implemented the priority intervention- the one intervention that would do the most to protect the patient from the exposures potentially associated with his or her illness. Taking into account the co-workers in the patients' immediate work environment, the implemented interventions potentially benefited a total of 1,204 workers.

They found that patients were 10.4 times more likely to stay employed if their employers implemented any one of the recommendations from the site visit and 13.3 times more likely if the priority recommendation was adopted. Employers were 3.7 times more likely to implement the priority intervention if they believed a worker's illness was work-related, which highlights the importance of the physician's role in working with the patient's employer. Preliminary data from the study weakly suggested that patients' health status may improve if employers implement the IH priority intervention. Patients who reported disease improvement were 5.5 times more likely to state that their illness had not adversely affected their chances for promotion or pay increases. This study demonstrates that worksite intervention can be beneficial to workers and can result in change in workplaces.⁴

¹ Connecticut Department of Public Health data. Letter from Carolyn Jean Dupuy to John Stanton, April 17, 1995.

² Maurer K *et al.* *Controlling lead toxicity in bridge workers -- Connecticut, 1991-1994.* Morbidity and Mortality Weekly Report, 44:4, Feb. 3, 1995.

³ Jung BC. *Evaluating the Lead in Construction Standard in Connecticut.* NIOSH Cooperative Agreement No. UGO/CCU108456-03. Connecticut Department of Public Health, April 23, 1996.

⁴ Bracker A, Blumberg J, Hodgson M, and Storey E. *Industrial hygiene recommendations as interventions: A collaborative model within occupational medicine.* Applied Occupational and Environmental Hygiene, 14:85-96, 1999.

Chapter X CONCLUSIONS AND RECOMMENDATIONS Further Directions

Conclusions

Occupational diseases still affect Connecticut workers. Analysis of data specific to Connecticut suggests that large numbers of workers are affected by diseases which are often disabling. The annual number of occupational diseases in the BLS survey is greater than at the time of the 1990 baseline report, primarily due to increases in cumulative trauma disorders. According to Occupational Disease Surveillance System (ODSS) data, over 75% of workers affected by occupational diseases are young, 20 to 49 years of age. Proportions of reports in the ODSS for Asian and "other" and Hispanic workers appear high when compared with Connecticut's working population

Occupational diseases are difficult to identify. Diseases caused by conditions at work are not recognized for several reasons. Many diseases may not become evident for many months or years after the beginning of the exposure(s). This latency period often prevents workers and physicians from recognizing the connection between work and illness. Physicians in the general practice of medicine have not been trained to recognize occupational diseases. If work-related disease is not identified, appropriate follow-up and prevention activities cannot be implemented.

Key recommendations of the 1990 Connecticut baseline report, *Occupational Disease in Connecticut*, have been implemented, primarily through the passage and implementation of the Occupational Health Clinics Bill. This has led to:

- **A central role of the State in conducting occupational disease surveillance** through the joint DPH/DOL Occupational Disease Surveillance System, with analysis provided by DPH and the annual reports from the WCC;
- **A network of occupational health clinics** that will provide diagnostic and treatment services for ill workers and participate as sentinel providers, reporting cases into the occupational disease surveillance system;
- **Coordination of existing resources** by DPH to identify clusters and to utilize teams of occupational physicians and industrial hygienists which can effectively evaluate outbreaks of occupational disease in specific worksites;
- **Increased interagency cooperation** through Memoranda of Agreement, joint investigations of occupational disease clusters; the Occupational Health Surveillance Working Group quarterly meetings, and joint sponsorship of seminars and conferences.

- **Systematic means of educating physicians, workers and employers** about occupational disease and prevention have been developed through publications, conferences and seminars;
- **Increased emphasis on developing effective industry-wide education and intervention** approaches through public-private partnering relationships.

A national system of surveillance for occupational diseases, injuries and hazards does not yet exist. State-based surveillance approaches such as the Connecticut ODSS are an important means of providing critically needed data about occupational diseases. The National Institute for Occupational Safety and Health is utilizing strategies to increase knowledge of occupational disease occurrence by funding the sentinel event model (SENSOR Program) for occupational diseases in various states, creating work committees to implement the National Occupational Research Agenda (NORA), and setting up the NIOSH-States Working Group to make recommendations regarding conditions for nationwide occupational disease, injury, and hazard surveillance.

The Connecticut Occupational Disease Surveillance System has generated Connecticut-specific data from physician reports, which link to prevention. The ODSS can serve as a means to actively link surveillance findings with intervention and prevention efforts being carried on through multiagency and clinic efforts.

Information is available regarding occurrence of the primary types of occupational diseases reported to the ODSS: cumulative trauma disorders, skin diseases and disorders, poisonings, and respiratory diseases or disorders. Cumulative trauma disorder clusters are widespread throughout Connecticut workplaces. Dermatitis and chemical and heat burns have affected an increasing number of Connecticut workers throughout the decade. Lead poisoning in the bridge construction sector has been effectively controlled through the Connecticut Road Industry Surveillance Project and continued funding by the Connecticut Department of Transportation's Lead Health Protection Plan. Lead poisoning in the home renovation and construction sector is an under-recognized problem which requires special approaches to control. Asthma and asbestos-related diseases are the most frequently-reported respiratory disease conditions, with asbestos reports reflecting past exposures in a variety of occupations.

The ODSS can be used in conjunction with data from the BLS and WCC to gain a truer picture of occupational disease in Connecticut. Each of the three systems singly may be more useful for looking at certain types of data, but use of all of the systems together allows for extrapolations to gain a more complete understanding of the extent of occupational disease in Connecticut.

Social and economic impacts of cumulative trauma disorders are significant. Workers with CTDs are more likely to experience other social and economic hardships, such as loss of health insurance, car, home, and divorce.

Participation by the network of occupational medicine and auxiliary clinics has been fundamental to the ODSS in Connecticut, but efforts need to be broadened for reporting by the wider physician community. The clinics supported under the Occupational Health Clinics Bill provide approximately 80% of the physician reports in the ODSS. The number of annual physician reports of occupational disease has leveled off, and still does not reflect the expected numbers of reports, based on the BLS employer survey. The expansion of efforts needs to be made to address the barriers of reporting by physicians, and the disincentives of reporting by employers.

Evaluation of interventions has shown that follow-up and intervention at the level of the individual worksite can be effective, if employers believe that their employee's diseases are caused by workplace exposures. A study in Connecticut has shown that industrial hygiene (IH) evaluations and recommendations on behalf of individual clinic patients from a variety of workplaces can be effective when implemented, and that the patient is 10 times more likely to remain employed if recommended changes to the work environment are made. Implementation of IH recommendations is often a result of employer belief in the work-relatedness of the disease and/or the presence of a Health and Safety Committee in the workplace. Employers are four times more likely to make changes to the work environment if either one of these situations is present.

Development efforts for industry-wide education and intervention in Connecticut have begun. During the past decade, experience has been developed in Connecticut to demonstrate the effectiveness of concerted efforts to educate employers, workers, and physicians. These include efforts with bridge construction and other lead-using industry sectors through programs such as CRISP/CLINIC, ABLES, and the Keep It Clean Campaign. They also include the recent efforts to bring together management and labor from manufacturing facilities which use metalworking fluids to work toward the implementation of state of the art control strategies. These kinds of efforts and activities can be developed in many other areas of occupational health.

Recommendations

- **Recognize the critical role played in Connecticut by the network of occupational medicine and auxiliary clinics** in identifying, reporting, and following up cases of occupational disease and injury, and their essential role in prevention and intervention efforts. Institutionalize long-term stable funding for the network of clinics and the interagency Occupational Disease Surveillance System.

- **Expand efforts to educate primary care providers** about recognition of occupational diseases and injuries to increase their participation in occupational disease surveillance and prevention efforts.
- **Eliminate the barriers to electronic reporting** of occupational disease and injury data.
- **Continue to foster collaborative relationships among the three state agencies with responsibilities in occupational disease and injury, DPH, DOL and WCC.** Include other agencies as appropriate when designing programs that may affect workers within those agencies' purviews, such as Connecticut Departments of Transportation, Education, and Public Safety, as well as local health departments.
- **Expand cooperative activities at the federal level,** particularly with the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA). In particular, Connecticut can influence the development of a national surveillance system for occupational disease, injuries, and hazards through strengthening of relationships with NIOSH and other states.
- **Design specific strategies for reduction of occupational injuries, as well as diseases,** in special populations using public health planning models. Initiatives could include such interventions as prevention of occupational burns in restaurants and specific education designed for adolescent workers.
- **Initiate and design cooperative activities for education and intervention on an industry-wide basis,** thinking broadly about partners in the private sector, such as industry trade groups, unions, and distributors of materials.
- **Assure that resources are sufficient** to implement comprehensive activities for surveillance, education, and intervention. Explore possibilities for increased and alternative funding for specific intervention strategies.

APPENDIX - TABLES

Appendix T-1

Disease Reports* by Two-Digit Standard Industrial Classification (SIC) Divisions, 1990 - 1998 Occupational Disease Surveillance Data, Connecticut Department of Public Health			
SIC Group Codes	SIC Division	No. of reports	% of reports
1-9	Agriculture, Forestry and Fishing	92	0.8
10-14	Mining	3	0.1
15-17	Construction	1,402	12.9
20-39	Manufacturing	4,068	37.5
40-49	Transportation and Public Utilities	396	3.7
50-51	Wholesale Trade	446	4.1
52-59	Retail Trade	1,035	9.6
60-67	Finance, Insurance and Real Estate	329	3.0
70-89	Services	2,223	20.5
91-97	Public Administration	607	5.6
99	Nonclassifiable	238	2.2
	TOTAL**	10,839	100

*Includes laboratory reports of cases of lead poisonings ≥ 20 $\mu\text{g/dL}$ from the CT Lead Surveillance System (LSS).

**Total less due to incomplete data.

Appendix T-2

Disease Reports (Excluding Lead Poisonings*) by Census Occupational Code Major Groups, 1990 - 1998			
Occupational Disease Surveillance Data, Connecticut Department of Public Health			
Occupational Codes	Major Groups	No of reports	% of reports
003-037	Executive, Administration, and Managerial	259	3.5
043-199	Professional Specialty	440	6.0
203-235	Technicians and Related Support	280	3.8
243-285	Sales	232	3.2
303-389	Administrative Support	826	11.2
403-407	Private Household	6	0.1
413-427	Protection Service	136	1.8
433-469	Service Occupations	936	12.7
473-499	Farming, Forestry and Fishing	146	2.0
503-549	Mechanics and Repairers	230	3.1
553-599	Construction Trades	282	3.8
613-617	Extractive Occupations	2	0.1
628-699	Precision Production	344	4.7
703-779	Machine Operators and Tenders	821	11.2
783-795	Fabricators, Assemblers, and Handworking	653	8.9
796-799	Prod. Inspectors, Testers, Samplers, Weighers	143	2.0
803-859	Transportation and Material moving	173	2.4
864-889	Handlers, Equip. Cleaners, Helpers, Laborers	495	6.7
999	Nonclassifiable	941	12.8
	TOTAL**	7,345	100.0

*Lead poisonings are primarily reported by laboratories and occupation is rarely provided. Therefore, occupations for lead poisoning cases are not included in this table.

**Total less due to incomplete data.

Appendix T-3

CTD Reports by Two-Digit Standard Industrial Classification (SIC) Divisions, 1990 - 1998			
Occupational Disease Surveillance Data, Connecticut Department of Public Health			
SIC Group Codes	SIC Division	No. of reports	% of reports
1-9	Agriculture, Forestry and Fishing	27	0.6
10-14	Mining	2	0.1
15-17	Construction	114	2.5
20-39	Manufacturing	1996	43.5
40-49	Transportation and Public Utilities	171	3.7
50-51	Wholesale Trade	162	3.5
52-59	Retail Trade	645	14.0
60-67	Finance, Insurance and Real Estate	281	6.1
70-89	Services	901	19.6
91-97	Public Administration	211	4.6
99	Nonclassifiable	83	1.8
	TOTAL	4,593	100

Appendix T-4

CTD Disease Reports by Occupational Code Major Groups, 1990 - 1998			
Occupational Disease Surveillance Data, Connecticut Department of Public Health			
Occupational Codes	Major Groups	No of reports	% of reports
003-037	Executive, Administration, and Managerial	148	3.9
043-199	Professional Specialty	164	4.3
203-235	Technicians and Related Support	126	3.3
243-285	Sales	162	4.2
303-389	Administrative Support	601	15.7
403-407	Private Household	3	0.1
413-427	Protection Service	44	1.2
433-469	Service Occupations	330	8.6
473-499	Farming, Forestry and Fishing	27	0.7
503-549	Mechanics and Repairers	99	2.6
553-599	Construction Trades	116	3.0
613-617	Extractive Occupations	0	0
628-699	Precision Production	169	4.4
703-779	Machine Operators and Tenders	415	10.8
783-795	Fabricators, Assemblers, and Handworking	476	12.4
796-799	Prod. Inspectors, Testers, Samplers, Weighers	107	2.8
803-859	Transportation and Material moving	97	2.5
864-889	Handlers, Equip. Cleaners, Helpers, Laborers	281	7.3
999	Nonclassifiable	469	12.2
	TOTAL*	3,834	100

*Number of reports with recorded occupations.

Appendix T-5

Poisoning Reports* by Two-Digit Standard Industrial Classification (SIC), 1990 - 1998			
Occupational Disease Surveillance Data, Connecticut Department of Public Health			
SIC Group Codes	SIC Division	No. of reports	% of reports
1-9	Agriculture, Forestry and Fishing	2	0.1
10-14	Mining	0	0
15-17	Construction	1127	45.5
20-39	Manufacturing	710	28.7
40-49	Transportation and Public Utilities	89	3.6
50-51	Wholesale Trade	161	6.5
52-59	Retail Trade	37	1.5
60-67	Finance, Insurance and Real Estate	8	0.3
70-89	Services	202	8.1
91-97	Public Administration	89	3.6
99	Nonclassifiable	53	2.1
	TOTAL**	2,472	100

*Includes laboratory reports of cases of lead poisonings ≥ 20 $\mu\text{g/dL}$ from the CT Lead Surveillance System (LSS).

**Number of reports with recorded SICs.

Appendix T-6

Poisoning Reports (Excluding Lead Poisonings*) by Occupational Code Major Groups, 1990 - 1998			
Occupational Disease Surveillance Data, Connecticut Department of Public Health			
Occupational Codes	Major Groups	No of reports	% of reports
003-037	Executive, Administration, and Managerial	24	5.3
043-199	Professional Specialty	31	6.9
203-235	Technicians and Related Support	18	4.0
243-285	Sales	12	2.7
303-389	Administrative Support	44	9.8
403-407	Private Household	0	0
413-427	Protection Service	26	5.8
433-469	Service Occupations	54	12.0
473-499	Farming, Forestry and Fishing	7	1.5
503-549	Mechanics and Repairers	16	3.5
553-599	Construction Trades	18	4.0
613-617	Extractive Occupations	1	0.2
628-699	Precision Production	23	5.1
703-779	Machine Operators and Tenders	52	11.5
783-795	Fabricators, Assemblers, and Handworking	23	5.1
796-799	Prod. Inspectors, Testers, Samplers, Weighers	6	1.3
803-859	Transportation and Material moving	13	2.9
864-889	Handlers, Equip. Cleaners, Helpers, Laborers	18	4.0
999	Nonclassifiable	65	14.4
	TOTAL**	451	100

*Lead poisonings are primarily reported by laboratories and occupation is rarely provided. Therefore, occupations for lead poisoning cases are not included in this table.

**Number of reports with recorded occupations.

Appendix T-7

Skin Disease and Disorder Reports by Two-Digit Standard Industrial Classification (SIC) Divisions, 1990 - 1998			
Occupational Disease Surveillance Data, Connecticut Department of Public Health			
SIC Group Codes	SIC Division	No. of reports	% of reports
1-9	Agriculture, Forestry and Fishing	40	2.2
10-14	Mining	0	0
15-17	Construction	84	4.5
20-39	Manufacturing	640	34.4
40-49	Transportation and Public Utilities	58	3.1
50-51	Wholesale Trade	63	3.4
52-59	Retail Trade	239	12.8
60-67	Finance, Insurance and Real Estate	13	0.7
70-89	Services	542	29.1
91-97	Public Administration	148	8.0
99	Nonclassifiable	33	1.8
	TOTAL*	1,860	100

*Number of reports with recorded SICs.

Appendix T-8

Skin Disease and Disorder Reports by Occupational Code Major Groups, 1990 - 1998			
Occupational Disease Surveillance Data, Connecticut Department of Public Health			
Occupational Codes	Major Groups	No of reports	% of reports
003-037	Executive, Administration, and Managerial	35	2.2
043-199	Professional Specialty	95	5.9
203-235	Technicians and Related Support	68	4.2
243-285	Sales	30	1.9
303-389	Administrative Support	65	4.1
403-407	Private Household	0	0
413-427	Protection Service	19	1.2
433-469	Service Occupations	368	23.0
473-499	Farming, Forestry and Fishing	84	5.2
503-549	Mechanics and Repairers	68	4.2
553-599	Construction Trades	64	4.0
613-617	Extractive Occupations	1	0.1
628-699	Precision Production	64	4.0
703-779	Machine Operators and Tenders	207	13.0
783-795	Fabricators, Assemblers, and Handworking	84	5.2
796-799	Prod. Inspectors, Testers, Samplers, Weighers	17	1.1
803-859	Transportation and Material moving	22	1.4
864-889	Handlers, Equip. Cleaners, Helpers, Laborers	114	7.1
999	Nonclassifiable	196	12.2
	TOTAL*	1,601	100

*Number of reports with recorded occupations.

Appendix T-9

Respiratory Disease Reports by Two-Digit Standard Industrial Classification (SIC) Divisions, 1990 - 1998			
Occupational Disease Surveillance Data, Connecticut Department of Public Health			
SIC Group Codes	SIC Division	No. of reports	% of reports
1-9	Agriculture, Forestry and Fishing	0	0
10-14	Mining	0	0
15-17	Construction	22	3.6
20-39	Manufacturing	317	52.0
40-49	Transportation and Public Utilities	10	1.6
50-51	Wholesale Trade	9	1.5
52-59	Retail Trade	17	2.8
60-67	Finance, Insurance and Real Estate	9	1.5
70-89	Services	142	23.3
91-97	Public Administration	43	7.0
99	Nonclassifiable	41	6.7
	TOTAL*	610	100

*Number of reports with recorded SICs.

Appendix T-10

Respiratory Disease Reports by Occupational Code Major Groups, 1990 - 1998 Occupational Disease Surveillance Data, Connecticut Department of Public Health			
Occupational Codes	Major Groups	No of reports	% of reports
003-037	Executive, Administration, and Managerial	20	5.3
043-199	Professional Specialty	51	13.5
203-235	Technicians and Related Support	19	5.0
243-285	Sales	5	1.3
303-389	Administrative Support	29	7.7
403-407	Private Household	0	0
413-427	Protection Service	8	2.1
433-469	Service Occupations	23	6.1
473-499	Farming, Forestry and Fishing	4	1.1
503-549	Mechanics and Repairers	11	3.0
553-599	Construction Trades	35	9.3
613-617	Extractive Occupations	0	0
628-699	Precision Production	36	9.5
703-779	Machine Operators and Tenders	44	11.7
783-795	Fabricators, Assemblers, and Handworking	22	5.8
796-799	Prod. Inspectors, Testers, Samplers, Weighers	4	1.1
803-859	Transportation and Material moving	3	0.8
864-889	Handlers, Equip. Cleaners, Helpers, Laborers	19	5.0
999	Nonclassifiable	44	11.7
	TOTAL*	377	100

*Number of reports with recorded occupations.

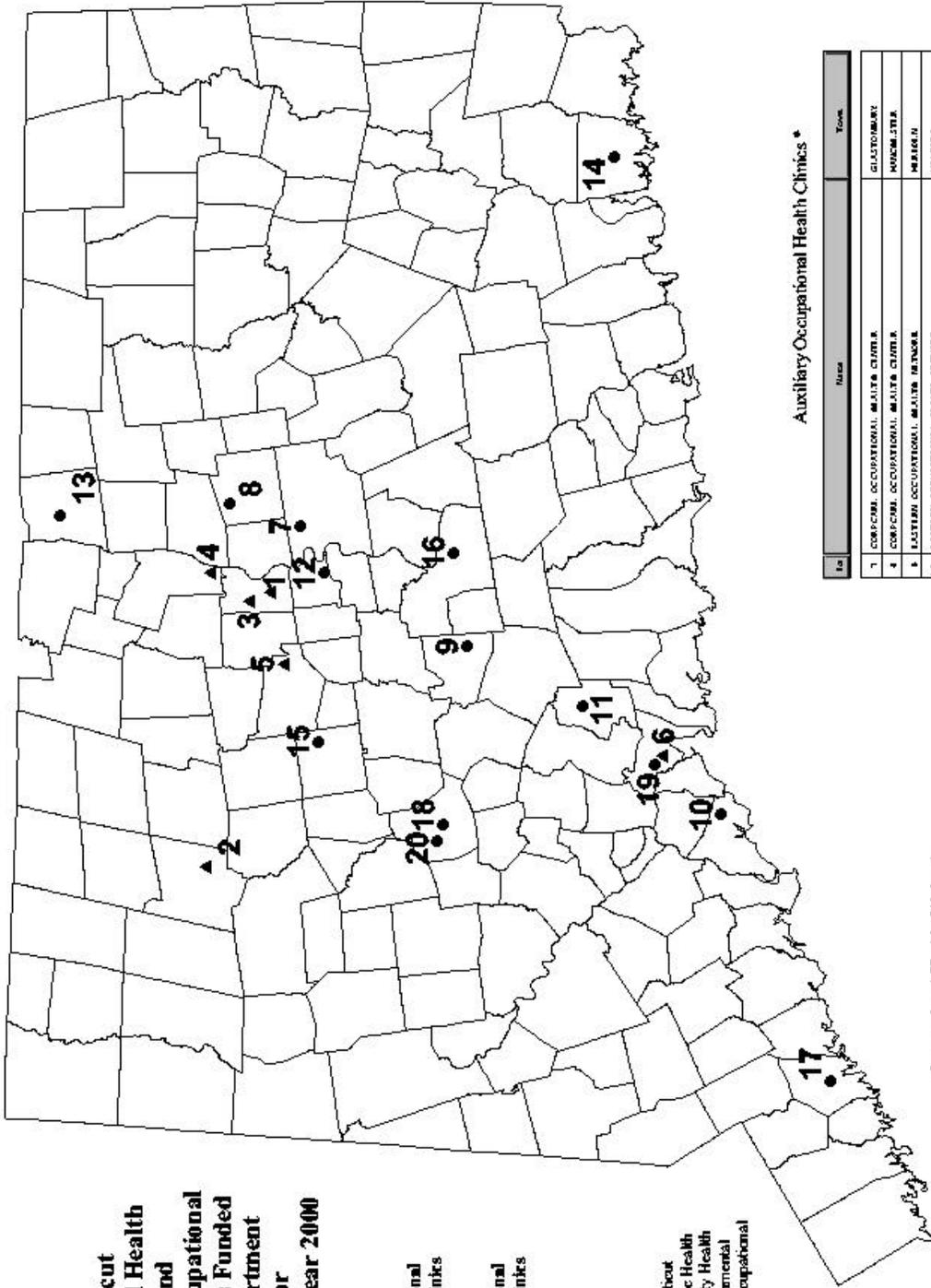
Map 1-1

**Connecticut
Occupational Health
Clinics and
Auxiliary Occupational
Health Clinics Funded
by the Department
of Labor
State Fiscal Year 2000**

- ▲ Occupational Health Clinics
- Auxiliary Occupational Health Clinics



State of Connecticut
Department of Public Health
Bureau of Community Health
Division of Environmental
Epidemiology and Occupational
Health



Occupational Health Clinics *

ID	Name	Town
1	HARTFORD JOSEPH PASTOR PRAXIS NETWORK	HARTFORD
2	MORRISSETT CT OCCUPATIONAL MEDICINE	LOBBINGTON
3	ST. FRANCIS HOSPITAL & MEDICAL CENTER	HARTFORD
4	ST. FRANCIS CENTER FOR OCCUPATIONAL HEALTH	HARTFORD
5	UCONN PRAXIS CENTER - GOSH	HARTFORD
6	YALE OCC. & ENV. MEDICINE PROGRAM	NEW HAVEN

* There are five Occupational Health Clinics at six sites and thirteen Auxiliary Occupational Health Clinics at fourteen sites.

Auxiliary Occupational Health Clinics *

ID	Name	Town
7	CONNECTICUT OCCUPATIONAL HEALTH CENTER	GLASTONBURY
8	CONNECTICUT OCCUPATIONAL HEALTH CENTER	MIDDLETOWN
9	EASTERN OCCUPATIONAL HEALTH NETWORK	MERIDEN
10	EASTERN OCCUPATIONAL HEALTH NETWORK	MILFORD
11	EASTERN OCCUPATIONAL HEALTH NETWORK	NEW BRITAIN
12	MERIDEN MEDICAL GROUP	MERIDEN
13	JONAS OCCUPATIONAL HEALTH CENTER	WATERBURY
14	JANNEY & JANNEY OCC. HEALTH CTR.	BRIDGE
15	MEADOWS	MIDDLETOWN
16	MIDDLESEX HOSPITAL OCC. MEDICINE	MIDDLESEX
17	NORWALK HOSPITAL	NORWALK
18	ST. MARY'S HOSPITAL	WATERBURY
19	ST. BARNABAS OCC. HEALTH PLUS	NEW BRITAIN
20	WATERBURY OCCUPATIONAL HEALTH	WATERBURY

Physician's Report of Occupational Disease
Connecticut Departments of Labor and Public Health

This information is reportable by law within forty-eight (48) hours under CGS Sec.31-40a
and confidential under CGS I-19(b)(2) and 19a-25
please type or write clearly



Date of Report: ___/___/___

I. Patient (Employee) Information

Name: Last First MI SSN: / /
Address: Street City State Zip Code
Home Phone #: () - Date of Birth: / / Gender: Male Female
Hispanic: Yes No Unknown Race: American Indian Asian Black White Other Unknown
Occupation (at time of exposure) (present)

II. Occupational Illness/Injury Information (ICD-9)

Repetitive Trauma Disorders: Carpal Tunnel Syndrome (354.0), DeQuervains Syndrome (727.04), Epicondylitis (Tennis Elbow) (726.32), Hand-Arm Vibration Syndrome (443.0), Raynaud's Syndrome (443.0), Thoracic Outlet Syndrome (353.0), Trigger Finger (727.03), Vibration White Finger (443.0), Bursitis (site) (727.3), Ganglion/ Cystic Tumor (site) (727.4), Synovitis (site) (727.0), Tendonitis (site) (726.90), Tenosynovitis (site) (727.0), OTHER (specify) ()
Respiratory Diseases/Disorders: Allergic Rhinitis (477), Asbestosis (501), Asthma (493), Bronchitis (491), Pleural Plaques (511.0), Reactive Airway Dysfunction Syndrome (506), Rhinitis (472.0), Silicosis (502), Sinusitis (473), OTHER (specify) ()
Infectious Processes: Hepatitis B (070.3), Tuberculin conversion (010), OTHER (specify) ()
Poisonings and toxic effects: Carbon Monoxide (986), Lead (984) µg/dL (Attach copy of lab report), Solvents (982), Cancer (type) (), OTHER (specify) ()
Noise Disorders: Hearing Loss (389), Tinnitus (388.3), OTHER (specify) ()
Skin Diseases/Disorders: Contact Dermatitis (692), OTHER (specify) ()
Injury (specify type and site on diagnosis line below)

Diagnosis (if not listed above): ICD-9(s) _____
Symptoms/Physical Findings: Date of First Symptom: ___/___/___
Suspected causal factor(s) (i.e., object, substance or event): _____
Exposure: Acute Chronic Is patient exposure continuing? Yes No Unknown Are others likely to be affected? Yes No Unknown
Certainty of work relatedness: High Moderate Low Length of employment in occupation of concern: ___yrs ___months
Comments: _____

III. Employer Information (where exposure occurred)

Company Name: _____
Mailing Address: Street City State Zip Code
Phone #: () - Work site location (if different than above)

IV. Health Care Provider Information

Name: Last First MI (MD, RN, PA, Other)
Institution/Clinic name: _____
Mailing Address: Street City State Zip Code
Phone #: () - Signature: _____

For more information call: (860) 566-4550 Labor Department or (860) 509-7744 Department of Public Health
Return to: State of Connecticut Labor Department, Division of Occupational Safety & Health, 38 Wolcott Hill Rd.,
Wethersfield, CT 06109

For office use only	ID No.	OC exp	OC present	Nature	POB	SIC
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