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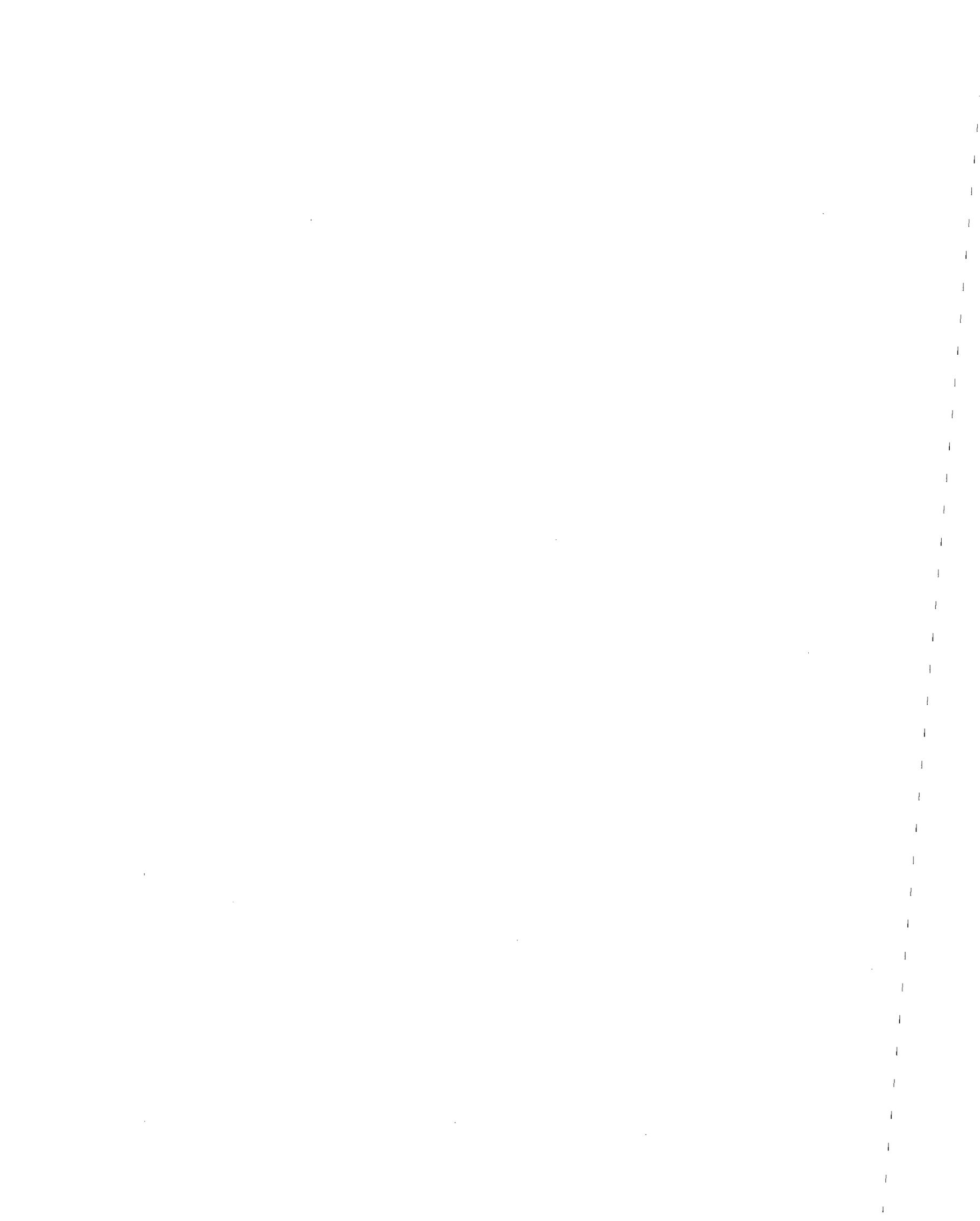


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ABSTRACT

The Yale Occupational and Environmental Medicine Program (YOEMP) under the Department of Medicine at the Yale University School of Medicine provides comprehensive training for physicians in occupational and environmental medicine (OEM). This postgraduate training program was established in 1985, and first granted NIOSH-sponsored fellowships in 1988. In 1989, it was accredited by the ACGME, and it remains a fully accredited training program. The explicit goal of the program is to train physicians to be qualified, board eligible OEM clinicians as well as future teachers of occupational and environmental medicine. In addition, a select group of trainees receive further training to become scientific investigators in the field. During the grant period, areas of achievement include the continuation of an excellent track record for recruiting high-quality candidates into the field, board certification in occupational medicine of a majority of recent graduates, expansion of educational efforts within the medical school, including a mandatory Occupational Medicine clinical rotation for all junior residents in the Primary Care program, increase in research opportunities and research grants awarded to faculty, continued growth and development of clinical and consultative services in conjunction with the establishment of a permanent clinic facility dedicated to the provision of occupational medicine services, and augmentation of community outreach and educational activities.

SUMMARY OF FINDINGS

Background

The Yale Occupational and Environmental Medicine Program has been training postgraduate MD fellows (residents) since 1985. Initially funded by a three year developmental grant from the Charles A. Dana Foundation, the Program has focused on selection and training of physicians seeking specialized academic and/or research careers in OEM, while providing a broad base of practical and didactic experience for graduates choosing more traditional practice opportunities. The Program has been supported as a Training Program Project by NIOSH since 1988 and became an ACGME approved training program in 1989.

YOEMP, the organizational unit which sponsors this training activity, was founded in 1979 by the Director, Dr. Mark Cullen, based on the philosophy that occupational and environmental medicine should be fully integrated into the mainstream of modern medical teaching, research and practice. For this reason, the Program has been administratively and academically based in a Department of Internal Medicine since its

inception, and faculty have been very active in the development of OEM as an integrated clinical and public health specialty.

The training program, initiated after 6 years of faculty growth and development at Yale, was established as a means for propagating this concept. Recruitment of trainee applicants has focused on a select pool who have completed training in internal medicine or a comparable primary care specialty. Building on this advanced preparation, trainees receive an intensive clinical/field experience through the evaluation of patients in the diagnostic referral OEM clinics, coupled with the opportunity to follow cases back to the workplace for evaluation of the environmental and occupational circumstances of concern. This approach, combining features both of classic subspecialty medical training and the Epidemiology Intelligence Service approach to field training lies at the core of the Yale Program.

A second core feature of the training program has been integration of the fellows into YOEMP practice. Fellows receive their industrial experience by undertaking the role of company medical officer for major clients of YOEMP, assuming extensive authority and responsibility in practice of OEM from the organizational perspective, with broad supervision from both faculty and company on-site colleagues in hygiene, nursing, safety and human resources.

Another distinctive feature of the Yale Program is the research environment. Because of the Program's commitment to preparation for academic careers, all fellows are accepted with the opportunity for three full years of training, with emphasis on development of research experience in the second year and full-time research experience by the third elective year. The clinical and epidemiologic research base of the Program, as well as the broad array of laboratory opportunities available within the Yale community, allows YOEMP to offer considerable diversity in research training experiences.

Facilitating and supporting the practical and research training opportunities is the curriculum offered at the Yale School of Public Health, within the Medical School and at the University generally. All candidates who have not completed formal public health training prior to arrival undertake the master's program, specializing in environmental health science or epidemiology. To facilitate appropriate time and energy to the other components, the requirements for the degree may be spread across two or three years, thus maximizing Program flexibility to accommodate individual training interests and needs.

Finally, the Yale Program is most unique in its size. Despite a full-time faculty of 7 physicians, an industrial hygienist, an occupational health nurse, epidemiologist, a social worker and full support staff, only 2 new fellows are selected each year, so that the Program never exceeds a student-faculty ratio of 1 to 1. Trainees maintain private offices adjacent to faculty and are fully integrated into all program resources and activities, perhaps more than any feature, the distinguishing characteristic of the training opportunity offered at Yale.

We believe it is for these reasons that we have attracted an outstanding group of candidates over the decade. Nineteen have completed the training, of whom 9 have taken positions as junior faculty doing research and teaching OEM. The remainder occupy responsible positions in hospital based practices and clinics, the corporate setting, and as

private consultants; virtually all maintain academic ties consistent with the Yale paradigm of teaching and practice.

Program Organization, Leadership, and Faculty

Responsibility for the training of MD fellows rests solely and exclusively within the faculty and professional staff of YOEMP, a division within the Department of Internal Medicine at the Yale University School of Medicine, under the leadership of Dr. Cullen. Because of the need for a broad base of didactic, clinical and research training, fellow training is supported by faculties in the Department of Epidemiology and Public Health (also known as the Yale School of Public Health, in which YOEMP faculty hold joint appointments) and by faculties in other Divisions of the Department of Medicine as well as other Departments in the School of Medicine.

Internal governance resides with the full time faculty which meets weekly. This faculty body assumes responsibility for all academic functions of the Program, including fellowship recruitment and selection, Program requirements and trainee evaluations, as well as staff hiring, resource allocation and grant applications affecting the whole Program. Dr. Cullen has ultimate fiscal and academic authority and is responsible to the Department of Internal Medicine and the Dean of the School of Medicine. The Residency Advisory Committee, comprised of leaders from neighboring Programs, physicians from industry, academic leaders from collaborating departments and divisions within the Medical Center and representative YOEMP faculty and fellows, meets 2 to 3 times annually to advise the Director and the Department Chairman on all matters relating to training.

Faculty, 1991-1996

The heart of the Program is the full time faculty, all dedicated to teaching, practice and research in occupational and environmental medicine. The faculty is a distinguished group of teachers with outstanding credentials. The following is an update of faculty accomplishments and roles within the Program during the period 1991-1996.

Mark Cullen, M.D., Professor of Medicine and Public Health, and the Program Director, is an authority on the clinical aspects of occupational and environmental medicine and on clinical research strategies. His research interests include biomarker studies of lead, beryllium, asbestos, glycol ethers and the syndrome of multiple chemical sensitivities. He has been active both in national and international activities promoting advancement of OEM as a field, and has consulted extensively to major corporations, unions, governmental organizations and other academic institutions. He was recently named to the NIOSH Board of Scientific Counselors. Despite these commitments, he devotes over a third of his time to the fellowship, including direct didactic and advisory functions with the fellows and administration of all facets of the training program.

William Beckett, M.D., M.P.H., former Associate Director, Associate Professor of Medicine and Public Health. He is internationally known for his work on respiratory effects of oxidant lung stresses, including welding fumes. As a former Academic Awardee in Preventive Pulmonary Medicine, he brought an extraordinary wealth of experience in the teaching arena, and assumed major Program responsibility for teaching at the fellow, medical resident and medical student levels. Dr. Beckett accepted a position at the University of Rochester in August of 1996.

Martin Cherniack, M.D., former Associate Professor of Medicine and Public Health, had been a member of the faculty since 1986. He is widely recognized for his expertise in muskulo-skeletal disorders, and in the health consequences of environmental neglect in the former Soviet Union and Eastern Europe. He devoted over 25% of his time to teaching in the program, mentoring in clinic and industrial rotation activities, as well as in classroom teaching. Dr. Cherniack accepted a position at the University of Connecticut in December, 1995.

Carrie Redlich, M.D., M.P.H., Associate Professor of Medicine, coordinates research training activities for the Program. An extraordinarily well funded young investigator, she is skilled both in laboratory investigations and clinical and field studies. In addition to her research commitments, she is a respected clinical attending in the Program and takes a very active position in both administrative and advisory components of the training program.

Mark Russi, M.D., M.P.H., Assistant Professor of Medicine, joined the faculty two years ago after graduating from the Program. His major responsibility is as Director of Occupational Health for Yale New Haven Hospital, the main Yale teaching hospital, with over 6,000 employees and staff. He provides faculty supervision of 2 of the "industrial" rotations. He is also a highly regarded clinical teacher and epidemiologist.

Amy Hopkins, M.D., M.P.H., former Instructor in Medicine and graduate of the Program, shared with Dr. Cherniack major interest in muskulo-skeletal disorders, as well as occupational skin diseases. She was consultant to the Groton Occupational Health Center, a collaborating clinic and training site located in the industrial center of Eastern Connecticut. Dr. Hopkins is no longer at Yale.

Kathy Maurer, M.D., M.P.H., former Associate Research Scientist, also graduated from the Program, had served as the designer and project director on a large and widely acclaimed, NIOSH funded surveillance project to control lead poisoning in construction workers. This project had been the source of both field and clinical training opportunities for fellows during the 1991-95 period. Dr. Maurer is no longer at Yale.

New Faculty

Oyebode Taiwo, M.D., M.P.H., Assistant Professor of Medicine, is a recent graduate of the Program whose major responsibility is working on the ALCOA/YOEMP collaboration.

Annette David, M.D., M.P.H., Senior Fellow, is currently acting in the capacity of Chief Resident. In addition, she is the Director of Clinical Services for the Program and the Assistant Residency Training Program Director

All nine physicians are board certified in both Internal Medicine and Occupational Medicine.

In addition to the full-time faculty, professional staff of the Program share a large responsibility for training:

Judy Sparer, C.I.H., Program Industrial Hygienist, has been with YOEMP for 13 years. She plays an integral role in training fellows to take accurate and detailed environmental and work histories and the performance of hazard evaluations. In addition she is the major resource for didactic training in measurement and control of environmental hazards.

Carolyn Gregory, R.N., COHN, Nurse Manager for the Occupational and Environmental Medicine and Industrial Clinics, came to YOEMP after a long and distinguished career in industry. She is the major Program liaison with industrial counterparts and teaches a broad array of practical skills including use of clinic testing equipment, record keeping, reporting and management of industrial clients.

Patricia Pace, M.P.H., Research Associate, had responsibility of managing Program computer systems and assisting in the development and conduct of research activities. She instructed fellows on the use of library data base searches, use of computer hardware and software systems and data management. Ms. Pace is no longer at Yale.

Brenda Cartmel, Ph.D., Epidemiologist, manages one of the Programs largest longterm research projects. She plays an active role in research design, critical review of scientific literature and research in progress. Dr. Cartmel holds a joint appointment in Epidemiology and Public Health.

Adjunct faculty, though obviously more limited in their time commitment, are also highly devoted to the training program.

Jonathan Borak, M.D., formerly Director of the Emergency Room and now a private consultant to industry on handling of toxic chemicals, directs an annual course on chemical controversies and the private sector which has been incredibly popular with fellows and physicians in local industry alike.

Beth Lewis, A.C..S.W., Assistant Clinical Professor of Medicine, is an authority on the psychosocial aspects of work and occupational illness; she does consultations on clinic patients and provides regular didactic talks to the fellows throughout their training.

Tushar Patel, M.D., Assistant Professor in Orthopaedics and Rehabilitation, provides consultative services on complicated musculoskeletal cases and lectures on occupational orthopaedic conditions.

Grant Thomson, M.D., Assistant Professor in Plastic Surgery, provides consultative services on complicated hand cases.

Kal Watsky, M.D., an occupational dermatologist, provides a clinical rotation for the fellows in the medical center and lectures on dermatologic aspects of the field.

Program Objectives

The goal of this program is to train outstanding young physicians to be qualified, board eligible specialists in the broad field of occupational and environmental medicine, equipped to practice, teach, and critically evaluate research. It is our explicit aim to further train a proportion of these physicians to have skills as scientific investigators, in preparation for academic careers.

Components of Training

Because of the unique nature of the Institution and the philosophy of integration of clinical and public health aspects of the field, trainees are recruited at the *fellow* level of training, having completed basic residency in a primary care specialty. Two new fellows are admitted annually, all with full support either from the training grant or other YOEMP funds.

The basic elements of the training program, and the year-by-year description of the training are described in the next two sections.

Basic Training Elements

The Academic Experience

All trainees are expected to complete the requirements for the M.P.H. degree at the Yale School of Public Health if they have not already completed this training prior to arrival. In addition to completing the basic degree requirements, which include 45 course credits and a research thesis, all candidates must complete the concentration requirements in either Chronic Disease Epidemiology or Environmental Health Sciences, and the basic requirements for board certification in Preventive Medicine/Occupational Medicine. These latter include toxicology, environmental measurement (industrial hygiene) and a behavioral medicine course in addition to the required coursework for the degree.

All training candidates, whether they have completed the degree previously or not, are required to take the Introduction to Environmental and Occupational Medicine course, a year-long course taught by Dr. Cullen and geared to provide a comprehensive, formal introduction to the data base of OEM practice.

The Practicum Experience

The practicum experience for Yale fellows consists of three basic components: clinical training, training in organized practice of occupational medicine ("industrial" training) and research training. These components are as follows:

Clinical Training

Given the strong emphasis on clinical training, this component consists of a full year of 50% commitment to the clinic. The centerpiece is the diagnostic clinic attended, a day long clinic each week. At this clinic fellows see new and follow-up referral patients with suspect or established occupational or environmental disorders. Each case is then reviewed with the Clinic attending, and then discussed in detail at post-clinic conference. At the conference, cases are discussed from the multi-disciplinary perspective, including clinical, psycho-social, industrial hygiene and public health perspectives. Plans for medical and follow-up activities are discussed, including the approaches to further characterizing and, if necessary remedying, the environment from which the case was referred. Where appropriate, plans are made for a site visit involving the fellow and hygienist. These field visits constitute an essential and core component of the clinic training.

A second component of the clinical training experience is supervision of the ongoing industrial medicine activities of the YOEMP clinic operation. Each fellow has responsibility for being present in clinic on 2 half days in addition to diagnostic clinic, to evaluate and treat urgent referrals, supervise nursing and medical resident clinicians in doing pre-placement and surveillance exams and seeing follow-up cases. An attending member of the full-time faculty is always available for consultation and teaching.

The third aspect of the clinical training is the consult service. Each week, over 10 calls for information and advice are received; these are the responsibility of the fellows, who carry 24-hour beepers. In addition, we receive about 30 in-patient referrals from the Yale New Haven Hospital each year, which are also the responsibility of the on-call fellow. All of these activities are discussed with faculty attendings who rotate this coverage/teaching responsibility on a monthly basis.

An important component of the clinical training are the various clinical conferences. In addition to the post-clinic conference discussed above, there is a weekly x-ray conference, run by one of two professors of radiology who are chest specialists and B-readers. A bi-weekly clinic staff meeting is utilized to discuss clinic problems and insure trainees have input from other faculty and clinic staff.

At the end of the year, each fellow has typically seen over 100 diagnostic patients, including most of the common occupational and environmental disorders, and over 250 industrial patients. Each usually gets to make 10-15 field investigations in follow-up of a suspected case or outbreak of occupational or environmental disease.

"Industrial" Training

The required rotation for fellows in the organized practice of occupational medicine is designed to provide trainees with positions of responsibility for worker populations. The emphasis is on programmatic training, including the development of policy and the solution of occupational health problems, for which YOEMP has on-going paid responsibility. Under the supervision of a faculty member and on-site non-medical personnel, the fellow designated to a rotation acts as medical director, with all of the privileges and obligations typically associated with that role. Under the terms of current contractual arrangements, this responsibility is discharged by devoting about 1/3 time commitment to the rotation on a part-time basis over 1 year or longer; about half of the total time is spent on-site.

There are presently 4 on-going contracts:

The Uretex Corporation in New Haven is a medium sized textile coating facility with a record of a major outbreak of toxic liver disease and high injury rates in the past. The workforce of about 100 is under surveillance for disease related to isocyanates, solvents and injuries.

The Bristol-Myers-Squibb Corporation has its major research and development facility nearby Yale in Wallingford. Over 1000 workers are exposed to an impressive array of chemical, biologic and physical hazards; over 20 exposure specific surveillance activities developed by former fellows are now in place.

The Bayer Pharmaceutical Division has a biotech research facility and production site in nearby West Haven. Fellow responsibilities at this site involve policy development, cooperation with industrial hygiene and environmental assessment staff to identify and resolve exposure problems and evaluation of occupational health problems which arise.

Yale-New Haven Hospital, one of our parent Institutions is a newer contract. This facility, with over 6000 personnel and staff, has invested full responsibility in YOEMP for development of occupational health and safety problems throughout the workforce, an almost limitless training and practice opportunity for trainees.

The newest addition to industrial training sites occurred in January 1997. The Aluminum Corporation of America (ALCOA) and YOEMP will work with ALCOA's medical/occupational health staff to provide services to the Corporation such as evaluating medical protocols and developing, updating and interpreting company-wide health programs.

In addition to undertaking one of these required rotations, trainees have the option of participating in another or taking additional rotations of 1 month or longer at governmental organizations (e.g., Federal OSHA, Connecticut State Health Department), or any local or other company or union prepared to provide appropriate on-site supervision and a structured plan for the trainees' work during the rotation.

Research Training

All fellows, irrespective of their choice to take a third year of research training, are required to undertake an independent research project resulting in either an MPH thesis or article for publication. Up to \$2500 in pilot funds is provided for this effort,

which is conducted under the supervision of a faculty member of YOEMP or approved Yale colleague, at the trainees discretion. Projects may be epidemiologic, clinical or laboratory based, or involve a combination of these modalities. Fellows are encouraged, but not obligated, to chose their research projects from ongoing activities of the full-time faculty, to assure close supervision and support. The following is a partial list of recent fellow projects:

- Effects of solvents on fallopian tube ciliary function in vitro
- Analysis of the 1993-4 experience with needlestick injuries in a teaching hospital
- Evaluation of personal risk factors and occupation predicting elevations of lead levels in bridge construction
- Use of peak expiratory flow records to confirm occupational asthma in spray painters
- An investigation of lower extremity complaints among police officers associated with use of firearm belts
- A meta-analysis of the attributability of lung cancer to occupational factors
- Retinoid metabolites as predictors of risk for bronchial metaplasia in asbestos workers
- Modification of epithelial tight junctions in vitro by nutrients and growth factors

Program Enhancements

Beyond the required elements, Yale trainees are exposed to a broad range of activities developed largely for their benefit:

1. Journal club- a monthly evening meeting at the home of a faculty member at which a fellow presents an article previously distributed, then discussed by an invited "expert."
2. Research Conference- biweekly Tuesday noon meetings at which scientists from the community and outside institutions present current work for critical discussion. A list of 1995-6 presentors is included as Appendix C.
3. Research in progress meetings- monthly informal lunches in which faculty and fellows present on-going work for review and advice.
4. Industry and Medicine series- an series of symposia, organized by Dr. Borak of the adjunct faculty, presenting topical issues from corporate and academic perspectives.
5. Outside conferences- each fellow receives up to \$750 and up to one week off to attend an academic conference of their chosing each year.

Needless to say, beyond these events, the Yale Medical Center offers an impressive array of formal lectures and events on a daily basis, to which fellows are welcome to attend.

Year-by-year Description

Year 1

Without exception, the Clinical/Field component of the Practicum experience begins on arrival and continues throughout the first year. Each fellow is assigned two half-day sessions in diagnostic clinic and two half days in industrial clinic. Call

responsibilities for consultations and patient coverage are shared. As noted, fellows are expected to lead approximately 10-15 field evaluations during the year, stemming from problems identified in clinic or through these consultations, under the supervision of the Program industrial hygienist and the faculty attending.

Most new fellows elect to do the required "industrial" placement during the first year as well. This demands about 10-15 hours per week, about half on-site as noted above, throughout the year. Typically the fellows "cross-cover" for these rotations as part of their clinic call schedule, so that their sites have the benefit of 24-hour coverage for emergencies and crises.

Academic activities during the first year depend on prior training (i.e., whether they already have an M.P.H. or equivalent) and ambition. All trainees take the introduction to OEM taught by Dr. Cullen. Fellows without prior formal public health training usually take, in addition, about half of the required course load, focusing on biostatistics, epidemiology, computer skills (if necessary) and toxicology. Occasionally, fellows eager to free up the second year for an intensive research experience, e.g., laboratory based work, will take a full course load, deferring only the thesis. Under unusual circumstances, fellows may take less course work in the first year.

Beyond these formal components, fellows are expected to participate in all aspects of the Program enrichment described above except for the informal research in progress sessions which are optional for first year fellows. A special component of the first year is the weekly Friday lunch with the Director, which provides an extremely informal and intimate setting to discuss any aspect of training, problems or life in general. In this way the Director has the opportunity to get to know the fellows well, and they have the chance to explore areas which may be impossible in a larger group and more structured settings.

Year 2

The content of the second year is far more variable and depends on what the fellow accomplished during the first, and the fellow's projected career pathway. In general, second year fellows are expected to finish all remaining required coursework and their industrial placement responsibility. Each has a requirement to work one half day per week in a clinical setting, which may be in Program clinics, at an industrial site or at a speciality clinic, such as Dermatology, Orthopedics, Pain Clinic, Neurology etc.

The Program focus for the second year is the research experience. Depending on the intensity of the project undertaken and the fellow's ambition regarding a research/academic career, this may involve from 1/3 (minimum) to almost full-time commitment during this year.

Second year fellows also have the option of taking rotations away from Yale, for example at OSHA or other agency, or at a corporation or union. These may be arranged on an ad hoc basis by agreement of the director and the host organization.

Another option available to fellows in the second year is to take additional course work, beyond what is required, at the School of Public Health, the Medical School or any other University School, such as Forestry, Organization and Management, Law or Arts and Sciences.

Other than during a rotation away from Yale, second year fellows are expected to participate actively in all Program activities, including the enrichment educational programs outlined above.

By completion of the second year, all fellows are expected to have completed all of the required activities for board eligibility in Preventive Medicine/Occupational Medicine.

Year 3

The optional third year is intended to provide extended academic training for fellows who are preparing for academic careers. NIOSH Training Program support is not requested for support of this optional year, but we describe it to provide a complete description of the Yale program. In general, the third year is largely dedicated to research. Advanced coursework or other rotations are encouraged to the extent they fill important niches in the fellow's planned career direction. Assuming that all board and program training requirements have been previously met, there are no other specific program obligations for this year.

Training Candidates

Physicians are sought who have completed training in a primary care specialty, usually internal medicine, who have a strong and demonstrated interest in a career in occupational and environmental medicine. Prior public health or equivalent training is desirable, but not requisite. Similarly, the Program encourages applications from physicians who have been in practice. Minority physicians are strongly encouraged to apply, based on their underrepresentation in the discipline. Because of the research emphasis of the program, candidates with research experience and/or stated goals for an academic career in OEM are given preference.

The Program receives approximately 30 completed applications each year, though typically only about 1/3 meet all of the requirements. All applications are reviewed by the Director; qualified applications are then reviewed by the entire faculty and decisions are made regarding interviews. Full-day interviews are an essential component of the application process, because of the very close working relationship which faculty and staff will have with fellows, especially in the first program year. Usually 3 to 5 candidates will be interviewed in order to select 2 for positions. Generally, no more than 3 offers have been made in order to fill the two available slots.

Training Facilities and Resources

Space

The core training facility for this training program is the office and clinic of YOEMP, a 6000 square foot off-campus space dedicated to service, teaching and non-laboratory research. Strategically located across the street from the School of Public Health and two blocks from Yale New Haven Hospital and the School of Medicine, this facility houses all faculty, professional staff, fellows and staff.

The facility is divided into two sides with separate entrances. On the parking lot side is the clinic, with four examination rooms, testing facilities for audiometry, electrocardiography, visual acuity, spirometry and neuromuscular testing, a lab for blood and urine collection and processing and offices of clinic personnel, including the offices of the first year fellows.

The academic side includes the offices of all faculty, non-clinical professional staff and fellows after the first year, as well as clerical support.

Beyond the immediate offices, YOEMP maintains numerous off-site resources associated with research projects and service activities. For example, the Program currently has research staff working at the State Health Department and at an office complex in Groton. Dedicated offices are also maintained at two of the major teaching sites: Yale New Haven Hospital and Bristol-Myers-Squibb. One faculty member and one fellow currently share bench lab space within the medical center itself.

Information Services

Extensive computing facilities, including six machines connected to the Yale ethernet system, provide all with access to information searches, electronic mail and data processing capabilities. These resources are constantly being upgraded; CD-ROM capabilities for faculty and fellow use are currently being developed. The centerpiece of the academic side is the library, which also serves as a large conference room. The library contains over 1500 volumes spanning the range of important publications and resources in OEM, as well as general medical reference text. The conference room serves as classroom for courses taught by YOEMP faculty, and as the home base for most conferences.

In addition to the books, the library serves as an information resource to faculty and fellows in an ongoing way. A student serves as librarian and receives the new editions of the approximately 15 periodicals to which the Program subscribes. The contents page of each is distributed to all who have signed up for that particular journal to check off the articles or abstracts they wish to have copied for them; these are delivered to the mailboxes within the week. In addition, the Program research associate is available to assist with computer based searches of major databases and searches of the contents of Yale libraries.

Equipment

Aside from clinical equipment, computers and books, the major equipment owned by the Program for teaching is basic industrial hygiene instrumentation maintained by the industrial hygienist. Basic pumps and direct reading tubes and instruments are maintained at the office, along with a sample of personal protective equipment for use on field activities and teaching purposes. More extensive sampling equipment is available from University Environmental Health and Safety Services, the hygiene and safety group which services Yale, and which is located directly below YOEMP, in the same building.

Research and Training Funding

In addition to the NIOSH training grant, training activities providing Program support during 1991-96 were: 1) an NIEHS Academic Award in OEM; 2) A grant from the State of Connecticut for Occupational Health Services and Training and 3) General Administration funds from the School of Medicine. Funds generated in part by fellow's work, including the contractual agreements with the four major sites for fellow practicum placement, are also used to offset training costs. Fellows have also been extremely successful in competing for Occupational Physician's Scholarship Fund stipends. Among the 6 graduates who started after the inception of the Program, 4 have been award OPSF awards for one or more years of their training; one of the current 4 fellows has the award.

The YOEMP faculty held 10 funded grants from federal scientific agencies, including NIOSH, NCI, NHLBI, NIEHS, ATSDR and Department of Veteran's Affairs. Research topics include asbestos, lead, metal fume, and causes of asthma and dermatitis; a major new venture to explore the mechanisms of isocyanate asthma is pending. An additional large foundation grant was received from the Willard Wirt Winchester Fund for the study of tuberculosis in hospital workers.

The overall budget for research and training is approximately \$1.7 million.

Highlights

Trainees

Twenty-three physician-trainees have entered the residency program since its inception in 1985. During the grant period covered by this report, 10 physician-trainees were accepted into the OEM training program. All had completed ACGME-approved residencies in internal medicine or family practice prior to joining YOEMP. Nine physician-trainees completed their fellowships during the same time frame. Four of the 9 graduates work full-time in academic positions, while 2 others maintain close ties with academic institutions. The rest are in hospital-based practices, private consultation or corporate positions.

Six of the 9 graduates are board certified by the American Board of Preventive Medicine in Occupational Medicine. In addition, 9 are board certified by the American Board of Internal Medicine. In fact, 5 of the 9 are board certified in both Internal Medicine and Occupational Medicine.

Within the grant period, YOEMP trainees were awarded 5 Occupational Physicians' Scholarship Fund training grants. One current trainee is the recipient of an American Cancer Society Physician Training Award in Preventive Medicine.

YOEMP Fellows, 1991-1996

NAME	Training Period	Degrees	Current Job Title	Board Certification	Training Grants
Rafael de la Hoz	1990-1993	MD, MPH	Staff Physician Bellevue Hosp	ABIM	
Sandra Mohr	1990-1992	MD, MPH	Occ. Med Training Program Director, UMDNJ	ABIM	
Garland Jackson	1991-1994	MD	Private consultant		
Mark Russi	1991-1993	MD, MPH	Asst. Professor YOEMP	ABIM, ABPM	
Amy Hopkins	1992-1994	MD, MPH	Private consultant	ABIM, ABPM	OPSF, 93-94
David Berube	1992-1994	MD, MPH	Director, Occ. Med. Program Saint Francis Hospital Adjunct Clinical Faculty, UCONN	ABIM, ABPM	OPSF, 92-93 and 93-94
Nirmal Patel	1993-1995	MBBS, MPH	Plant Physician Pitney Bowes	ABPM	
Zsuzsanna Seybold	1993-1995	MD	Private consultant		
Annette M. David	1994-1997	MD, MPH	Director, Clinical Services Asst. Training Program Director YOEMP	ABIM, ABPM	OPSF, 95-96
Oyebode Taiwo	1994-1996	MD, MPH	Clinical Asst. Professor, YOEMP	ABIM, ABPM	
Leslie Israel	1995-1997	DO	Fellow		ACS grant
Akshay Sood	1995-1997	MBBS	Fellow	ABIM	OPSF, 96-97
Saud Anwar	1996-1998	MD	Fellow	ABIM	
Peter Rabinowitz	1996-1998	MD, MPH	Fellow	ABFP	

The Yale program is the only specialty training program on the fellowship level in OEM within the state of CT. It is one of only three such programs in New England.

YOEMP remains deeply committed to training future faculty for institutions who either are without an OEM program or need additional faculty. A majority of our graduates have gone on to full-time academic jobs; the rest provide services in areas where there is a need for OEM expertise, often teaching on a part-time basis. This emphasis on “training the trainers” is the reason for the high level of faculty involvement for each individual fellow, the requirement for completion of residency training in a clinical specialty prior to commencing the fellowship and the intimate nature of the training environment. Despite the still limited experience, we believe that our program has been quite successful in producing faculty who can expand national training opportunities and scudded in even the most rigorous institutional

Teaching/Community Outreach Activities

1991 was a landmark year for YOEMP’s efforts to impact on medical housestaff training. Beginning that year, all junior residents (PGY-2) in the Primary Care/Internal Medicine program were required to do a 4-week mandatory clinical OEM rotation. Since then, 24 to 25 PGY-2 residents have completed the rotation annually. Over the past 5 years, the rotation has evolved into an organized effort complete with a syllabus, textbook and structured didactic, clinical and industrial hygiene components. Two of the graduates of the Primary Care program have actually gone on to do the OEM fellowship at Yale, an indication of the success of this approach.

In 1996, a combined Primary Care/Occupational Medicine residency was offered to the incoming pool of Primary Care residents. The first individual accepted into this program had done an elective rotation with YOEMP while in his fourth year of medical school; the quality of that experience prompted him to apply for the joint residency.

YOEMP also offers on an ad hoc basis elective clinical rotations for Yale Internal Medicine residents in the Traditional track, residents from neighboring institutions, medical students, and students in the allied health professions. Over the years, a diverse group of trainees have taken advantage of this opportunity to learn about OEM.

As part of the YOEMP outreach initiative, faculty and fellows routinely participate in state and regional conferences and are actively involved in numerous governmental and voluntary occupational health projects in the state of Connecticut. Faculty and fellows also regularly give talks to a variety of audiences and serve as a core consulting and referral source for physicians, corporations, labor unions, and government and community organizations.

Publications : See Appendix A

Grants: See Appendix B

Clinical Activities

1993 marked a turning point in the history of YOEMP. During this year, the Program moved into a dedicated facility housing the Occupational and Environmental Medicine Clinic at 135 College Street. This resulted in an expansion of the service component of the program. A full-time nurse manager was hired and clinic time increased from 1 to 4 days per week. Patient encounters have subsequently increased, as have the number of clients seeking clinical and consultative services. These changes have augmented the clinical training aspect of the fellowship program.

Patient Encounters, 1991-1996

Patient Encounters	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996
New Patients	232	222	226	647	940
Follow-up	350	389	315	804	1014
TOTAL	582	611	541	1451	1954

Industrial Site Visits

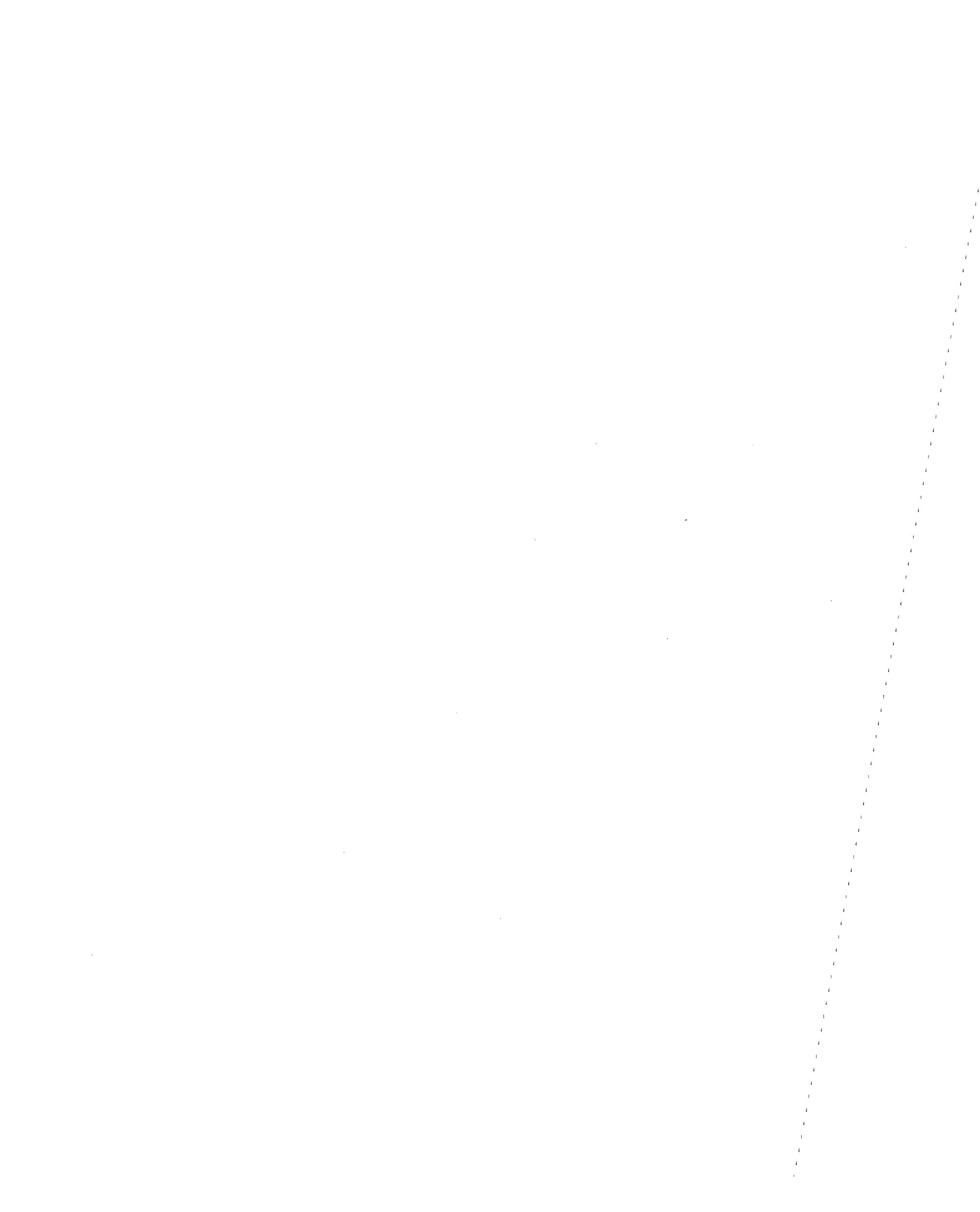
Work site visits are an integral part of the fellowship experience at YOEMP. Fellows embark on site evaluations under the supervision of our staff industrial hygienist. Results of site visits are integrated into the overall management plan for patients.

1991-96 Site Visit Evaluations : See Appendix D

Appendices:

- A. Publications
- B. Grants
- C. Program Seminars
- D. Site Visit Evaluations

APPENDIX A
PUBLICATIONS



PUBLICATIONS 1991-1992

A. Published

Merrill WW, Carter D, Cullen MR. The relationship between large airway inflammation and airway metaplasia. *Chest* 1991; 100:131-5.

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APPENDIX B

GRANTS



ANNUAL REPORT
OCCUPATIONAL AND ENVIRONMENTAL MEDICINE PROGRAM, 1991-92

GRANTS

A. New Grants

Chemoprevention Effect of Vitamin A; Redlich PI; CPRU (NCI) 4/92 - 3/93.

Chemoprevention Effects of Vitamin A in Asbestos Workers; Redlich PI; American Institute for Cancer Research; 7/92 - 6/94.

Metabolites of Retinol and Retinoic Acid in Assessment of Retinoid Status; Mohr PI, CPRU (NCI); 2-/92 - 3/93.

Characterization and Modulation of Radiation-Induced Lung Injury; Redlich PI; Donaghue Medical Foundation; 9/92 - 8/95.

Occupational Physicians Scholarship Fund; Berube; 7/92 - 6/94.

Health Hazards of Boiler Cleaning and Maintenance, Phase II; Sparer PI; State of Connecticut Division of Administration (Health Care Cost Containment Committee); 7/91 - 4/92.

B. Continuing Grants

Connecticut Road Industry Surveillance Project; Cullen PI, Maurer Project Director; NIOSH (CDC); 9/90 - 6/95

Academic Award in Environmental and Occupational Medicine; Cullen PI; NIEHS; 7/91 - 6/96

Occupational Health Clinic Award; Cullen PI; State of Connecticut; 12/91 -

Training Program Project in Occupational Medicine; Cullen PI; NIOSH; 7/91 - 6/96

Preventive Pulmonary Academic Award; Beckett PI; NHLBI; 6/89 - 5/94

Beta-Carotene/Retinol Chemoprevention Trial; Cullen PI; Cherniack Project Director; NCI; 7/88 - 6/93.

**ANNUAL REPORT
OCCUPATIONAL AND ENVIRONMENTAL MEDICINE PROGRAM, 1992-93**

GRANTS

A. New Grants

1. Occupational Physicians Scholarship Fund: Berube - 7/92-6/94
Hopkins - 7/93-6/94.

2. Lead Exposures in Bridge Work - CRISP Goldstar Project: Cullen PI; Maurer, Project Director. NIOSH (CDC): 9/30/92 - 6/30/95.

3. Metal Fume Fever: Beckett, PI. CDC: 9/30/92 - 6/30/95.

4. Subcontract to Pierce Laboratory, Acid Aerosol, Leaderer, PI; Beckett - 20%. 9/1/92 - 8/31/95.

5. Subcontract to Pierce Laboratory, Cutaneous Sensitivity and Aging, Stevens, PI. Cherniack 5%. 9/18/92 - 6/30/95.

B. Continuing Grants

1. Chemoprevention Effects of Vitamin A in Asbestos Workers: Redlich, PI. American Institute for Cancer Research: 7/92 - 6/94.

2. Characterization and Modulation of Radiation-Induced Lung Injury: Redlich, PI. Donaghue Medical Foundation: 9/92 - 8/95.

3. Connecticut Road Industry Surveillance Project: Cullen, PI; Maurer, Project Director. NIOSH (CDC): 9/90 - 6/95.

4. Academic Award in Environmental and Occupational Medicine: Cullen, PI. NIEHS: 7/91 - 6/96.

5. Occupational Health Clinics Award: Cullen, PI. State of Connecticut: 12/91 -

6. Training Program Project in Occupational Medicine: Cullen, PI. NIOSH: 7/91 - 6/96.

7. Preventive Pulmonary Academic Award: Beckett, PI. NHLBI: 6/89 - 5/94.

8. Beta-Carotene/Retinol Chemoprevention Trial: Cullen, PI; Cherniack, Project Director. NCI: 7/88 - 6/94.

ANNUAL REPORT
OCCUPATIONAL AND ENVIRONMENTAL MEDICINE PROGRAM, 1993-94

GRANTS

A. New Grants

1. Characterization and Modulation of Radiation Induced Lung Injury: Redlich PI. VA: 10/93 - 9/95.
2. Shannon Award. Causes of Laryngeal Cancer: Russi Co-investigator. NCI: 8/93 - 8/94.

B. Continuing and Renewed Grants

1. Chemoprevention Effects of Vitamin A in Asbestos Workers: Redlich, PI. American Institute for Cancer Research: 7/92 - 6/94.
2. Characterization and Modulation of Radiation-Induced Lung Injury: Redlich, PI. Donoghue Medical Foundation: 9/92 - 8/95.
3. Connecticut Road Industry Surveillance Project: Cullen, PI; Maurer, Project Director. NIOSH (CDC): 9/90 - 6/95.
4. Academic Award in Environmental and Occupational Medicine: Cullen, PI. NIEHS: 7/91 - 6/96.
5. Occupational Health Clinics Award: Cullen, PI. State of Connecticut: 12/91 -
6. Training Program Project in Occupational Medicine: Cullen, PI. NIOSH: 7/91 - 6/96.
7. Preventive Pulmonary Academic Award: Beckett, PI. NHLBI: 6/89 - 5/94.
8. Beta-Carotene/Retinol Chemoprevention Trial: Cullen, PI; Cherniack, Project Director. NCI: 7/88 - 3/99.
9. Occupational Physicians Scholarship Fund: Berube - 7/92-6/94; Hopkins - 7/93-6/94
10. Lead Exposures in Bridge Work - CRISP Goldstar Project: Cullen PI; Maurer, Project Director. NIOSH (CDC): 9/30/92 - 6/30/95.
11. Metal Fume Fever: Beckett, PI. NIOSH: 9/30/92 - 6/30/95.
12. Acid Aerosols, Respiratory Effects: Leaderer PI; Beckett - 20%. NIEHS: 9/1/92 - 8/31/95.
13. Cutaneous Sensitivity and Aging: Stevens PI; Cherniack - 5%. NIA: 9/18/92 - 6/30/95.

ANNUAL REPORT
OCCUPATIONAL AND ENVIRONMENTAL MEDICINE PROGRAM, 1994-95

GRANTS

A. New Grants

1. Vitamin A Modulation of Environmental Lung Injury, NHLB: 1/94-99 (Redlich, P.I.).
2. Biomarkers of Disease and Vitamin A in Asbestos Workers, NCI: 6/95-5/97 (Redlich, P.I., Cullen, Co-I.).
3. Environmental Agents: Asthma Development and Severity, NIEHS: 4/95-3/00 (Beckett) (Co-I).

B. Continuing and Renewed Grants

1. Characterization and Modulation of Radiation Induced Lung Injury, VA:10/93-9/95 (Redlich, P.I.).
2. Characterization and Modulation of Radiation-Induced Lung Injury, Donaghue Medical Foundation: 9/92-8/95 (Redlich, P.I.).
3. Connecticut Road Industry Surveillance Project, NIOSH (CDC): 9/90-6/96 (Cullen, PI; Maurer, Co-I).
4. Academic Award in Environmental and Occupational Medicine, NIEHS: 7/91-6/96 (Cullen, P.I.).
5. Occupational Health Clinics Award, State of Connecticut: 12/91- (Cullen, P.I.).
6. Training Program Project in Occupational Medicine, NIOSH: 7/91-6/96 (Cullen, P.I.).
7. Beta-Carotene/Retinol Chemoprevention Trial, NCI: 7/88-3/99 (Cullen, P.I.; Cherniack, Co-I).
8. Occupational Physicians Scholarship Fund: Annette David, 1995-96.
9. Metal Fume Fever, NIOSH: 9/30/92-6/30/95 (Beckett, P.I.).
10. Acid Aerosols, Respiratory Effects, NIEHS: 9/1/92-8/31/95 (Beckett, Co-I).
11. Cutaneous Sensitivity and Aging, NIA: 9/18/92-6/30/95 (Cherniack, Co-I).

ANNUAL REPORT
OCCUPATIONAL AND ENVIRONMENTAL MEDICINE PROGRAM, 1995-96

GRANTS

A. New Grants

Occupational Physicans Scholarship Fund (Akshay Sood, 1996-97).

B. Continuing and Renewed Grants

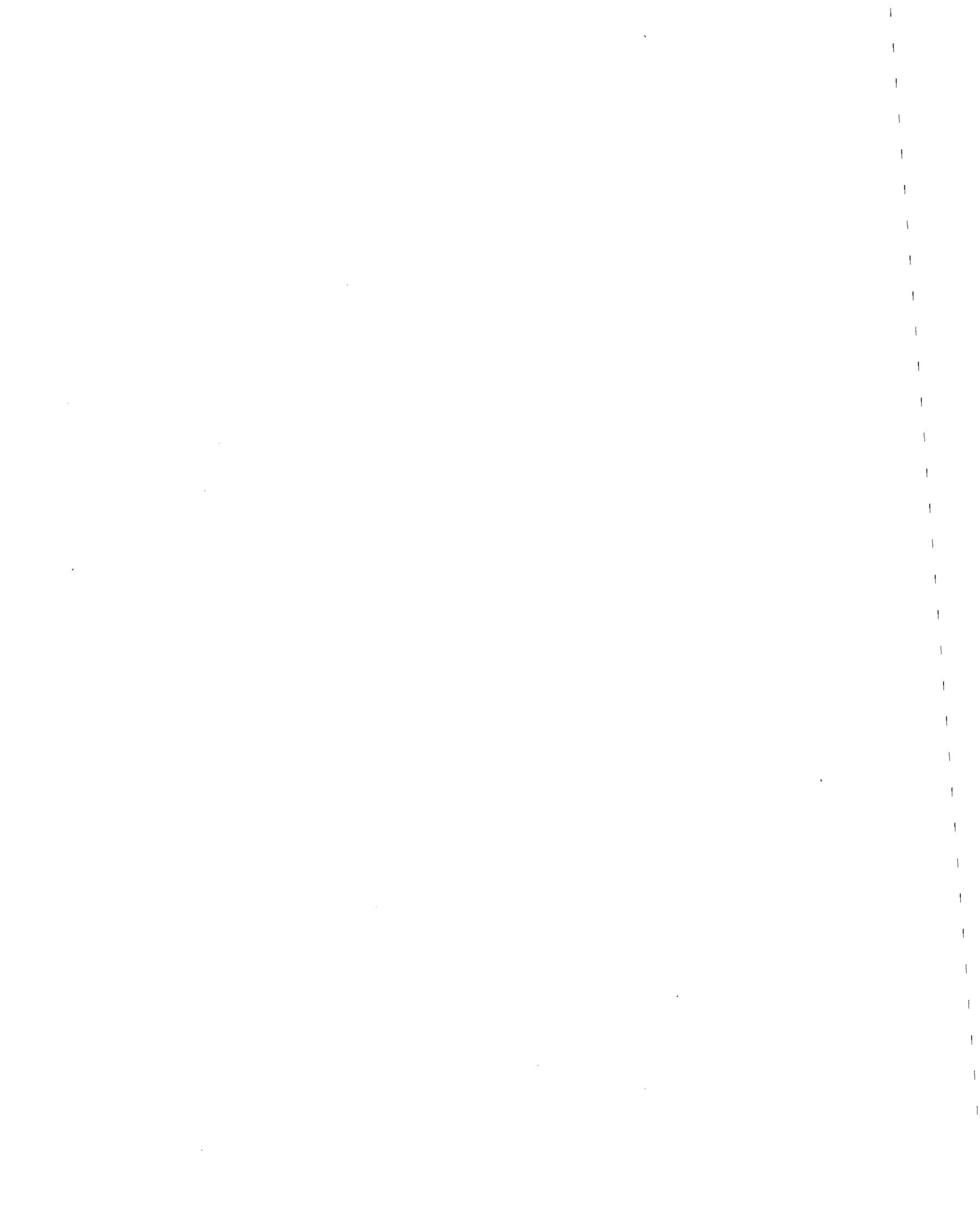
1. Vitamin A Modulation of Environmental Lung Injury, NHLB: 1/94-99 (Redlich, P.I.).
2. Biomarkers of Disease and Vitamin A in Asbestos Workers, NCI: 6/95-5/97 (Redlich, P.I., Cullen, Co-I.).
3. Environmental Agents: Asthma Development and Severity, NIEHS: 4/95-3/00 (Beckett) (Co-I).
4. Characterization and Modulation of Radiation Induced Lung Injury, VA:10/93-9/95 (Redlich, .I.).
5. Characterization and Modulation of Radiation-Induced Lung Injury, Donaghue Medical Foundation: 9/92-8/95 (Redlich, P.I.).
6. Connecticut Road Industry Surveillance Project, NIOSH (CDC): 9/90-6/96 (Cullen, PI).
7. Academic Award in Environmental and Occupational Medicine, NIEHS: 7/91-6/96 (Cullen, P.I.).
8. Occupational Health Clinics Award, State of Connecticut: 12/91- (Cullen, P.I.).
9. Training Program Project in Occupational Medicine, NIOSH: 7/87-6/01 (Cullen, P.I.).
10. Beta-Carotene/Retinol Chemoprevention Trial, NCI: 7/88-3/99 Cullen, P.I.; Cherniack, Co-I).
11. Acid Aerosols, Respiratory Effects, NIEHS: 9/1/92-8/97 (Beckett, Co-I).

VI. PENDING GRANTS

1. NIH 1PH50HL56389-01ZHL1-SRC(99), T-lymphocytes and cytokines in asthma (clinical and data management core) Dr. J. Elias, PI SCOR grant (Cullen)

2. NIH, Epidemiologic Study of Isocyanate Asthma in Autobody Shops and Epidemiologic study of HDI exposed autobody shop spray painters and coworkers. (Cullen)
3. CDC/NIOSH. Connecticut Road Industry Surveillance 10%. Project: Injury Control.
To establish an approach which can be introduced on a wide scale in CT and evaluated for efficacy in control of acute traumatic and cumulative trauma injuries in bridge workers. (Cullen)
4. Recognition and Control of Latex Allergies in Hospital Workers, NIH, 4/1/97 - 3/31/00. (Russi)

APPENDIX C
PROGRAM SEMINAR EXAMPLE



YALE OCCUPATIONAL & ENVIRONMENTAL MEDICINE RESEARCH SEMINAR

APPENDIX C:
Prog. Sem. Example

TIME: 12:00 NOON, TUESDAYS
PLACE: 135 COLLEGE ST., 3RD FLOOR CONFERENCE ROOM
SEMINAR COORDINATOR: CARRIE A. REDLICH, M.D., M.P.H.

DATE	NAME	TOPIC
July 11, 1995	Rodney Erlich, MD	Chronic renal failure associated with work in a lead battery factory
July 18	Brian Yellin, CIH, OSHA	Hospital safety and health
August 15	Carrie Redlich, MD, MPH & Mark Cullen, MD	Isocyanate asthma
August 22	William S. Beckett, MD, MPH	Clinical year in review: environ/occupational lung disease
September 12	Mark R. Cullen, MD	Issues in epidemiology of occupational asthma
September 19	Susan Woskie, Sc.D. Dept. of Work Environment UMASS	Respiratory effects of mining borax
September 22	Linda Clever, MD Occupational Health Calif. Pacific Med. Ctr.	Women's health in the workplace
September 26	Janneane Gent, Ph.D. Pierce Foundation	A pilot study of sensory challenge to MCS patients
October 3	Chuck Levenstein, Ph.D. Dept. of Work Environment UMASS	Lead policy in Eastern Europe
October 24	Renaë Reese UCONN Health Ctr.	Worker education
October 31	Paul Blanc, MD., MSPH Occ. Med., U.C.S.F.	Pathogenesis of metal fume fever
November 21	Martin Cherniack, MD	A comprehensive approach to worker's compensation in a municipality

YALE OCCUPATIONAL & ENVIRONMENTAL MEDICINE RESEARCH SEMINAR**TIME: 12:00 NOON, TUESDAYS**

DATE	SPEAKER	TOPIC
December 5	Anne Bracker, CIH UCONN Health Ctr. Farmington CT	The effectiveness of a clinic-based sentinel event intervention model
December 19	Howard Kipen, MD Robert Wood Johnson Medical School, UMDNJ	rescheduled to 5/21/96
January 23,	Mark Russi, MD	Latex allergy in hospital workers
January 30	Jonathan Borak, MD	Reformulated gasoline, MTBE, and human health
February 20	Patrick Kinney, Ph.D. Columbia University School of Public Health	Epidemiologic studies of air pollution
February 27	Kathy Maurer, MD	The CRISP Project
March 5	Dr. Tushar Patel, M.D. YPB	Natural history of low back pain
March 19	Lewis Nelson, MD Yale Emergency Med.	Plant associated occupational illness
March 27	William Beckett, M.D., M.P.H.	Home triggers for asthma
April 9	Mark Cullen, M.D.	rescheduled to 6/4/96
April 23	Nick Warren, M.S., M.A.T. UCONN Occupational Medicine Program	Psychosocial factors in repetitive strain injury
April 30	Kathleen Rest, Ph.D. Occupational Health Program UMASS	OSHA: Past and Future
May 21	Howard Kipen, MD Robert Wood Johnson Medical School, UMDNJ	MCS in chronic fatigue, army fatigue, and clinic patients
May 28	Oyebode Taiwo, MD	The natural history of occupational asthma

YALE OCCUPATIONAL & ENVIRONMENTAL MEDICINE RESEARCH SEMINAR

TIME: 12:00 NOON, TUESDAYS

DATE	SPEAKER	TOPIC
June 4	Mark Cullen, MD	SES and health
June 11	Carrie Redlich, MD, MPH	The CARET intervention
June 18	Tim Morse, Ph.D. UCONN Community Medicine Program	Occupational health resources on the internet

