IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF OHIO

WESTERN DIVISION

MARY A. DENDINGER, et al. and ETTA M. WALLACE, et al.,	:	
Plaintiffs,	:	
vs.	:	Case No. C87-7117
CHRYSLER PLASTIC PRODUCTS CORPORATION, et al.,	:	(Hon. Nicholas J. Walinski)
Defendants.	:	

Deposition of RALPH MICHAEL KELLY, M.D., a witness of lawful age, taken on behalf of the defendants under the Federal Rules of Civil Procedure, in the above-entitled cause, wherein Mary A. Dendinger, et al., are the plaintiffs, and Chrysler Plastic Products Corporation, et al., are the defendants, pending in United States District Court, Northern District of Ohio, Western Division, before Luke T. Lavin, Registered Professional Reporter, a Notary Public in and for the State of Ohio, at the offices of the deponent, Suite 106, 2450 Kipling Avenue, Cincinnati, Ohio, at 10:05 o'clock a.m., on Friday, May 6, 1988.

C O P Y

APPEARANCES:

On behalf of the plaintiffs:

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On behalf of the defendants The Goodyear Tire & Rubber Company; The BF Goodrich Company; Firestone Tire & Rubber Company; Conoco, Inc.; Uniroyal, Inc.; Union Carbide Corporation; Maxus Energy Corporation; Tenneco, Inc. and Occidental Chemical Corp.:

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Also present:

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RALPH MICHAEL KELLY, M.D.

called by the defendants under the Federal Rules of Civil Procedure, being first duly sworn in the above cause, testified on his oath as follows:

CROSS-EXAMINATION

BY MR. BUNDA:

Q Doctor, can you please state your name and your business address for the record?

A Yes. Ralph Michael Kelly, 2450 Kipling, Suite 106, Cincinnati 45239.

Q What is your home address, Doctor?

A Home address?

Q Yes, sir.

A 7360 Kirkwood, Cincinnati.

Q Doctor, do you have any plans to be traveling or out of the country during January of 1989?

A No.

Q Doctor, I've got a curriculum vitae for you

that I received from you in another case. Is that current, or do you have an updated one?

A Fairly current. There's a couple of additions. I have been a commissioned member of the Sayer Commission, the state of Ohio, the EPA Superfund, a statewide organization legislated in, I think, the '86 legislation.

Another article has been accepted for publication in Reproductive Toxicology, having to do with methylene chloride. And another article's being considered with respect to the CNS affects of methylene chloride.

Q Other than that, is that current?

A Yes.

Q If I could have that back, please.

Well, Doctor, if we can go through your background for just a minute. Do you want to have reference to this, or do you have a copy of your curriculum vitae? I need to look at this one, too.

A That's fine.

Q Okay. You graduated from the University of Michigan with an undergraduate degree. Is that right?

A That's right.

Q That's in 1969?
A Yes.
Q When did you start medical school, then?
A 1971.
Q What did you do in the two years between or the year and a half between undergrad and medical school?
A I was a VISTA volunteer, North Platte, Nebraska. I did some work in a laboratory as a laboratory technician.
Q What company were you working for when you were a lab tech?
A I think it was Saint Joseph Hospital in Ann Arbor.
Q You went straight through in medical school, or did you take time off?
A No. I went straight through.
Q You previously have told me that all the courses in medical school are pass-fail. Is that right?
A They were, yes.
Q Were there any that you had to take over again?
A No.

Q After you graduated from medical school, then you went to Detroit General Hospital as a resident. Is that right?

A That's correct.

Q When you began your course of study at the University of Michigan School of Public Health, that was while you were still working. Is that right?

A Yes.

Q Would you describe for me how that worked, please?

A Yes. It's what's called a job-on-campus program. You attend classes three days a month, doing course work, reading, writing, research during the month at home. So it's basically a full-time master's program but tailored in such a way that I could work as a physician during the day and then do the study in the evenings.

Q Did you take the classes in the evenings, too?

A The classes were over a weekend once a month.

Q How many years did you do that?

A The program was a two-year program. I took some course work in '79 and '80, I think, maybe '80

and '81 independently, but the course was from '81 to '83.

Q Was that full time through the year, or did you take quarters?

A Full time through the year.

Q How many courses in all did that involve?

A I don't know. I think it was 60 credit hours. It's hard because of the special nature of the program. I never was clear, you know, when one course was ending and another one was beginning, and so it's hard to say how many different courses. But they had to do with epidemiology, toxicology, industrial hygiene, some administrative law, occupational medicine, biostatistics. I think that covers the general course work. There was a thesis associated, and computer work, but all that was incorporated into the other courses.

Q Do you remember who you had as instructors in epidemiology?

A Well, Larry Fein was the overall coordinator of the course. There were a couple of different epidemiologists that talked.

Q These were lectors?

A Yes.

Q Did you have a text that you used during the course of this study, or several texts, or was it mostly course materials?

A Mostly course materials. We had some primers in epidemiology. You're still taking about epidemiology?

Q Yes. Let's focus on epidemiology first.

A Okay. We had a couple of texts, but mostly it was articles and material prepared for the course.

Q Do you remember any of the texts that related to epidemiology?

A I think one was called a primer in epidemiology, but I don't remember who it was authored by. I think there was one called Occupational Epidemiology, and I don't remember the author of that one, either.

Q Have you saved the course materials from your epidemiology courses?

A Yes.

Q Do you still have them?

A Yes.

Q Do you have them here in the office?

A Some of them I do.

Q Did you have courses in occupational medi-

cine?

A Yes.

Q Do you remember who your lecturers were in that area?

A Again, Larry Fein. I mean, he was the overall coordinator of the course and he was the -- and in fact, with occupational medicine did mostly that. There was a Kelly Brecks that did some, and some other guest lecturers.

Q Did you use a text there?

A Again, no. There was some suggested ones, Rohm's text, Zins' text, and then a lot of course materials.

Q Have you received all your or the greater extent of your course materials from all of the courses you took during this master's program?

A I believe so, yes.

Q Do you remember who your instructors were for toxicology?

A I'm remembering faces, but there was a Rory somebody and -- I don't remember. These were all faculty members of the University of Michigan.

Q And industrial hygiene, do you remember anybody specifically?

A A Dr. Smith, Armstrong and, again, I don't remember any others.

Q That was Ralph Smith?

A Yes.

Q Did you ever have Ian Higgans coming in to testify?

A Yes, yes.

Q Or, I'm sorry, not testify, but lecture.

A Yes.

Q That was on epidemiology?

A Yes.

Q When you went for your internship, how did that work? You were at Detroit General Hospital as a resident. Is that right?

A Yes.

Q Then where were you working when you were going for your master's degree? You were also working at the time, right?

A Yes. I worked some at Wayne State University supervising residents in an outpatient, seeing patients myself. I was working for the City of Detroit doing both internal medicine and occupational medicine work, and for a portion of that time that I was taking the course work in Ann Arbor I was the

director of the Employee Medical Services at Detroit Receiving Hospital.

Q Were those three jobs that you had in addition? I realize that some of these are overlapping, but were you doing those three that you mentioned all at the same time at any point?

A Never quite all three at the same time. I worked for the City from 1980 on, and so that overlapped with both of the other jobs.

Q That was when you were at Herman Keifer Hospital?

A At Herman Keifer, that's right.

Q Specifically, what were you doing there?

A Working in an internal medicine clinic, and also doing occupational medicine, surveillance work for the city health department.

Q I'm sorry. For the city --

A Health department.

Q What did that involve?

A We were involved with designing and delivering a program for small businesses in the city to help them better monitor employee health. We were also involved with follow-up of patients, concern about cancer cases arising in a particular location

of the city, helping to design studies, public health, epidemiologic and otherwise on those situations.

Q What was the department of the city that you were working for?

A Health department.

Q What was your title?

A Physician.

Q You were a physician in the health department. Is that right?

A Yes.

Q Were you enforcing ordinances or regulations of the City?

A I was not.

Q How was it that the City was involved in this type of work?

A Well, the City has, I think, some legal responsibility for maintenance of health. They were involved with some surveillance work. There's a long history of a hygiene department at the City, and partly it was what was felt to be the responsibility of the city to provide services like this for businesses and residents of the City.

Q Did you have legal authority to enter and

inspect the premises of businesses, or was this a voluntary thing on behalf of the companies that you were working with?

A Mostly voluntarily. I had no legal authority as an individual. The City does have some legal authority in certain areas. I'm not quite sure what those are right now. But mostly the legal authority got -- you know, when OSHA was created in '70, most of that legal authority was transferred to MIOSHA, Michigan OSHA.

Q Which was a state responsibility. Is that right?

A Right.

Q Was there any delegation of that responsibility from the state to the City?

A I don't think so.

Q In your job for the City, did you have a responsibility for health other than occupational matters?

A Internal medicine, yes. I saw adult medical patients.

Q This clinic that you were working in was run by the City?

A Yes.

Q Was this work overlapping the work that you were doing at the University Health Center?

A For some, yes.

Q You understand what I mean by overlapping?

A Yes.

Q It was at the same time?

A Right. During the year that I was director of the health center, the employee medical department -- Employee Health Services, I guess that was the official name -- I was only working an afternoon a week for the City. After and before I was doing the employee health service work I worked more for the City.

Q You worked in the Employee Health Services. In other words, you were responsible for providing medical care to the employees of the Detroit Receiving Hospital. Is that right?

A That's right.

Q You say you were director. How many doctors did you have underneath you?

A There was one other doctor, a nurse, and the the staff that went with that.

Q All right. The doctor was an intern?

A No, another staff physician.

Q How many days a week were you doing this work?

A I did that full time.

Q You worked for Herman Keifer Hospital with regard to the internal medicine clinic, and your other responsibilities for the health department, that was one day a week, you say?

A A half-day a week during that year, yes.

Q What year was that?

A I think it was most of '83 and a part of '82.

Q Well, let's back up just a second so I can get this in chronology. You got out of medical school. Is that right?

A Yes.

Q Then you went as an intern to which hospital?

A Detroit Receiving, Detroit General.

Q Detroit General is different from Detroit Receiving?

A Well, Detroit Receiving replaced Detroit General, and frequently the names were interchanged.

Q You were a resident in internal medicine. Is that right?

A That's right.
Q How long was that?
A I had a three-year residency, and then I was chief medical resident for a fourth year.
Q Who was your supervisor as a resident? You had a doctor supervising your activities?
A Carter Bishop was the head of the department.
Q The internal medicine department?
A Yes.
Q Do you know if he's still there?
A He's still at the university, yes. He's not the head of the department now.
Q When were you chief medical resident?
A July '78 to June '79.
Q What did you do after that, then?
A That's when I began work at and for Wayne State University in the internal medicine department as an instructor teaching, supervising of residents and also seeing patients myself. I began working for the City sometime in early 1980.
Q Well, let's back up for just a second. Okay?
A Okay.

Q You were working for Wayne State University. Is that right?
A Yes.
Q In what capacity?
A As an instructor in the medicine department.
Q Of the medical school?
A Yes.
Q The Wayne State University Medical School?
A That's right.
Q And then what else were you doing?
A Umm --
Q That was full time?
A That was full time.
Q How long did you do that?
A I did that until I left Detroit in August of 1984. It became less than full time early in 1980, and then continued at at least a part-time basis until I left.
Q From 1979 until 1980 you were doing that full time?
A Yes.
Q And you were also seeing patients?
A Yes.
Q Is that when you began your work testifying

in workers' comp cases?

A No. I don't remember the first time I testified. I think it was sometime in 1980, perhaps. Maybe even later.

Q When did you, in addition to your responsibilities at Wayne State, then take on an additional job at your next post?

A At the City?

Q Yes, sir.

A That was early in 1980.

Q When you say at the City, are you talking about the Employee Health Services, or are you --

A No. I'm talking about Herman Keifer.

Q That was part time. Is that right?

A That's right.

Q When did that begin in 1982?

A In 1980?

Q Oh, I'm sorry. I thought you told me it was part time in part of 1982, and I presumed that it began -- let me just ask you. When did it start?

A In 1980.

Q And that was part time or full time?

A Part time.

Q How extensive was the part-time work? And

you understand what I'm asking. Was it one day a week, or how often during a week's time?

A I actually forget. I think it was at least three half-days a week. You understand that there was, you know, some changes over the four-plus years, and it's hard to remember exactly how much and when I was working.

Q When you first began, were your responsibilities at Herman Keifer as you have described them earlier, or did they change over time?

A When I first began, they were primarily internal medicine. The occupational medicine responsibilities developed over time.

Q This was an internal medicine clinic that they had there?

A Yes.

Q This was run by the City for the residents of the City?

A That's right.

Q In 1980, then, you were working as an instructor for the university and working at Herman Keifer Hospital. Is that right?

A Yes.

Q Were you doing anything else at that time?

A No.

Q Your duties at that time for the university, were they part time as well?

A Yes.

Q How extensive were they?

A Well, again, it's hard to remember. I was working full time divided between the two places.

Q Were you teaching classes or just supervising clinical instruction?

A Some teaching in an outpatient setting. Not a formal structure, but there was a weekly seminar that I wouldn't have responsibility for every week; maybe once a month.

Q You say in an outpatient setting. Would you have students come from the university to you?

A Residents.

Q I'm sorry.

A As part of their training would be in an outpatient setting, and there would be an hour's seminar prior to the start of the clinic.

Q Would they assist you in this clinic?

A Actually, I was their supervisor. They were directly seeing the patients themselves and would come to me for advice and help.

Q On a particular patient?
A That's right.
Q They were on a rotation basis?
A That's right.
Q You said you would have this seminar once a week. That would be discussing patients that they would be seeing?
A Yes. And I wouldn't have the seminar once a week. There was one once a week.
Yes, the seminars were either exhibiting difficult problems, general outpatient problems, how to handle them, and so on.
Q Would there be a topic for each?
A Generally, yes.
Q How many of those did you present?
A Over the time I was there, quite a few.
Q How many residents at a time would be assigned to your clinic?
A Oh, ten to 15.
Q You were never in a situation where you were actually going and instructing or giving lectures to students in the medical school?
A You're right.
Q How did your responsibilities, then, in 1980

for supervising the residents and treating patients at the clinic, when did that change and how did it change?

A It really didn't change much during the entire time that I was there.

Q In Detroit, you mean?

A In Detroit, that's right.

Q Eventually you picked up this responsibility for employee health care at Detroit Receiving?

A Yes.

Q That was late in '82?

A Yes.

Q And that was in addition to your other responsibilities that you've described?

A Yes, although during that period, I guess, the supervision of residents declined considerably.

Q Why was that?

A Because I was spending most of my time in the Employee Health Service.

Q Now, you have down on your resume employment at the University Health Center at Wayne State University, and then you also have as a separate category Herman Keifer Hospital.

What is the difference between those? I

thought I understood your testimony to be that you were supervising the residents actually at Herman Keifer.

A At Herman Keifer, no. I was seeing patients myself. There were no residents at Herman Keifer.

Q All right. You were seeing patients yourself at University Health Center?

A I was also doing that, yes.

Q And you were supervising the residents at the University Health Center?

A That's right.

Q There was also an internal medicine clinic at Herman Keifer?

A Yes.

Q And you would shuttle between those two?

A Yes.

Q And in 1981 you decided to get your masters' degree in public health. Is that right?

A That's right.

Q Was there a concentration that you had when you were getting that master's degree, or was that a general Master's of Public Health?

A Occupational medicine was the concentration.

Q Was that the concentration for everybody

involved, or were other people --

A Yes.

Q -- concentrating?

A Yes. This was a course for physicians, and it was in occupational medicine.

Q The thesis that you did for you master's was then published in the Proceedings of the Society for Prospective Medicine?

A Yes.

Q What is prospective medicine?

A Medicine in the future. Preventive medicine is the general field.

Q Can you briefly describe your thesis for me?

A Yes. We designed a questionnaire for use in small businesses, and we tested that questionnaire for its reliability. We invited some of the employees into the health department at Herman Keifer, did more extensive testing, follow-up, and then used that as a basis to test the overall questionnaire for its ability to give some surveillance, early monitoring, early warning of possible problems, and the thesis was a description of that.

Q Were there particular industries that you were working with or designing this for?

A Mostly small businesses of a vast majority, a vast variety.

Q Among those businesses, they did many different things, used many different chemicals?

A Yes.

Q You weren't focusing on, for example, metal plating or something?

A No.

Q In the course of your work for the City of Detroit did you have any experience in businesses involving exposure to vinyl chloride?

A I don't think so, no.

Q In your course work as a student at medical school did you have any courses strictly devoted to epidemiology?

A No, not per se. There was about two hours having to do with occupational diseases.

Q Two hours in your medical training?

A Yes.

Q Do you know who taught that?

A A hygienist at Wayne State. I don't remember his name now.

Q When you say a hygienist, is that an industrial hygienist?

A An industrial hygienist, yes.
Q This two hours, that was two hours of lecture?
A Yes, yes.
Q Did you have any discussion of vinyl chloride during those lectures?
A I don't think so. You know, vinyl chloride made headlines in '74, and I know there was discussion during that time, but in the particular class, I don't think so.
Q When you say you know there was discussion, you know that there was discussion in the medical community?
A In the whole medical, right. That was big news.
Q Did you use a text when you had that two hours of instruction?
A No.
Q He provided you with materials?
A Yes.
Q When you were at the University of Michigan what types of epidemiology, if I can call it an instruction? I get the sense that your master's program was not divided into real discrete segments

of epidemiology and toxicology. I get the impression that it was a continuum. Maybe you can explain to me a little bit how that worked.

A Yes. It wasn't completely nonstructured, and, you know, there was a here comes the epidemiologist who's going to talk for an hour. But frequently we and the general course director tried to weave the same process through. So, for example, when we were maybe talking about vinyl chloride in the occupational medicine, we would be reviewing occupational studies of vinyl chloride, critiquing, discussing different modes, ways to do epi. projects, and so on. So that's some of my difficulty in saying, well, this course began here and ended there. But there were nevertheless discrete hours or two-hour periods where it was one subject or another.

Q To the extent that you're able, therefore, can you describe for me the types of instruction that you had in epidemiology? Was it broken down into anything other than just epidemiology?

A No, not really. I mean, there were two or three courses called epidemiology for which there was a grade going from, you know, beginning to more advanced. Much of the course work, in fact, involved

projects for us to do as part of our ways to getting a better handle on what epidemiology was and how to use it and how to design studies.

Q Do you remember the names of any of those courses?

A They could have been Epi. I, II and III. I don't know.

Q Do you remember what your grades were?

A No. I think my overall grade for the whole program was an A minus.

Q Was there a discussion of vinyl chloride during your master's instruction?

A Yes.

Q Can you describe for me what was said or what you recall?

A That would be hard.

Q You just know that there was some discussion?

A Yes.

Q After you graduated or received your degree from the Michigan School of Public Health as a master's, did you continue working on your other jobs in Detroit?

A Yes.

Q For how long did that continue?

A I guess it was about a year.

Q Were you looking for work other than what you were doing, or were you satisfied with what you were doing after you got your master's?

A Well, I took another job, so I guess I was looking. I wasn't real active, but, yes, I was looking.

Q Did you attempt to find an occupational medicine job around Detroit?

A Yes. I was interested in getting something going at Wayne State, for that matter, and this other job came along that was more interesting and looked like it was going to happen sooner, and that's when I decided to take it.

Q This other job, you mean the Cincinnati job?

A That's right.

Q Continuing along this line, then, with your jobs, you came down to Cincinnati to run the Greater Cincinnati Occupational Health Clinic. Is that right?

A Yes.

Q Was that a full-time responsibility?

A Yes, it was.

Q How was that structured? What exactly was or is the Greater Cincinnati Occupational Health Center?

A It's a nonprofit corporation involved with primarily treating, the treatment of patients. There was some researching and teaching that went along with it. There was grant money for doing some research. Most of the monies came through patient revenues.

Q Were you the first physician at this health center?

A No. Another physician was there a couple of months before I was.

Q And he was the first?

A Yes.

Q So it was a new clinic, essentially?

A Yes.

Q Who organized the clinic?

A Several people were involved, but basically the Central Labor Council of the AFL-CIO.

Q That's of the international union or of the local?

A That's the local.

Q Did it have a board of directors?

A Yes.

Q Without getting into specific names of the people on the board of directors, did they represent various groups?

A Yes. There are about 11 people, I think, six represented unions. Five. There was a City Council rep, a couple medical school faculties, an administrative and hospital, epidemiologist from the University of Cincinnati, a representative of the Chamber of Commerce.

Q Who was the epidemiologist from Cincinnati?

A Eula Bingham.

Q Who were the representatives from Cincinnati medical school?

A Well, actually it was Columbus, Ohio State, and it was a Dr. Keller, Martin Keller.

Q I thought you said there were several medical school faculty. Was Dr. Keller the only one?

A Yes, yes.

Q Was this center, if I can use the phrase, in competition with or doing the same thing as the University of Cincinnati health clinic or occupational health center?

A Yes, I think it basically was doing the same

thing.

Q Were you working with the other physician that was here at the center before you, or did you replace him?

A No. We worked together. He left in June of '85.

Q What was his name?

A David Egelmann.

Q Do you know where he went?

A He's in Providence, Rhode Island.

Q Do you know what he's doing there?

A Not exactly. He's doing something at the medical school there.

Q Do you know why he left?

A He was interested in doing something different.

Q Something different than what, working at the clinic?

A Right.

Q Or occupational medicine?

A No. What he was doing at the clinic, although I don't think he's doing as much occupational medicine work right now.

Q What was he doing at the clinic? In other

words, what was the relationship between the two of you?

A Seeing some patients. Involved in some research, but mostly we saw some patients.

Q Were you equals, or was there one --

A We were equals.

Q You came in October of 1984. Is that correct?

A Yes.

Q To the clinic, I mean.

A Yes.

Q And then he left in 1985?

A Yes.

Q How long after you came did he leave?

A He left in June, so eight months.

Q And you were the only physician then?

A Yes.

Q You said there were other responsibilities with regard to supervising interns. Is that right?

A I did, yes. I did some teaching of both students and residents in occupational medicine at the clinic. I also did instruction in outpatient settings at the university.

Q Your teaching of students at the clinic,

what did that involve?

A Mostly the preceptor type situation, one-on-one teaching. Students or residents would spend a month at the clinic in a rotation, mostly observing. Doing some direct evaluations themselves, but mostly observation.

Q This would be the medical school, as part of the course of teaching their students, they would have the student go out into the community and work with doctors. Is that right?

A Yes, yes.

Q Describe, then, your work with residents.

A It's been on two levels. Mostly, in family medicine department at the university in their out-patient program, quite similar to what I was doing in Detroit: supervision, doing a monthly seminar on, in this case, occupational medicine. There has been inpatient supervision in the internal medicine department as well.

Q You had your own patients in the internal medicine department at the University of Cincinnati?

A No.

Q All right. Just explain for me the last part, then.

A It was as an attending for a month, and this was at the Veterans Administration Hospital, and would supervise the residents in their care of their internal medicine patients that are hospitalized.

Q You were an attending physician?

A Yes, yes.

Q At Veterans Hospital?

A Yes.

Q How often would you do that?

A I've done that once a year.

Q How long would that occur?

A A month.

Q Would that be full time during the day?

A No. It's about two hours a day, although, of course, I'm available for consultation, but I'm there two hours a day.

Q Were you doing this on a for-pay basis?

A Yes.

Q And while you were there, you would be supervising residents?

A Yes.

Q Was that your primary responsibility, or your primary responsibility was treating patients?

A At the VA?

Q Yes, sir.

A The primary is to supervise. I mean, ultimately the patients are under my care as a fully-licensed physician, but in a resident program a lot of the responsibility is given to the residents and it is a supervisory type relationship.

Q When you would come in this once a month, those wouldn't be --

A Well, that's once a year.

Q I'm sorry.

A For an entire month.

Q I'm sorry. Once a year for that month, would those per se be your patients in the sense that you didn't place them in the Veterans Hospital, did you?

A No, I didn't. But they would come through the emergency room or the clinics there at the VA. They would come to the particular team that I was supervisor. I would be the attending physician, and they officially would be my patients during that time.

Q Were you working in the internal medicine department or the emergency room, where, in the VA?

A This would be in the internal medicine

department.

Q This was in an inpatient or an outpatient?

A Inpatient.

Q What types of cases would you see?

A Typical inpatient internal medicine, myocardial infarctions, shock, respiratory failure, cancer, hypertension, diabetes; you name it.

Q You have also down in your curriculum vitae the fact that you were an assistant professor at the University of Cincinnati family medicine department. What was involved with that?

A That's the supervision of outpatient residents that I talked about and doing the monthly seminars.

Q Would you physically go to the University of Cincinnati?

A Yes, I would.

Q Do they have a family medicine clinic there?

A Yes, they do.

Q And that's where you would be doing this?

A Yes.

Q How much time would this involve? How frequently would you do it?

A This was an afternoon a week.

Q Are you still doing that?

A Yes.

Q When you were at this clinic and doing this supervision, did you have an emphasis on occupational medicine, or was your responsibility general family practice?

A It was somewhat of a mix. The outpatient department is a family medicine department, and mostly it was a consultation, observation of, care of general medical family problems. The seminars I would give would be occupational medicine, and by the nature of my speciality, you know, I would see that each resident knew what each of their patients did, and I had some understanding of preventive or possible things to be looking for.

Q That was steady one afternoon a week throughout the year?

A Yes, yes.

Q I asked you, you're still doing this. Is that right?

A Yes.

Q What is your title now when you do that?

A I'm assistant professor. Adjunct assistant professor, I think, is the --

Q All right. The adjunct means that you're coming in. You're not --

A I'm not full time. That's right.

Q How many physicians are doing that in the family medicine department, do you know?

A No.

Q I presume you're not the only one doing that.

A No. There are probably five to ten. The majority are full-time faculty, but several of us come in an afternoon or so a week.

Q Do you have any idea of how many full-time faculty there are in the family medicine department?

A No.

Q How many at the clinic?

A When I'm there, there will be two others when I'm there.

Q Full-time faculty?

A That are precepting, doing the same thing I'm doing, yes.

Q I'm sorry. I don't understand. Yes, there are full-time faculty there working with the residents while you are also doing that?

A That's right.

Q You also have down on your curriculum vitae that you are a clinical instructor at the University of Cincinnati. What does that involve?

A I guess the only thing we haven't talked about -- well, that's the internal medicine department. We haven't talked about my relationship to the Environmental and Occupational Health Division.

Q I understand, but I'm going to get to that.

A Okay.

Q But above that on the CV is something about the clinical.

A That's my job description. That has me rounding at the VA Hospital and has me supervising or doing preceptors for medical students and internal medicine residents in my office.

Q Are you still doing both of those?

A Yes.

Q That is, having responsibility for -- is it students or residents at the VA?

A Both. Well, at the VA there's -- yes. The team consists of mostly residents, and I think there are two students now on the team.

Q When you do your work at the VA?

A Yes.

Q Then you also have both coming here?
A Yes, yes.
Q When I say "here," I'm talking about your office now.
A That's correct.
Q Then describe for me, please, your relationship to the Environmental and Occupational Health Division of Kettering Laboratory.
A Much the same as it is with the medicine department. I have had residents in that program under me in an outpatient setting in a preceptor type situation. I've done some lecturing in that department, seminars as well.
Q Well, when you say in an outpatient setting --
A That's in my offices. Residents will spend a month with me in the offices.
Q The Environmental and Occupational Health Division of Kettering Laboratory, is that a, for want of a better word, public health school?
A Well, it's not a public health school, but it's quite close. I mean, if you ask what's the difference, I'm not sure what the difference is. I know it's not an accredited public health school, but

they have industrial hygiene, toxicology, occupational medicine program.

Q Well, okay. Pardon me for interrupting, but I'm just trying to get it clear in my own mind what's going on. You and I both know in Michigan they have the medical school and they have the public health school.

A Right.

Q And down here the situation is the same. You're getting in students from the medical school and also Kettering Laboratory. Is that right?

A That's correct.

Q So the type of relationship you have with the students and the residents at the University of Cincinnati in the internal medicine department, that type of relationship you also have with students coming from Kettering Labs?

A Yes.

Q How many a month come from Kettering Lab to work with you?

A It's probably been, since I've been here, less than ten overall.

Q How long do they stay here?

A A month.

Q With you?
A Yes.
Q And they work a full day with you?
A Generally.
Q Do you receive compensation for the fact that they come here?
A No.
Q This is the service that you do as part of the medical community?
A Yes. I guess the remuneration for myself is contact with students, stimulation, keeping up with events and, you know, research and medical literature, and so on.
Q What about with the medical school? Do you receive any remuneration for having them come into your offices?
A No. I am paid for going to the family medicine department. I do get paid for that.
Q Is that on a salary basis? Do you receive a salary as an adjunct professor?
A No. It's a per hour basis.
Q Your title is assistant professor with regard to your responsibilities at Kettering Laboratory. Is that the same thing they classify you as,

an adjunct professor?

A Well, although I don't get paid, so that means I'm not an adjunct.

Q What do you call yourself, or what do they call you?

A I think that's where the clinical comes in. Clinical means you don't get paid.

Q Your CV identifies yourself as an assistant professor in connection with the Kettering Laboratory. Is that incorrect, then?

A Well, I guess it should say clinical assistant professor. Believe me, I remain confused as to all the different nuances as to what each title means.

Q Well, you and me both. But in any event, you don't get paid, so they don't give you the full title?

A Right.

Q Finally, let's talk about the entry on your resume with regard to your acting as a consultant to the National Cancer Institute. Describe that for me, please.

A Yes. From September of '84 to June of '86 I served as a consultant with several other occupa-

tional physicians with NCI, National Cancer Institute. We were all involved with advising the Institute as to how to go about identifying, controlling and developing preventive strategies with respect to occupational cancers.

Q What is the Central Clinical Research Network? Do you see that?

A Yes. That's what we sort of called ourselves as part of it.

Q The letters that you wrote to the editor in, for example, Journal of American Medical Association on asbestos-related diseases, you wrote that with a bunch of other people, didn't you?

A Yes.

Q Are they part of this Central Clinical Research?

A Yes. Many of us were, yes.

Q How many people were part of the Central Clinical Research Network?

A There may have been 14 or 15 clinics, groups seeing, evaluating and treating patients with possible occupational diseases, and that meant there were maybe 20 of us altogether.

Q How did the clinics get together?

A I wasn't involved with that, so I'm not sure how the process got started. Many of us are part of the American Public Health Association, and I think that perhaps, you know, the occupational health section of the association is how we came to meet each other.

Q I'm sorry. I still don't have a real clear understanding about what type of consulting work you did for the NCI.

A Well, it was very preliminary work on how to identify occupational cancers; how to design programs to prevent; doing a lot of stuff with asbestos in terms of how to identify cohorts, groups of asbestos exposed individuals; what could we design in terms of prevention and/or treatment that would prevent the development of occupational cancers.

My view, in fact, was that it was similar to the work that was done 25 years ago with the development of the cancer treatment centers, to what was initiated by the NCI in the '60s. I'm not sure that everyone shared that view, but that was sort of my conception of what we were about.

Q Were you working on a grant to this group?

A Yes.

Q What was the description contained in the grant as to what the group was supposed to do, if you can recall?

A Pretty much what I've said.

Q The grant came from the NCI?

A Yes.

Q And it was specifically granted to the Central Clinical Research Network?

A Yes.

Q What did you provide back in response to the money that you received?

A Development of questionnaires, some preliminary papers with respect to how to design RFPs, request for grant proposals. I think generally those were the things provided.

Q Did you do an actual report, final report?

A I don't think there was an actual final report, because Graham-Ruddman came along then and stopped the program sort of in its -- not even in midstream; just as we were getting started. The general cutbacks in all the departments eliminated this program.

Q Did you produce anything in connection with this grant?

A Other than what I've talked about?

Q Well, let's back up. I'm not quite sure what you've talked about. Did you sit down and actually do a pencil-to-paper for anything?

A Yes.

Q What?

A These questionnaires and these initial proposals for RFPs. And, again, it wasn't done entirely by myself. We had committees that were involved with different aspects of developing these programs.

Q The questionnaires, were they derived from the work that you had done on your master's thesis?

A To some extent. Others have done the same sort of thing, so it was not a question of totally designing a questionnaire but pulling from the various bits and pieces that all of us had been developing.

Q So all of you had your own questionnaires that you gave to patients or people out there?

A Right.

Q And then you just synthesized these to come up with one that you thought was good?

A That's correct.

Q I don't understand the RFP work that you

were talking about. You got a grant and you used that money to make more requests for grants?

A Well, in any program to prevent something like occupational cancer, there is preparatory work as to, you know, what are the questions, what do we need to decide, what are the general issues, and that's basically what we were involved with.

The next stage would be to actually develop programs, trials, and there would have to be requests for proposals, requests for grants to do that, and the NCI was asking for our help in how to develop such proposals.

Q How much money was the grant?

A I don't recall. I think the Occupational Health Center got about 25,000.

Q The Cincinnati Health?

A Yes.

Q You don't recall what the total amount of the grant was?

A No, I don't.

Q Do you have copies of the -- what do you call them -- RFPs?

A That's what they're called, and I don't think I do. I have copies of some of the statements

of principles and purpose of the work we did, that brought us together, but any of the work that we did, I don't think I have copies of those.

Q That would be at the Occupational Health Center here in Cincinnati?

A No. I think that's with the NCI.

Q If you can bear with me for a second, these RFPs were what, again? What were they proposing that the NCI do?

A They were going to be RFPs from the NCI.

Q All right.

A And were going to be used to identify groups, cohorts of individuals at risk for occupational cancer, and then mechanisms for prevention of all types.

Q That sounds like epidemiology work, doesn't it, identifying cohorts of people?

A Yes. In many ways, yes.

Q Was the proposal that you clinics would get involved in that type of work?

A We were hoping to, yes.

Q Was this spanning all occupational cancers, or are you focusing on asbestos or a particular type?

A Well, there was nothing in it to limit which

occupational cancers, but asbestos looked to us to be something to get started with.

Q Are you still continuing today in your responsibilities with the family medicine department in Cincinnati?

A Yes.

Q And the work at the VA?

A Yes.

Q And the work with the Kettering Laboratory residents?

A Yes.

Q Or students. What are they, residents, students, or both?

A Both.

Q Are those MDs coming out of that program at Kettering, or are they others?

A They've already received their -- oh, you mean the people?

Q Yes.

A The students are not physicians. They're more, they've been hygienists. The residents have, you know, finished medical school.

Q And then they decide to go through this Kettering program?

A Yes.

Q Have you been involved in any lecturing or anything at the Kettering Laboratory program?

A Yes.

Q Other than what you've done here in your office?

A Yes. I've given some seminars for the occupational medicine residents.

Q What were the subjects of the seminars?

A One of them had to do with criteria for asbestos diagnosis, and the others have been interesting case discussions.

Q Interesting cases?

A Cases, yes.

Q I don't understand what you mean by seminar. Now, was this a continuing program where they would meet once a week for an hour or something, or was it just a one-shot lecture?

A This is a continuing program. I did not have responsibility for the vast majority of them, but would attend many of them and made several presentations.

Q And these you've already described?

A Yes.

Q In the course of this, have you had any contact with the faculty at Kettering Laboratory?

A Yes.

Q Who have you worked with?

A Grace LeMasters, Jim Lockey, probably the most.

Q Grace LeMasters?

A Yes.

Q I understand you've terminated your relationship with the Greater Cincinnati Occupational Health Center.

A Yes.

Q When did that occur?

A September '87.

Q Would you describe your activities now after that point in time?

A Primarily private practice, although the teaching responsibilities have continued.

Q Private practice in what?

A Occupational, internal medicine.

Q Why did you leave the Greater Cincinnati Occupational Health Center?

A We had differences about primary care, that is, the treatment of individuals for their problems.

They were interested more in evaluations, primarily.

Q What were you interested in?

A Doing both. I felt that it was important to offer treatment as well as just doing evaluations.

Q Did the quality of your work have anything to do with the severance of the relationship?

A I don't believe so.

Q Do you think, in the opinion of the clinic, that's true?

A I don't believe so.

Q Did the board of trustees ask you to leave?

A Yes, they did.

Q This came after an audit of some of the files of the clinic. Is that right?

A We had been through a fairly long discussion about primary care issues, and, yes, they were concerned by the amount of primary care that was being done. I, frankly, didn't realize that they felt so deeply about it, but I feel pretty deeply about it as well, that primary care is important.

Q I don't understand what you mean by primary care. Perhaps you can describe that for me.

A Treatment of people's problems.

Q Were they concerned about the quality of the

care or diagnoses that you were rendering?

A I don't believe so.

Q It was the University of Cincinnati that did the audit, or people from there?

A Well, there was a nurse that was through, and actually I think she works for the City, the health department, and she was involved with auditing charts, yes.

Q Was there anybody else?

A There was a physician with the occupational medicine department that came and discussed cases.

Q That was Channing Meyers?

A Yes.

Q What opinions did he express?

A It was sort of your general type chart discussion, going over cases. Sometimes we agreed; sometimes we disagreed.

Q Did he express criticisms to you?

A On occasion, yes.

Q What was the nature of those criticisms?

A Well, we disagreed on many occasions as to what diagnostic criteria were useful in making decisions.

Q He disagreed with some of the diagnoses that

you rendered?
A Yes.
Q Do you know whether he made any recommendations to the board of trustees of the clinic?
A I don't know.
Q You have no knowledge about that one way or the other?
A I don't.
Q You've done consulting work with attorneys since you've been here in Cincinnati. Is that right?
A Yes.
Q You were doing that up in Detroit, too. Is that right?
A Yes.
Q You've told me before that you've done over a hundred workers' compensation cases when you were in Detroit.
A Probably.
Q Is that number accurate?
A I think so.
Q All of these were on the claimant's side?
A I think the vast majority were, yes.
Q The work that you've done down here in Cincinnati, those are primarily on the plaintiff's

side. Is that right?

A Yes.

Q You understand the plaintiff being the person who claims he's injured?

A Right. I mean, that sort of stands to reason in someone doing primary care. If I'm going to be diagnosing a problem, then they're the ones who are going to go on to seek legal assistance if they feel they need it.

Q Well, whether or not it stands to reason, you've also worked with attorneys who send patients to you. You are not their primary treating physician?

A That's true.

Q Again, that work that you've been doing has been for the plaintiff's side. Is that right?

A Yes, I think so. That's the definite minority of all of the patients I see, but, yes, that's true.

Q And then that happens that you have attorneys sending patients to you to be evaluated. Is that right?

A Yes.

Q The plaintiffs' attorneys in this case,

Murray and Murray, have done that sort of thing with you, haven't they?

A Yes, they have.

Q You did not see Mr. Wallace or Mr. Dendinger in this particular case, though, have you?

A No, I haven't.

Q You were involved with seeing patients arising out of this Celanese factory in Columbus?

A I have, yes.

Q Have you had any other cases where the attorneys from Murray and Murray have been involved?

A Yes, there have been a couple of others.

Q What were those cases about? Without giving names, I just want to know the diseases.

A Yes. Scleroderma, and I think some hypersensitive lung disease.

Q The Celanese cases, were you a primary care physician? Did you see the people before you knew the attorneys were involved?

A No.

Q These people came to you; they were sent by the attorneys?

A That's right.

Q And the other cases that were involved with

Murray and Murray, was that the same situation?

A Yes.

Q What percentage of your practice now or since the time that you left the Greater Cincinnati Occupational Health Clinic is involved with consulting with attorneys on cases that are sent to you?

A Basically about the same; about five percent, I think.

Q That's five percent of time or five percent of the money that you're making?

A Probably yes to both.

Q When you were with the Greater Cincinnati Occupational Health Clinic, how much time was spent in consulting with attorneys and consulting with patients with regard to medical legal claims?

A I set aside an afternoon a week for depositions, and that didn't occur, that was not every week. Probably two or three afternoons a month were spent like that.

Q The money that you made from that type of work, did that go to the clinic or did that come to you?

A That went to the clinic.

Q Was that type of work involved at all with

the differences between you and the clinic?

A I don't think so. I think the issue, again, was primarily one of ongoing treatment, of primary care type medical problems.

Q If you could, can you explain that for me a little bit more? What were the differences? You wanted to treat these people after they came to you?

A Yes.

Q And the clinic didn't want you to?

A Right.

Q Did the differences that you had with Dr. Meyers with regard to the accuracy of diagnoses have anything to do with the severance of the relationship?

A I don't think so.

Q Do you think the clinic thought so?

A I don't think so.

Q Do you know who was involved with the decision to ask you to leave?

A Well, I think it was primarily Dan Radford.

Q Dan Radford?

A Yes.

Q Who was he?

A He's the executive secretary of the AFL-CIO

and chairman of the board.

Q Was he on the board of trustees for the clinic?

A Yes. He's the chairman of the board, the chairman of that medical board.

(Recess taken.)

Q Doctor, are you currently getting any referrals of people to you from the unions, or has that stopped after you left the clinic?

A No, I continue to get some referrals.

Q From the unions that were sponsoring the clinic before?

A Yes.

Q How many people would that be, approximately? Is that a large number of people, or has the number dwindled?

A It's still the bulk of my new patients.

Q How many would that be?

A I really don't know. I probably am still getting about three to five new patients a week as part of an evaluation, and three or four are from a union, but I guess 75, 80 percent.

Q What union is that?

A There are several: the machinists, the

building trades, asbestos workers, transit workers, postal. I guess those are the main ones.

Q When you say evaluations, these are evaluations of people that have physical complaints, or do they come to you just for a regular checkup?

A There's some of all. Some are involved, you know, are concerned about some exposures and wanting some screening. Some have injuries. Some have illnesses that they're not sure of the cause. Some just want treatment of a problem.

Q Are you currently involved in working with patients on or in connection with lawsuits either as a primary treating physician or as a consulting physician?

A I guess I'm not sure what you mean.

Q Let me back up with that. It's a poor question. As I understand it, you have two ways to get involved with testifying in connection with a lawsuit that may be brought by one of your patients. One is to see the patient and evaluate him after he has been diagnosed as having some disease, and you can testify at trial about your opinion. And my understanding is the other way is that you see the patient just because he is brought to you to be

evaluated. You are treating him for a particular condition or diagnose the original condition, and then you get involved in a lawsuit that way. Is that accurate?

A Yes, I think that's right.

Q In either of those or even apart from that, without you ever having seen the patient, if you were just asked to testify in a particular matter in a lawsuit, how many matters are you currently involved in like that, like those three types of involvements?

A I'm not sure I could tell you, because I know, by the nature of the business, many of the patients have either work comp or third-part lawsuits, and, frankly, I don't even know who does or how many or whatever.

Q There comes a point in time when you're contacted by an attorney in connection with those. Is that right?

A Yes.

Q How many contacts, approximately, have you had since you left the clinic? And by contacts I mean from attorneys.

A My schedule of depositions has been about the same. I try and save a half a day a week to do

that, and most weeks there is one. Again, maybe two to three of them is what it usually works out to be.

Q Two to three weeks a month or two to three depositions?

A Two to three depositions a month.

Q Can you give me some sense about how many cases you've been involved in since you left the clinic?

A Well, four months last year, four months this year. 20, 25.

Q You've indicated that's approximately the same rate as when you were at the clinic. Is that right?

A I believe so, yes.

Q I'm trying to get some sense now about when you were at the clinic what your involvement was with --

A Again, about the same. Two to three times a month there would be a deposition, I think.

Q How many times have you testified in trial since you've come to Cincinnati?

A I think four times.

Q The Scott case was one. That was an asbestos case.

A Yes.
Q What were the others?
A There was another asbestos case. There was a case involving asbestos exposure to inmates.
Q When you say inmates, that's a prison?
A Prison, yes, in Kentucky. The people weren't sick but were concerned about exposures. And a third involved a postal worker, I think, who was being disciplined for lost time as a result of an injury.
Q This was a traumatic injury?
A Yes.
Q The inmate case was, what, a fear of cancer type of thing?
A Well, I wasn't testifying even about that, but what I felt was, you know, appropriate hygiene and what the risks of disease were per se.
Q The Scott case was a pleural plaque minimal asbestos case. Is that right?
A I believe so, yes.
Q What was the other asbestos case? What was the claimed injury?
A The asbestosis. I think there was both plaque and interstitial fibrosis.

Q Can I ask you to -- yes, I obviously can ask you. Can you give me some sense about how many depositions you've given since you came to Cincinnati?

A Well, I've been here four years or nearly four years. I suppose it's 25 to 30 a year times four.

Q So we're talking between 100 and 120 depositions?

A Yes.

Q Just for my records, what are you charging these days?

A 250 an hour.

Q That's for testifying at trial and deposition?

A Yes.

Q Do you have a different rate for evaluating cases for lawyers?

A That generally depends upon -- yes. It's not a straight fee. It depends upon the -- I utilize the fees that I normally charge individuals.

Q What are those?

A A limited visit is $30. Intermediate -- actually for a new patient, limited is $40. An

intermediate is 80. A comprehensive is 120. If there's pulmonary function, there's charges for that. If there's chest X ray, there's charges for that.

Q When you have this limited, intermediate and comprehensive, does that correlate to any period of time?

A Yes. Generally comprehensive is an hour.

Q So it's about $80 an hour?

A 120. Comprehensive is 120.

Q Getting back, if I can, to your curriculum vitae for a moment, you have down there publications. The first one is listed as Occupational Disease Surveillance for the City of Detroit. You indicated that's the thesis you did for your master's program. Is that right?

A Basically, yes.

Q And that was printed in the Proceedings of the Society for Prospective Medicine. You were invited to submit that?

A Yes.

Q How big is the Society for Prospective Medicine?

A I don't know.

Q Do you know where it's headquartered?

A I think Washington, D.C.

Q The Proceedings, that's not a regular journal, is it?

A Well, the Society has a yearly convention, and the proceedings of the convention get published in this journal.

Q But the Proceedings don't have a subscription to that journal other than becoming a member of the Society?

A I think you're right.

Q Do you know whether or not, for example, if I go down to the University of Cincinnati medical school library they will have a copy of the Proceedings?

A I don't know. I haven't looked for it there.

Q You don't know what the distribution is of that?

A I don't.

Q Do you know whether that was subject to any sort of peer review process before it was published?

A I don't know. There was probably some peer review process of some sort prior to the invitation to make the presentation, but after that I don't

think so. I think what was presented got published.

Q You made an oral presentation at the meeting?

A Yes. We submitted printed material, but, yes, mainly oral presentation.

Q In connection with that, then, as part of the proceedings, the speech that you gave was then printed in the Proceedings?

A Yes.

Q How many other people gave presentations like that at the meeting that you attended?

A I don't know.

Q How did you come to have this presentation made, do you know?

A No, I don't; no, I don't.

Q You don't know whether one of your professors suggested that to someone or --

A Well, no. It was through the health department for the city, and that's basically -- well, my thesis was the basis for two other people, also, who worked and contributed to the presentation which was the published. So there's two other names on the article.

Q Those were people at the City of Detroit?

A Health department, yes.

Q Were they listed as the primary authors, or were you?

A I was the primary author.

Q The next listing on your CV is for Long-term Health Effects Following Isocyanate Exposure, to be found in the Journal of Occupational Medicine. I think we've established before that's a letter to the editor. Is that right?

A Yes.

Q And your next entry, the Journal of American Medical Association for September 13, 1985, entitled Asbestos Related Disease, that also is a letter to the editor. Is that right?

A Yes.

Q You mentioned when we began that you had one article that had been accepted by a publication. What was the topic of that article again?

A Oligospermia and Methylene Chloride Exposure.

Q That's in Reproductive Toxicology? That's the name of journal?

A Yes.

Q Was that a peer review?

A Yes.
Q And you have one that has been submitted. Is that right?
A Yes.
Q What is the topic of that again, please?
A Central nervous system effects of methylene chloride.
Q Have you submitted any others that are pending?
A No.
Q Have you had any that are rejected?
A Well, both of these have taken some time.
Q Have they been rejected by other journals?
A Yes.
Q Have you submitted any others besides these particular two involving methylene chloride --
A No.
Q -- that were submitted for publication?
A No.
Q The topic of both of these papers that you have written, did that information arise out of your involvement with a lawsuit?
A No.
Q How did your interest in methylene chloride

arise?

A I saw about a hundred people with exposure to methylene chloride.

Q This is the Budd Company situation?

A Yes.

Q All right. And there is litigation arising out of that. Is that right?

A There is litigation, yes.

Q You're involved as, I guess, a treating physician in that?

A Yes, although I don't think I've had any depositions.

Q It's coming, believe me.

Now, you have listed current research. One is asbestos prevalence in exposed workers. That's in connection with the people that you saw at the clinic. Is that right?

A Yes, and continue to see.

Q When you talk about current research, am I correct in presuming that what you're really talking about is observations that you make in the course of your evaluation and treating of these people?

A Well, more than that. I'm continually in the process of trying to, you know, develop data,

process it so that I can report what I'm finding. So it's more than just I'm seeing, but an interest in collecting that and making it in presentable form.

Q What data are you collecting on asbestos prevalence in exposed workers?

A Particularly a facility where there's a mixture of several different exposures, and seeing if there's some synergism between asbestos and other materials.

Q What would be the other materials?

A Some tars; pitches in particular.

Q This would be the Celotex facility?

A Yes.

Q Are they roofing materials?

A Yes.

Q Bladder cancer screening. What kind of research are you doing on that?

A Not much at the moment. I did some initial surveillance work and have not done much on that recently.

Q Okay. If I can back up for a second, the asbestos prevalence research that you're doing, you're also involved in lawsuits from time to time involving asbestosis. Is that right?

A Yes.

Q Were you involved in any lawsuits involving bladder cancer?

A I don't believe so.

Q What kind of screening was that that you were doing?

A Basically cytology and urine analysis screening.

Q What chemicals were you looking for?

A Individuals exposed to some of the dyes.

Q Was that involving a particular company here in town?

A No.

Q The research you were doing on skin cancer prevalence in sun, tar, pitch, arsenical and PCP exposed workers --

A Yes.

Q -- what is the PCP?

A The pentachlorophenols that are used as an herbicide.

Q What kind of research were you doing there?

A Basically review and examination of individuals that have either some of those exposures, all or none, and looking for rates of skin cancer.

Q Then the next one you have down is central nervous system effects of methylene chloride. That came out of the Budd population?

A Yes.

Q And metals and chronic renal disease research that you were doing, what did that involve?

A Individuals with exposures to a variety of metals, looking at specific metals that correlate with markers of renal disease.

Q What metals would we be talking about?

A Several. Nickel, cadmium, lead, titanium.

Q These would be from people that you would see in your practice?

A Yes.

Q Would they be particular jobs that they would be doing or particular occupations that they had?

A Mostly machinists, but there's a scattering of others.

Q And, finally, you have oligospermia --

A Yes.

Q -- and methylene chloride. Again, that's involving the Budd population?

A Yes.

Q All of these research areas arose out of your practice as an occupational physician screening and evaluating workers. Is that right?

A Yes.

Q When we're talking about research, we're not talking about animal experimentation, are we?

A No.

Q Are we talking at all about formalized epidemiological studies?

A Well, with the one with skin cancer, yes.

Q Is that currently pending?

A That's still ongoing, yes.

Q Are you working with anybody else in that?

A Yes. Grace LeMasters is the epidemiologist on that case.

Q What's the relationship between you and her?

A Well, she's the principal investigator.

Q And you're just gathering information for her?

A Yes.

Q Other than that, there are no formalized epidemiologic studies that you've structured?

A Not in the sense of prospective. I would like to give credence to these through epidemiologic

measures, case controls, and so on. But in terms of prospective or retrospective studies, that's the only one.

Q When you say you would like to give credence, you are not currently doing either prospective or retrospective epidemiologic?

A Right. My work has been, it's mostly cross-sectional stuff.

Q Well, by cross-sectional stuff, what you're talking about is you're looking at the files that you have on your individual patients and developing these. Is that correct?

A That's right, yes.

Q Have you made any research proposals to any schools or any government agencies?

A Not recently, no.

Q Well, have you made any in the past other than what you've indicated in connection with the NCI?

A Yes. I had made some to March of Dimes, looking at reproductive effects in hospital workers.

Q That was in connection with your work in Detroit?

A Yes.

Q That wasn't accepted?
A It was not.
Q In connection with your deposition here today, Doctor, have you reviewed any materials?
A Yes.
Q Describe for me briefly, if you would, what types of things you've looked at.
A Medical records on Herman Dendinger and Fred Wallace, including some work records, depositions that they've given, and I've reviewed some of my literature on vinyl chloride.
Q When you say you reviewed your literature on vinyl chloride, you're talking about medical journals and texts and things?
A Yes.
Q Have you reviewed any materials that have been supplied to you by plaintiffs' counsel?
A Yes.
Q These are medical journals and articles and things. Is that right?
A Yes.
Q Which is the larger in bulk? Did he supply you with more stuff, or did you get your own stuff to a greater extent?

A At this point I'm not sure. I'm looking at two inches here of literature, and I know I had quite a bit.

Q Prior to being consulted in this case?

A Yes.

Q How about prior to being involved in the Columbus case? How much material did you have on vinyl chloride?

A Quite a bit.

Q And you gathered additional information after that time?

A Yes.

Q At the time that you were -- well, let me back up just a second. I was going to say at the time you were asked to be involved in the Columbus case. Do I recall your testimony correctly that you were asked to become involve in the Columbus case?

A I'm not sure that I have been. I was asked to see some individuals that worked at the Celanese facility.

Q These people had been making complaints of ailments and things before, and then they were sent to see you. Is that right?

A Yes.

Q You just didn't happen to see them in the normal course of seeing them on a regular basis?

A No.

Q At or about the time that you saw these people on a consulting basis, were you collecting material on vinyl chloride from the medical literature?

A No. I'd had the files before then. Yes, I've collected additional stuff since then, but I had a considerable amount before.

Q Have you talked with anybody in preparation for your deposition here today about the topic of vinyl chloride and the types of cancer it can cause?

A Specifically in preparation for this deposition?

Q Yes. And I'm talking about other than discussions with the attorney for the plaintiffs.

A Well, I've had discussions with Channing Meyer before his death on vinyl chloride. I don't think I specifically talked about these individuals. Since I was asked if I would review this material, I don't think I specifically talked to anybody.

Q When you had these discussions with Channing Meyer, what was involved? What was said, to the best

of your recollection?

A I think just general discussions about vinyl chloride, its nature, what each of us knew about the literature, epidemiology, and so on.

Q Were there any disagreements with regard to your opinions?

A I don't think so. I mean, generally I don't think we ever really disagreed in theory about what certain exposures in chemicals could do or be or what have you. There were disagreements occasionally on did symptoms, signs, meet criteria for cause and effect. But I think in theory, I don't think there was much disagreement.

Q So his disagreements with you arose more out of the diagnostic criteria and whether those were met for a particular disease?

A Yes, and that by no means was all. It was just on some occasions.

Q How about anyone else? Besides Dr. Meyer, either in preparation for this deposition or involving any preparation for testifying in either this or the Columbus case involving vinyl chloride, did you have discussions with other medical people?

A I don't think I have in the last several

months.

Q Have you consulted any medical texts in connection with your preparation for this deposition here or in connection with the Columbus case?

A Well, I know I have been back through the literature. I think, in fact, the -- well, clearly there's no single source. I'm sure I've looked at Rohm's textbook, but mostly I think it's been literature.

Q How did you go about doing your research through the literature?

A Well, I usually review the files that I have to start when I'm looking at a fresh topic.

Q If I can stop you there for just a second. I presume when you say your files, you keep your own files on medical articles. Is that right?

A Yes. Then I go to the medical index, Index Medicus, and look at most recent articles and then work backwards from there, especially when there has been a gap in terms of most recent review of the literature.

Q Did you do any computer research?

A I don't think I did on this situation.

Q Do you have access to computer research here

in your office?

A No, but I can call up NIOSH quite easily and ask them to do one. I can do one in the family medicine department at the university and will frequently use that as well.

Q NIOSH provides that as a service to people?

A Yes.

Q You pay them a fee, and they go through and do it?

A Yes. Usually I don't have to pay them a fee.

Q Did you keep any notes during your review of the literature?

A No.

Q At this time is there any way to segregate what you had in your files prior to the time that you became involved in the Columbus case or this case and what you have reviewed?

A I don't think so.

Q Where did you get your articles once you determined which ones you wanted to see?

A You mean which journals?

Q Well, no, physically. I mean, did you go to the University of Cincinnati library?

A Usually, yes, that's where I go.

Q Doctor, you're licensed both in Michigan and Ohio. Is that right?

A Yes.

Q And you're board certified in internal medicine and preventative medicine. Is that right?

A Yes. It's the occupational division of preventative medicine.

Q Did you pass both boards on the first go-round?

A Occupational medicine, yes. I took internal medicine twice.

Q You flunked the first time?

A Yes.

Q Do you have to wait a period of time before you can take it again?

A There's one test a year. I took it before I had finished my first three years of internal medicine residency, taking it again after I had completed it during my chief medical year.

Q Have you taken any other boards that you have not passed?

A No.

Q Have you taken any other certification exam-

inations that you have not passed?

A No.

Q Have you ever had privileges denied or revoked at any hospitals?

A No.

Q Have you ever had any privileges restricted?

A No.

Q Have you had any problems in the past with any substance abuse?

A No.

Q A lawsuit was brought against the Greater Cincinnati Occupational Health Clinic, is that right, at some point?

A Yes.

Q Tell me about that.

A A foundry, Dayton-Walther, sued the clinic, and it basically was dismissed at all levels and most recently has been dismissed at the Supreme Court level.

Q What was the basis of the claims in that lawsuit?

A The claims were silicosis.

Q What were claims against the clinic by Dayton-Walther?

A That an incorrect diagnosis was made. I think they also claimed that there was some, I don't think they used the word conspiracy, but something along that line.

Q Okay. I don't quite understand that.

A Well, I didn't pay much attention to the entire process, so I'm not sure I understand, either.

Q That was filed here in Cincinnati?

A Yes.

Q In state court or federal court?

A State, I think.

Q Were you ever deposed in connection with that?

A No.

Q Those were your diagnoses of silicosis?

A Yes.

Q Were there ever any other lawsuits brought against the clinic as a result of your activities?

A No.

Q Any lawsuits against you personally?

A No.

Q Can you describe for me, please, whether or not you have any medical texts in your office here that serve as your own quick consulting library, if

you would?

A Yes.

Q Do you have some?

A Yes.

Q What types of texts do you have?

A I have an internal medicine text, a toxicology text, a hygiene, industrial hygiene, text, a text of biological monitoring, the AMA's Guide to Permanent Partial Impairment Ratings. I can run back and look. I think there's a pulmonary text too.

Q Do you have Paddy's here?

A No, I don't.

Q Do you ever use that?

A Yes.

Q You use that where, at the University of Cincinnati?

A Yes.

Q Do you have any tests that you regularly used at the clinic that stayed at the clinic?

A No.

Q Do you understand what I'm saying?

A No. Those were all mine. I said occupational medicine, didn't I? A Rohm textbook, I also have that.

Q I'm not sure you said that.
A No.
Yes, all of the textbooks were mine.
Q Do you have the Zins textbook on occupational medicine?
A Yes, but not here.
Q Where is that?
A I think it's at my home.
Q Do you have any other texts at home that you use?
A Not much.
Q What is the toxicology textbook?
A Kasserette and Doualls.
Q And the industrial hygiene text?
A I think it's the NIOSH industrial hygiene, the white text.
Q What is the pulmonary text that you have?
A The orange one. I forget the author of it.
Q Where do you go to when you want to know whether a chemical causes cancer?
A And I'm not already familiar with it, you mean?
Q Yes, sir.
A Well, several sources. One would be Medical

Index or Index Medicus. Another would be R text, the Registry of Toxic Effects of Chemicals. Those would both be starting points.

Q By starting points, the Index Medicus indicates medical articles. Is that right?

A Yes. There's a number of -- it also includes toxicology as well and not necessarily health effects on humans.

Q I understand that. But I guess what I'm asking is, do you ever go to something as a starting point, an encyclopedia or that type of text, to give you a summary of the literature that's out there?

A Well, occasionally I'll go to the Chemical Index, but I find the Index Medicus generally most suitable.

Q Then what do you do after you go there?

A Pull out articles, read articles, look at their references, and basically that opens up the whole field of literature.

Q That involves looking up the articles, then?

A Yes.

Q Do you physically do that, or do you order copies?

A Usually I do it myself.

Q How often do you do this? It involves some time, doesn't it?

A Yes. I spend, oh, a couple hours a week.

Q Do you have any oncology texts here?

A No.

Q Any of your -- well, let me see, your occupational medicine texts will involve carcinogenesis, won't they?

A Yes.

Q What do you consider to be an authoritative text in the area of occupational medicine?

A Well, I use several, really. I don't think any single source by itself meets all those criteria.

Q Which would you use?

A Well, I think I've mentioned some of them.

Q Rohm's?

A Rohm's. Zins'. Then I like the NIOSH booklet. I think that's a fairly good one. I guess there's a couple others, but I can't remember editors at this point.

Q What about industrial hygiene texts? Would you consider any of those to be authoritative?

A Well, again, I mean, I guess it's hard to beat Paddy's, it's so all-inclusive. But, again,

that's certainly not the only text that's available.

Q What about epidemiology? Where would you go to get an authoritative text on epidemiology?

A I think that's an area that's perhaps weakest of all of these in any single text. Mostly, you know, the texts are describing methodologies, and you really need to review several different methodologies to get what you need sometimes.

Q How extensive is your knowledge of epidemiology? You mentioned your two or three courses in your public health training. Have you had any training in epidemiology since then?

A No, other than, you know, review of literature and conferences, and so on.

Q In your opinion, are there universities or public health schools that are stronger in epidemiology than others? Research, I'm talking about now.

A I think probably most of the 14 or so public health schools are fairly comparable. You know, I wouldn't say they're all the same for sure, but don't ask me to rate one or the other.

Q All right. Would Harvard rank up there?

A I think that's the -- the Harvard, Michigan, the research triangle, Alabama. There are a number.

Q Next let me ask you about national experts in some of these areas. In epidemiology who would you recognize as a recognized authority?

A Well, I guess I go with, stick close to where I am when I need some advice. So I really don't think of them, well, this is the person to answer all questions. But, you know, Ula Bingham or Grace LeMasters are people that I'll ask.

Q Well, I understand that they're right here and they're accessible to you. Are there others in the country that you would recognize in the field of epidemiology?

A Yes. I'm not sure I would, you know -- not many names come to hand immediately. With asbestos you recognize Selikoff, of course; Ian Higgans at Michigan. Again, there are a number of people.

Q What about internationally? Does any name come to mind?

A Well, certainly Doll has an international reputation.

Q You're familiar with his reputation?

A Yes.

Q What about Richard Monson? Have you ever heard of him?

A Monson?
Q Yes, at Harvard School of Public Health.
A Actually, no.
Q You've heard of the Harvard School of Public Health?
A Oh, yes.
Q That has a pretty good reputation?
A Yes.
Q Now moving to the area of occupational medicine, who would you view as being a recognized authority in that area?
A Depending upon the particular area, there might be several different people.
Q Give me some ideas of names.
A Again, asbestos, Selikoff is obvious.
Q Well, Selikoff is more of an epidemiologist, isn't he?
A Yes, although he's specifically concentrated on asbestos and occupational disease. Just about, you know, the most of the heads of NIOSH, for example, would fall into that category. Many of the individuals at the clinics, part of the network that I have belonged to I would look to for advice.
Q Well, again, we have to understand that I'm

asking about not necessarily just the people you were going to for advice.

A But I think they would also be recognized.

Q Are there people that you wouldn't go to for advice but that you nevertheless recognize as being national experts in the eyes of the medical community in the area of occupational --

A Probably not. But I mean, I'm allowed to disagree with them any time I want, I suppose.

Q Toxicology, do you view that as being different than occupational medicine?

A Yes.

Q What types of authorities do you recognize in toxicology?

A I don't know as many people in toxicology, and the practice has generally been to utilize people that are close.

Q Again, for your own information?

A Yes.

Q Are there names that are appearing in the literature that you recognize as authorities that are not close to you physically? I mean here in proximity.

A There are a few. I, frankly, don't recog-

nize a lot of names.

Q What about experts in the field of carcinogenesis, if I can classify that in that way? I'm not sure that that's a unique medical speciality, but you understand what I'm talking about, experts in the cause of cancer?

A Yes, I understand what you're saying.

Q Do you have any that spring to mind?

A Not offhand. Again, I'll utilize people that are in close proximity, but I don't necessarily recognize names.

Q In your practice at the clinic and your practice here, can you give me some percentage of the cases that you have consulted with that involve cancer as opposed to dust diseases and other things?

A Well, the vast majority of the individuals I see have lung problems or back problems, and that's probably 80 percent and perhaps evenly divided. And then the remaining 20 percent is a mix, and neurologic is probably the third highest. Then the remaining would be a mix of heart, liver, kidney cancer. So we're down about, you know, a portion of ten or 15 percent, five percent cancer perhaps.

Q You expressed an interest in your CV with

regard to skin cancer. Have you treated people with skin cancer?

A No. I've seen people with it, and I refer to a dermatologist.

Q All right. Well, perhaps my question was bad, then. Have you evaluated people that have had skin cancer?

A Yes.

Q And that's within this five percent?

A Yes.

Q Have you treated people with cancer?

A Not directly. Several of my patients have cancer. I refer to an oncologist. I will, of course, follow along but will rely on their choice of chemotherapy and mode of therapy.

Q You say several. I presume that means two or three. What is the number?

A Since I've been in Cincinnati how many patients have I had with cancer?

Q Yes, sir.

A At least ten.

Q Do you recall what kind of cancers were involved?

A Lung, laryngeal, breast, oral, colon,

kidney, skin.

Q That's seven right there.

A Yes. I mean, these are different types, not just individuals, so quite a few.

Q I understand. Have you had any experience with vinyl chloride or polyvinyl chloride exposures other than those people that you saw in connection with the Columbus case and this case?

A Yes.

Q Describe that for me, then.

A Individuals working with some of the resins, the PVC resins, outside of these situations; individuals with vinyl chloride exposure outside of these.

Q Well, what were they doing? What kind of exposures?

A One was working a press. In fact, there were several individuals who were press operators handling the green resin. Another was a design engineer working with design of a facility using vinyl chloride.

Q He was designing a facility?

A He was involved with, yes. Well, I guess not design. He wasn't the architect, but was a mechanic. But more of a technical, skilled, than

simply a maintenance mechanic.

Q This was an operating facility?

A Yes.

Q His exposure was to what?

A Vinyl chloride.

Q What was his complaint?

A He had oral cancer.

Q When you say oral, that's in the mouth?

A Yes.

Q Where was he working?

A I think these were in Kentucky.

Q And the press operators, what were they doing?

A They were involved in the manufacturing of seat coverings, floor panels.

Q What were their complaints?

A They had problems with some respiratory complaints, but primarily hand and finger problems.

Q What kind of hand and finger problems?

A There was some arthritic problems, also some circulatory problems.

Q This wasn't acroosteolysis?

A I don't think it was, and I don't think it was scleroderma, either, but in some cases there was

some hint of at least perhaps earlier problems. But I didn't diagnose scleroderma or the osteolysis on either one of them.

Q That has been your extent, then, with involvement with polyvinyl chloride or vinyl chloride?

A I think so, yes.

Q What were you doing, evaluating these people or treating them?

A Both.

Q Were you involved in any lawsuits arising out of these cases?

A Well, the one with the oral cancer was awarded a workers' compensation claim. There was no lawsuit. And I don't think the others had any -- well, I wasn't involved if there were any lawsuits or work comp claims.

Q You saw these when you were down here in Cincinnati?

A Some were in Detroit; some were here.

Q The Kentucky case was down here?

A Yes.

MR. BUNDA: Doctor, if we could, I would like to ask you some questions about the -- well,

let me stop for a second. Let's go off the record.

(Discussion off the record.)

Q I would like to talk to you now about the types of information that appears in a published form with regard to medicine. You have medical texts. Is that right?

A Yes.

Q What is that information used for in the general practice of medicine, if you understand my question?

A Sort of general knowledge bases. They are generally organized into chapters by organ system, and then within each chapter or division of organs will be a division by disease, disease process. So they're basic information. Some may be more -- if it's medicine, it's primarily on treatment suggestions, a diagnosis. If it's toxicology, it's more review of what's known about a specific material.

Q It's an overview of the information available?

A That's right.

Q Have you ever heard the term "case report"?

A Oh, yes.

Q What is that?

A Well, case report is reporting of an individual or group of individuals without direct claim, if it's by itself, of proof of cause and effect, but interesting situations, and quite useful in all areas of medicine, including occupational medicine. Some of the earliest observations are called that, for example, before you've had time to make comparisons to cohort prospective studies.

Q When you say useful, useful for what?

A Alerting individuals to possible new diseases, new relationships, or, in some setting where there might be animal data about cause and effect, similar situations in humans where there hasn't been a full epi. study.

Q Would I be correct in saying that case reports are not used for establishing cause and effect?

A By themselves. You know, in some settings, if that's all the information that's available for humans, that might be enough. If there's lots of bacterial and laboratory data, for example.

Q They can be used for triggering hypotheses?

A Oh, definitely that.

Q That's their primary role?

A Yes. Take, for example, formaldehyde where there is bacterial evidence for carcinogenicity, laboratory evidence and the human epidemiology is still ongoing. There are case reports of the nasal-pharyngeal cancers, and that's being utilized as a basis for making some additional standard settings, monitoring, and so on.

Q Well, if we can stay away from --

A That's what I'm talking about in terms of not only then are they useful for hypotheses generated, but definitely that they are useful for that.

Q Well, if we can stay away from the standard setting, because you will and I will agree there are political implications in setting standards. You have a factor of safety you want to maintain. You know, safety for the population is designed. It's not purely an issue of cause and effect in a standard. Would you agree with something like that?

A Well, I agree that there are political considerations. I don't think that safety is a political consideration, but you're right, standard setting does involve more than just straight science.

Q Well, I didn't mean to imply that standards

were purely political, but it has that element to them. Correct?

A Yes.

Q What I'm trying to establish is some sort of hierarchy in the medical literature for providing information that you as a doctor or others in the medical profession will use and rely upon in establishing cause and effect. Okay?

A That's fine.

Q Case reports are something that you can refer to in that hierarchy. Is that right?

A Yes.

Q If you have epidemiologic literature or animal or laboratory information available to you, that is of a higher degree of quality than case reports. Is that right?

A Yes.

Q What would be next on that hierarchy of information that you would look to as being valuable to you or to the medical profession in general?

A Well, perhaps taking case reports and establishing a control group, and either using, in most situations, a standard mortality or morbidity ratios, SMRs, you might be able to take those case reports

and do a PMR, a proportionate morbidity/mortality, based upon the total exposed group or possibly exposed group or work force or what have you. You might be able to do either a prospective or, you know, historical retrospective, what have you, of a group, of a cohort, again based upon those case records.

Q So you're taking a bunch of case reports, conglomerating them together and then --

A And following them through time or going backwards in time. And all of those would strengthen and upgrade the simple case reporting.

Q So now you're shading into the area of epidemiology. Is that right?

A Well, and in the broadest sense, case reports are epidemiologic, for that matter, as well. Theirs perhaps were just scratching the surface in some of the simplest forms that can be done.

Q You're using them in a broad sense, though?

A That's right.

Q What is epidemiology?

A It's the study of disease as it exists in a population.

Q What do epidemiologists do, to your under-

standing?

A Okay. Study that disease and its relationship to the population as a whole. Like I say, case reports fall under an epidemiologic job and expertise.

Then the other things that I described, designing studies as to how would you either seek to prove causality or disprove it with respect to some case reports, or even when there are no case reports, where there's animal data, how would you go about designing a study to prove or disprove a relationship.

Q Epidemiologists don't work with case reports per se, though. They attempt to design their own studies if they have the ability to do so. Is that right?

A Yes.

Q Okay. When you say designing a study, am I correct in understanding that epidemiologists, when they do a study, they look at large groups of people. Is that right?

A Okay. That's certainly part of the thing that they do, yes.

Q And in looking at these large groups of

people, they try and determine whether there is a difference between two groups of people depending on various factors. Is that too broad?

A No. That's fine.

Q And if I can make this more concrete, you have one group of people that is exactly alike, theoretically, to the other group of people except for one particular factor?

A That would be the ideal setting, yes.

Q And they attempt to determine whether that particular factor has any bearing on the health of those people, then. Is that right?

A That's right, or any other measure that you're seeking to look for, yes.

Q One of the reasons they use this is because you can't do experiments on human beings. Is that right?

A That's right.

Q What are animal experiments?

A It can be of a variety of different types, both acute and chronic toxicity experiments: dosing animals with a specific substance, giving different doses to different amounts of animals; looking for grossly observable effects, death, abnormal neuro-

logic behavior, respiratory function; looking for microscopic abnormalities, again, with those responses.

There are more chronic types of animal experiments: give longer term exposures, probably less exposures, again looking for differences based upon the amount, duration, extent, intensity, what have you, of exposure; look for cancers; any one of a number of different things.

Q Science uses animals because, again, you can't use humans to experiment on?

A That's right. And you can far better control for the variety of different factors that are involved.

Q And that information is taken and there is some analysis done in an attempt to extrapolate that information in animals to the use with humans?

A Yes.

Q There are problems with doing that, aren't there?

A The whole field of, yes, occupational medicine, epidemiology has great difficulties because of controlling for different factors, and so on.

(Discussion off the record.)

Q Is there any other type of medical literature that you look to for information?

A Well, we haven't talked about bacterial studies.

Q What are those?

A Well, these would be some of the easiest, simplest, first type of studies of toxicity, seeing the effect upon bacterial systems of various chemicals. Particularly genetic mutations are the easiest sample with these kinds of testing.

Ames (Ed)

Q You're talking about things like the AIDS test now?

A That's the historic test, yes.

Q Anything else?

A Well, certainly hygiene is important in terms of the mechanisms of generation of fumes, dust, particulates. Mechanisms of measurements are also important.

Q Okay. I'm thinking more in the area of cause-and-effect relationships now.

A Okay. Yes. There are a number of things you can do with statistics, too, but I think we've talked mostly about cause and effect.

Q When you say -- I'm sorry. I didn't mean to

interrupt you. Are you finished?

A Yes.

Q When you say statistics, you're talking about biostatistics?

A Yes.

Q And that is a category of epidemiology?

A Well, I don't think either field would agree to that. Biostatistics has to do with how do you take data and analyze it to show causation, relationships that didn't just happen by chance, and there's obviously quite a science involved with that as to what particular test and testing procedures to use.

Q You said you had some training in your master's program in biostatistics. Is that right?

A Yes.

Q How many courses did you have?

A Three or four.

Q Did I ask you how many occupational medicine courses you had in the program?

A No.

Q I'm asking you now.

A I'm not sure. Yes, I'm really not sure, because that format was probably -- I hate to say least structured, but there would be seminars on each

weekend that we were there, and there would be usually a stack, two-inch stack, of articles that were handed out, and within each of the different sections specific diseases would be dealt with, so that's really hard to say how many different occupational medicine courses there were.

Q What about toxicology courses? How many did you have?

A Three or four.

Q These courses, how long did they last? I mean, my understanding was you had a weekend a month, right?

A Yes. And so they would last three to six months. They were basically -- I think the equivalent in toxicology would be three or four semesters of a course a semester, and that was what they based the courses on. But since they would stretch out, we weren't really in semesters. It's hard to, you know, tell you how long they lasted.

Q Each course went three to six months?

A Yes.

Q And you met one weekend a month?

A Yes.

Q Within that weekend, how much time was

devoted to each course?

A Well, it was three days, so we would go eight hours each day and we'd generally have two to three hours each day on the courses that we were on.

Q Two to three hours each day?

A (Nodding.)

Q Is that right?

A Yes.

Q And you would spend three days?

A Yes.

Q So that would be six to nine hours a month?

A In formal course work, yes.

Q On one particular subject?

A In one, yes, when we were taking epidemiology courses. Actually, I think there was an epi. course almost the whole time.

Q Then you would keep that same focus of study for three to six months?

A Yes.

Q How many courses in all did you have?

A I don't know. I mean, there were courses in administrative law, biostatistics, toxicology, industrial hygiene, occupational medicine, epidemiology. There was some computer time, and I think that was

mixed into one of the other -- that was maybe part of biostatistics or epidemiology.

Q How many courses did you have in industrial hygiene?

A I took three or four. Basically, most of these are pretty much equally divided.

Q Those courses in industrial hygiene, do you remember what any of them were? Was one testing?

A I think we had a ventilation course. There was the testing, sampling course, and I don't know whether it was called beginner's, beginning --

Q You received instruction in threshold limit values, then?

A Yes.

Q So you're familiar with the American Conference of Governmental Industrial Hygienists?

A Yes.

Q They issue the threshold limit values?

A Yes.

Q They're here in Cincinnati, right?

A Yes.

Q Do you subscribe to the theory of threshold limit values?

A I guess I don't understand. They're here.

They're real.

Q Okay. There is a dose to which you can be exposed and there's no effect?

A Okay. Now, that's not implied. I mean, the ACGIH will not tell you that if you're under a standard you're either safe or what have you. If you're asking about safe levels with respect to disease, I think there are safe levels. If you're asking about safe levels with respect to cancer, I think that's another story.

Q Well, we'll get to that story in a little bit.

A All right.

Q With regard to developing scientific information regarding cause and effect between a chemical and its effect on humans or animals, can you describe for me how, when you are faced with a chemical and you don't know what it does, and when I'm speaking about "you," I'm speaking about the medical profession in general, what happens? How do they gather information then?

A Well, there could be several levels. One is monitoring of individuals with exposures.

Q What will that tell you?

A You can develop symptoms, characteristics, look for dose response. You know, do people with more symptoms have more exposures, those with less symptoms have less exposure?

Q Historically, that has been a way of determining whether chemicals cause an effect on humans. Is that right?

A Yes.

Q Epidemiology, Doctor, animal experimentation, these are all fairly recent developments?

A That's right. Now, of course, all of those are involved with some of those initial evaluations, but, yes, the sciences have developed to utilizing laboratory animal data, bacterial systems, the study of the physical chemical properties of chemicals, how do they behave, what's their metabolism, a variety of different ways.

Q When you have this observed cause and effect on people actually subject to the exposures, what type of information do you need to determine whether there is the cause and effect relationship? Do you have to look at the dose?

A Yes. I mean, a lot of times you don't have all the data, you don't have dose, and that's partic-

ularly true in occupational medicine. Doses, you know, weren't available in a specific setting. If you were to design something, then you would want to be able to measure dose if you were going to test it out.

Q You would also want to look to the reproducibility of that? You want a consistency in a reaction. Is that right?

A That's right, yes.

Q You want to look at other causes of a particular effect and try to rule those out, right?

A That's right.

Q Animal experiments are another way to give you information. Is that right?

A Yes.

Q That is a tool that has been developed by science to determine cause and effect in humans. Is that right?

A Yes.

Q Looking at animal experiments, you can more closely control factors such as dose, outside causes of a particular effect and things like that. Is that right?

A Yes. And you can do it over shorter periods

of time. You can give higher doses and then make your extrapolations based upon that, yes.

Q You also have problems because you have to decide whether the animal will react in the same way that a human will. Is that right?

A That's right.

Q You have to decide whether the dose given to the animal is somehow proportionate to how a human being will react?

A That's right.

Q And you want to make sure that the animals are not, or the effect that you see in the animals is not due to some other cause particular to the animal? I mean spontaneous cancers peculiar to that type of animal.

A That's right.

Q And you want to make sure that the effect seen in the animals is reproducible. Is that right?

A Yes.

Q Now, in epidemiology that's another tool that has been developed by science to determine cause and effect. Correct?

A Yes.

Q Would you agree with me that epidemiology is

not too able to determine cause and effect but can only establish association? Have you ever heard that before?

A Well, I've heard that, yes. I'm not sure I necessarily agree with that, but I guess in the strictest sense, epidemiology does not study what happens at the tissue level. It is just looking at events that are occurring. So that, I think, is a basis of a statement, for the statement it looks for associations. However, there comes a point that associations become real enough that that, in fact, is proof enough.

Q Do you know where that point lies, in general?

A You mean how --

Q How you can go from an association to say that epidemiology actually establishes cause and effect.

A I don't think there's any one set, ironclad rule that says if you have A, B or C, then that's sufficient.

Q Have you ever heard of a term referring to the power of an epidemiologic study?

A Yes.

Q What is your understanding of that?

A Well, that has to do with sample size, how many people or individuals or whatever are being studied. It has to do with how common, prevalent a particular disease process is, and then the characteristics of that, what you're looking for. If you have small numbers of participants and a common disease, the power would be relatively low. If you have a large number and a common disease, well, the power goes up, and as simile for rare diseases, you can get by with smaller numbers in a group with rare disease for the same sort of reasoning. And power is how we describe that.

Q So when you're referring to an epidemiologic study with a high degree of power, you're talking about ones that you can place a great deal of reliance on?

A That's right. And the converse is, too, if you have a lower power study, and it particularly has to do with studies that don't show relationships, if you have a lower power study that shows a relationship, that speaks to the strength, because the chances of showing that were fairly low. A high power study means that a negative study, a study that

Q Specifically focusing on the salivary gland, do any of these, leaving aside vinyl chloride, but do any of these others, are they recognized specifically as attacking the salivary gland or the parotid gland? I'm using those terms equivalently.

A That's fine.

Q Is that your understanding?

A Yes. Well, probably cigarettes and alcohol. Some associations with other chemicals, but I don't think they're as strong.

Q Are there salivary gland cancers that arise that people don't know what the cause is?

A Yes.

Q What percentage or proportion of that?

A Those are the majority.

Q You're in occupational medicine. Do you have an idea about approximately what proportion of cancers are occupationally related?

A Someplace between ten and 20 percent, I would say.

Q Where did you get this information?

A Through a review of the published literature. You know, the low end, I think, is five percent, and I think Doll will talk about five per-

cent. The high end is about 20 percent, and it gets someplace in between there, although I think Doll is conservative.

Q You're talking about Doll and Peto's study?

A Yes.

Q That's the one they did for the National Cancer Institute?

A Yes.

Q Which one is the 20 percent?

A Well, several. I don't recall the authors for those that have suggested it.

Q That was the President's Advisory Board?

A That's one.

Q The one that Doll says is trash?

A I don't know that he said it was trash. If you say so, all right.

Q Well, you're not familiar with that, in other words. Is that right?

A I'm not familiar with Doll's comments on it, no.

Q You're not familiar with the study itself that says 20 percent, either, are you?

A Not that, no.

Q So you would agree with me that at least 80

percent of the cancers have or are thought to have origin other than arising from the workplace?

A Yes, at this point. We may be proved wrong in the future, but data today will tell us that, yes.

Q Can you describe for me your knowledge about cancer? What is cancer?

A Well, cancer has to do with altered genetics such that the cell no longer behaves normally and will spread, divide in a bizarre and unusual fashion, essentially disrupting normal physiology to the extent that life is not possible. It implies that the cancer will spread past the site of origin to a site some distance from that original site.

Q What is the word used for that?

A Metastatic disease; metastasis.

Q What causes the cell to do this?

A Well, probably several stages, several steps. We know a fair amount, although still the precise mechanisms aren't well worked out, but what likely happens is several different events change, a change in the DNA, the basic genetic code, such that the cell affected no longer either makes proteins, enzymes or goes about body growth repair normally, then followed by additional changes in other portions

of the genetic code, the DNA, so that the either control, regulation of that particular area, that particular gene, no longer occurs appropriately, allowing for additional and more rapid growth.

We're basically talking about likely several different steps involved with clones of cells growing at first not necessarily malignant but abnormal, becoming progressively more abnormal until they attain malignant status, that is, the ability to spread beyond the local source.

Q We're talking about the loss of a control mechanism in the cell for reproduction. Isn't that right?

A That certainly occurs, yes.

Q When you say there's a DNA alteration, do you know why that occurs in cancer?

A In some cases it's quite clear what happens. A chemical, because of its reactivity, makes what's called an adduct. It attaches to the DNA permanently in such a fashion that that cell and all the other cells that come after it don't behave properly or normally. In other instances, it's not clear. Some situations, pieces get added, deleted, but it's not clear, the process.

Q You're familiar with research on altered genes?

A Yes.

Q There are a lot of theories going around about carcinogenesis. Is that right?

A Yes.

Q And research is going on at this time?

A Yes.

Q But it's not exactly established how that occurs in all instances?

A No.

Q Do you know the phraseology or the terms "promoters" and "initiators"?

A Yes.

Q Describe for me your understanding of those.

A Well, that's basically what I was doing. An initiator is that chemical that will start the ball rolling, so to speak, has ability to attach to the DNA, change the DNA, form a DNA adduct in such a way that they have a permanent change.

The promoter has to do with a chemical or a substance that will make alterations at some other part that will enhance the growth, development of this initiated cell or cellae.

Q Do you know how vinyl chloride acts as a carcinogen?

A Probably in both of -- many of the initiators are also promoters. Either vinyl chloride through its metabolism forms this epoxide that's quite reactive, retrofilally attaching to DNA, changing it, forming adducts. This is fairly typical of many of the carcinogenic materials.

Q You say it forms an epoxide?

A Yes.

Q So what you're talking about is the vinyl chloride is metabolized. Is that right?

A Yes.

Q Vinyl chloride is not a carcinogen, but it's processed by the body to form a carcinogen. Is that correct?

A Yes. That may be a real shade of difference there, but that's right. It's probably a metabolite that causes the problem.

Q The metabolite has been found to be formed in the liver. Is that right?

A Well, anyplace where there's cytochromes. And the liver is not the only site. The liver is the primary site for metabolism, and most of the cyto-

chromes are there, but the process, the ability to metabolize materials, exists elsewhere in the body, too.

Q Have you heard the term "metabolic pathway"?

A Metabolic pathway, yes.

Q What is that?

A It speaks to what we've just been talking about, that is, the steps and the changes that occur in a specific substance, chemical, that either renders them active or inactive. Life makes many different things, proteins, enzymes, and there's a metabolic pathway that starts with building blocks and makes those. Or, with respect to synthesized chemicals, proteins in the body, or exogenous chemicals, outside the body, they get integrated through a pathway.

Q It refers to a mechanism through which an outside chemical comes into the body and arrives at a certain part of the body where it does harm.

A That also may be included, yes. It has more to do with pharmacodynamics. The pathway specifically has to do with what -- has to do with its degradation or anabolic process.

Q If I can back up for just a second, the fact

that, for example, sunlight is known to be a cause of cancer, skin cancer specifically, you know that to be true. Is that right?

A Yes.

Q The fact that sun causes cancer of the skin does not necessarily mean that sun can cause lung cancer. Is that right?

A That's right.

Q And that's because you have these metabolic pathways, and there's no explanation for how the sun could cause any changes in the lung, because the lung's inside the body. Is that right?

A Yes, although I'm not sure I understand the metabolic pathway, what you're driving at in terms of that. The sunlight does not reach the lungs. It's stopped by the skin. The energy is absorbed by the skin, so --

Q There's some pathway between what happens on the skin once it's exposed to the sunlight and the effects of the sunlight, the chemical changes that occur and the eventual development of cancer. That's what I'm getting at.

A All right. I wouldn't call that a metabolic pathway.

Q Well, there's some relationship between what's known to be a cause of cancer and the place where the cancer arises. Is that right?

A That's right. Energy is absorbed and the energy from sunlight, ultraviolet radiation, produces genetic DNA alterations in some of the skin cells, and that's what occurs.

Q You'd agree with me that the fact that something is known to be a cause or suspected to be a cause of cancer in one particular part of the body doesn't mean that that particular substance will cause cancer in any part of the body?

A No. You have to be able to demonstrate that that substance can get to -- I mean, that would be vital. The substance or the metabolic product or some such has to reach an area for that to be a primary site for cancer.

Q A more specific example, there is knowledge that vinyl chloride can cause angiosarcoma of the liver. Is that right?

A Yes.

Q That doesn't necessarily mean that vinyl chloride is known to cause skin cancer?

A That's right.

Q Let's talk now about the effect that dose has on the formation of cancer. What are your thoughts on that?

A That's a difficult area. From a statistical point you can talk about dose having an effect upon the prevalence, the amount of cancer that occurs in a population. The higher the dose, the more cases you're going to develop. But by the very nature of a carcinogenic material, it's very difficult to find a dose that doesn't cause some problem, i.e., potentially cancer. We know that the body has the ability to repair potentially carcinogenic events. In other words, a DNA adduct gets made that the body is able to cut out. But in terms of threshold dosage, for example, I don't think that we can talk about safe doses, safe exposures for materials that are carcinogenic.

Q Why do you say that?

A Because of what I've just talked about. In other words, if something is carcinogenic, it means by definition that it has the ability to alter DNA and, therefore, that ability can occur at almost any dose. Thus, you can't really talk about safe levels.

Q Why do you say that ability can occur at

almost any dose?

A Because all that it takes is one molecule at the right site to cause a problem. Now, statistically you can talk about the more molecules you have, the more likely you're going to cause that. That's absolutely true. But we know that one molecule can produce the problem.

Q Theoretically, you're talking about?

A That's right.

Q That is, as a practical matter it doesn't work that way. Is that right?

A Well, with many substances -- we can show that single asbestos fibers are sufficient to produce mesotheliomas, and that's probably the easiest example, because it's very difficult to give a person one molecule of a substance. But you can give them one fiber in a laboratory setting.

Q Well, all of us are exposed to sunlight and all of us don't have skin cancer.

A That's right.

Q Correct?

A That's right.

Q All of us are exposed to vinyl chloride, for that matter, and all of us don't have cancer of the

liver. Correct?

A You'd have to go some to prove how much we're all exposed to vinyl chloride.

Q Well, would you accept the theorem that all of us are at least exposed to a molecule of vinyl chloride?

A That may be so, yes.

Q So there are at least the defenses in the body to fight off exposures like this?

A That's right.

Q So it's not necessarily going to happen that you get cancer just because you're exposed to a molecule of a carcinogen?

A Right, yes. I didn't mean to imply by anything that I said that that was the case.

Q And, in fact, the U.S. Government -- again, we're getting into areas of policy -- but permits exposures to known carcinogens at levels which the scientific community, or at least the government, believes are acceptable.

A That's right. You know, cases at about one in a million have been ruled -- you know, exposures that cause, one in a million have been ruled to be safe, basically.

Q What do you know about the exposures that Mr. Wallace and Mr. Dendinger had in the factory? I'm talking now about materials other than vinyl chloride or polyvinyl chloride.

A There were some solvents of the ketone type, methyl ethyl ketone, MIBK, methyl isobutyl ketone, some tetrahydrofurans, I believe, some toluene, perhaps some trichloroethylene, some dyes. I don't know the specific names of those.

Q Now, did you analyze these exposures in your considerations of cause, potential causes, of their cancers?

A Yes, I've taken them into account.

Q What about MEK? Is this known to cause any cancers of the mouth and throat or the colon cancers?

A Not known to be.

Q Not known to you to be?

A That's right. And I don't think to the medical community.

Q What about the MIBK?

A Yes.

Q What about that?

A I don't think so for that, either.

Q For either type of cancer?

A That's right.
Q What about THF?
A Not known to be.
Q What about toluene?
A Toluene may be a promoter.
Q But in your opinion, it's not an initiator?
A I don't think it's an initiator, that's right.
Q What about the relationship between those? You can have initiation and never have it grow into a cancer. Isn't that true?
A That's part of the theory. I don't think the answer's in on that. But in the one sense I think the answer's no. It may be a very benign, slow-growing type of cancer. On the other hand, that may be, you know, the initiation may produce the benign growth, for example, although, to my point of view, to be an initiator of cancer really has to be something more than something benign, but depending upon which particular theory you're holding as to how you would answer whether a cancer can develop without a promoter. And, of course, many initiators are promoters themselves.
Q I'm not sure I got an answer to my question.

My question is if vinyl chloride, in your opinion, is an initiator and you get another chemical as a promoter, an initiator can change the DNA characteristic in the cell. Is that right?

A Yes.

Q That cell can die if it doesn't reproduce. Is that right?

A That's right.

Q And that's the job of promoters, is to promote the reproduction of those cells. Is that right?

A Well, all right. I mean, it's not quite that simple. If, in fact, the initiated cell dies, then no promoter is going to bring it back. Okay?

Q That's right.

A So the scenario would be that an initiator causes abnormalities that in theory ultimately would lead to a cancer. The promoter brings that cancer forward in time.

Q And if you don't have a promoter, then you don't have the cancer growing?

A Or maybe it's growing more slowly and isn't going to develop for some time, a longer time down the road.

Q Or it may never develop?

A Or possibly that individual could die from something else first, right.

Q So if you have toluene, which is a promoter, the toluene could have been promoting the cancers in these gentlemen?

A That's possible.

Q Have you sorted out in your own mind the relationship between these two?

A I think so. I'm interested in more information as to how much toluene and so on was involved.

Q Well, let me suggest that at times the toluene exposure was in excess of the threshold limit values. In your opinion, would the toluene have been a substantial contributing factor to the cancers that arose in one or both of these gentlemen?

A It depends upon how much, how often that was occurring.

Q Well, explain that for me. How much would be enough?

A Well, was this once that it was over the TLV? Was this every day, constantly, eight hours a day, five days a week, it was over the TLV? All of those things. I mean, the more of the exposure, the

more likely that it became important in terms of promotion.

Q Well, tell me how much exposure would be significant and enough for you to decide in your own mind that it was a substantial contributing cause to the cancers.

A I think that if there was constant exposure to a hundred parts per million, for example, of toluene, you know, eight hours a day, five days a week, through most of these particular men's employment, that would be an important role.

Q What if it was less than that in terms of the length of time? How about a couple of years' exposure?

A That also could be possibly important. It would depend upon which years, what else was going on at the time, and so on.

Q You don't have that information yet. Is that right?

A No.

Q That's information that you would need before you make a decision?

A Yes.

Q Have you been provided with information

concerning exposures in the factory?

A No.

Q Have you been provided with information concerning exposures to vinyl chloride?

A Not specific measurements. I have general knowledge of the types of exposures that would occur in this type of situation, but I have not seen specific numbers.

Q Tell me your general knowledge about types of exposures like this.

A Generally, conservative would be one to five parts per million generally with peak exposures probably occurring daily, peak exposures of 25 to 100 parts per million, although both of these individuals remarked that they could smell vinyl chloride, which would mean probably considerably higher exposures. You know, the ability to detect vinyl chloride, some say, can be done as low as 400 parts per million, but many think it's much higher than that.

Q In your experience, has anybody in a fabricating situation documented that they could smell vinyl chloride and it actually was vinyl chloride?

A This is the most descriptive detection that I've seen.

Q Have you expressed an opinion as to whether, in fact, they were smelling vinyl chloride as opposed to something else?

A All I have is their description of it, so I can't say.

Q What about if you were supplied with information that an industrial hygienist from the State of Ohio received that information, checked it out and concluded that they were smelling the ketones or something else? Would that have any bearing on your analysis?

A Yes.

MR. DELLI BOVI: I'm going to object. You can go ahead and answer.

Q Okay. What effect would that information have?

A If a hygienist had made an evaluation, that would certainly speak to the opinion at the time of the evaluation. These gentlemen are dead, so it's hard to question.

Q It's hard to ask them what they smelled?

A Yes. All we have is their description that they smelled this sweet type odor.

Q If you had your choice between the analytic

measurement done by the State and by Chrysler versus their opinion, which would you place more emphasis upon?

A It would depend upon the timing of that. I mean, if they're smelling this and saying "I'm smelling vinyl chloride" and someone is there measuring and says, "No, it's this," then it's much more on what's being measured. If it's a historical thing, "We used to smell this all the time; we haven't smelled it in a while," and measurements are done then and say, "Yes, you're right; you're not smelling vinyl chloride," then the historical observation would have more credence.

(Recess taken.)

Q Doctor, we were talking about exposure levels in the Sandusky Chrysler Plastic Products plant. You have not seen those figures. Is that right?

A That's right.

Q If, in fact, the exposure levels were below the level of .5 parts per million, would that have a bearing on your opinion?

MR. DELLI BOVI: Objection. You can answer.

A If someone can demonstrate, yes, that expo-

sures throughout the whole period were never above .5, yes, that way.

Q How would that affect your opinion?

A Well, that would mean there would be essentially little or no exposures to vinyl chloride.

Q And that would affect your opinion about whether these cancers were caused by vinyl chloride, then. Is that right?

A Yes.

Q You would have to change your opinion and conclude that they were not caused. Is that right?

A It would be much less likely, yes.

Q We weren't finished going through some of the other exposures. You thought there was some trichloroethylene there.

A It seems likely, yes.

Q What about the effect of that exposure? Would that have any effect on the cancers?

A Possibly. There's some evidence that trichloroethylene is carcinogenic.

Q If there was exposure to that chemical at the plant, in your opinion, would that have played a contributing role to the cancers in these gentlemen?

A It's possible.

Q What about the dyes? There were numerous dyes used in the ink room where both of these gentlemen had exposures. Have you analyzed any role that these dyes may have played in the cancers?

A I don't know which ones they were. Dyes, you know, bladder cancer's associated with some dyes for sure. So it would be valuable to get information about that, about those dyes.

Q Don't you need that information before you can form a conclusion as to the cause of the cancers?

A Well, except that the vinyl chloride is fairly striking here and that sticks out in terms of causality.

Q But you haven't ruled out any other possible -- these particular possible causes?

A For completeness I should get the information about the dyes, yes.

Q What about their exposures to other substances and materials in jobs other than at Chrysler? Have you analyzed that?

A Yes, I have some job descriptions of other employment.

Q Have you found any exposures in those jobs that are of significance to you?

A I don't think so. No, I don't think so.

Q What about their lifestyles? Anything other than their occupations? Have you analyzed that for both of these gentlemen?

A Yes.

Q Have you found anything there that, in your opinion, would be a factor for contributing to the cancers?

A I don't think so. Neither one of them. Mr. Wallace was not a smoker. Mr. Dendinger smoked a pipe, claimed not to inhale it. So both have very little smoking history. Alcohol is not a problem. Diet looked like there's nothing special there, either. So I don't think there's anything socially that's involved.

Q Well, let's stop for a second, if we could. The discussion of diet is in particular connection with the colon cancer. Is that right?

A Yes.

Q Isn't it also a fact that there is not a full knowledge by the medical community about what particular factor in diet causes the cancer?

A That's right.

Q So the fact that Mr. Dendinger ate like the

rest of us or, if I can back up on that, the fact that Mr. Dendinger had a diet and it's not entirely clear what that diet is, how can you rule that out as a cause of the colon cancer?

A It basically means that the risk of diet is probably awash with the background; in other words, that there's nothing that sticks out. Fibers seemed fairly normal, nonexcessive fat, you know, meat diet. So there's nothing that sticks out in it, and you're left with, well, there's some hint that diet may be involved, but given other exposures that we do know about, my opinion would then be more for the vinyl chloride.

Q Well, let's get into the meat of it here. I am correct, am I not, that in both the colon cancer involved in this case and the parotid gland cancer involved with Mr. Wallace, neither one of those cancers had any particular characteristic which is known by the medical community to be associated with vinyl chloride caused cancer?

Do you understand the question?

A By cell type you're referring to it?

Q Yes, sir. Or by any other characteristic.

A Well, there's several pieces of information

shows no relationships, may, in fact, have more weight to it.

Q Or conversely, a low power study that shoes relationships, if it has a lower power, that implies that that relationship that is seen could be due to chance alone?

A Well, not truly, because you've already taken into account the chance association through the use of your statistics. So if you have a lower power study that shows a positive relationship cause and effect, statistically you've already gone through the calculations to show that this was not likely to be by chance. And in fact, if it's a lower power study, that lends more weight to it because your chances, your predictive chances of finding an association were really low when you started, and if you found one, that makes it perhaps stronger.

Q Would you describe for me your understanding of the different types of epidemiologic studies?

A Well, why don't you name -- I mean, there's a list a mile long of different names. I think we've talked about a number of them.

Q Well, maybe you can give me yours that you recall, and then we'll work from there.

A All right. Well, we talk about case studies, would be a simple study, a case control.

Q You view a case study as an epidemiologic study?

A It falls under the purview of epidemiology, yes, case control, nested case control.

Q Well, wait a second. What is a case control?

A Well, that would be a study where you have found individuals -- you look at a disease, for example, and you find individuals who match those with the disease in all characteristics except for that disease, and then you look for a particular factor or factors to see if there's a relationship.

And you can design that in any one of a number of different ways. You can either do it cross-sectionally. You can follow a group through time. You can go backwards in time and follow them up to the present. You can do that in a number of different ways.

We've mentioned the PMR, SMR studies, prospective studies.

Q Well, what's a proportionate mortality study?

A It's where you take a group of individuals, and you compare the disease rates in that group based upon exposures in that group. By definition, then, the total of the diseases, the total percentage of diseases, has to total a hundred percent. And it may not have all the strength of an SMR study, but frequently it's easier or shorter and less expensive to do.

Q What are some of the weaknesses of a study like that?

A Well, you frequently have a smaller size group. You can't necessarily control for some outside factors, other community exposures, for example, or if it's in a similar community, perhaps some ethnic peculiarities. So there can be several weaknesses.

Q Within that type of a study, the numbers have to add up to a hundred percent. Is that right?

A That's right.

Q And if some of those, the categories within that factor, are less than what is expected by the standardized rate, then that necessarily means that other factors are going to be at a higher than expected rate?

A That's right. And that may or may not reflect what you're looking for.

Q What is a standardized mortality rate?

A Well, that's probably the next step past the PMR. In other words, you take disease rates, death rates, what have you, in a specific group, specific exposure, and you compare them to a larger population, either the U.S. as a whole or a community, a city, country, state, death rates, disease rates that you know in the larger population, and then you make your comparison to that group.

Q You do that with the proportionate mortality study, too?

A Well, proportionate, right, but it's in the particular group. The control group is the group itself, as opposed to in the standardized. The control group is a group not exposed, not being studied in this particular process.

Q Any other groups?

A Of epidemiologic studies?

Q Yes, sir.

A Well, numerous variations of the above.

Q And in those variations they all have an effect on the accuracy or the strength of the data

that you get. Is that right?

A Yes.

Q Can you rank them in terms of some of those that we've mentioned with regard to how important or how significant you consider the data to be once they come?

A Well, a lot of it depends upon the data itself so that I could say in general, with all things being equal, you know, your prospective study is probably the strongest and best, and case control or case reports are probably the weakest. But all things aren't equal, and so that ranking can change based upon the data itself.

Q Are you saying that what the results are from the particular studies determines how you view the accuracy of the information?

A No. No, but it's the data that you have that forms -- that you have to form the basis of the study, not the outcome. For example, if you do a prospective study but don't have specific data, for example, don't have industrial hygiene measures, can't get them, or patients are lost to follow-up, you know, then that prospective study isn't as valuable. That's what I'm driving at.

Q What you're saying is within each one of these categories you have to meet specific criteria to establish whether or not that's a good prospective study or a bad prospective study. You have to catch all the follow-up. You have to determine that the exposures, for example, are closely defined. Is that what you're talking about?

A Yes. And I'm not trying to, you know, say they're good or bad. Sometimes you can't get it. That's all I'm saying.

Q But those are variables that you have to look inside within each study?

A Yes.

Q But as a general matter your prospective study would be the one that you would like to, that you generally would rely on if you had a difference between that or you had to choose between that and a proportionate mortality study. Is that right?

A Yes.

Q And then between a proportionate mortality study and a case study, you would prefer to have the proportionate mortality study and you would rely on that more than the case study. Is that right?

A Right, yes.

Q Have you ever heard the term "background rate" before?

A Yes.

Q What is that?

A Well, that generally refers to the rate of a process disease, death that's occurring in the general community, a situation where you assume no exposures or equal exposures, something, some variable of that.

Q There are causes of disease, or specifically with regard to cancer, that we don't know about. They occur either spontaneously or they're common to the population. Is that right?

A Well, there's always a cause, but we don't know what it is, yes.

Q You try and distinguish those from the cancers that are caused by a particular chemical or exposures when you do an epidemiological study. Is that right?

A Yes.

Q Is that what we are referring to when we talk about a standard mortality rate?

A Yes.

Q And those things are taken from a nationwide

study sometimes?

A Some group, yes. They can either be nation, state, city, county.

Q With regard to cancer, those figures are available nationwide from, what is it, the American Cancer Society. Is that right?

A Yes. There are several reporting systems that will generate that data for you, yes.

Q Do you know what that information is for Erie County, Ohio?

A For Erie County, Ohio?

Q Yes, sir.

A No, I don't.

Q Can I talk to you for a second now about your knowledge of cancer in general. Can you give me some idea of the most prevalent cancers among males in the United States?

A Lung, probably the most common; is the most common.

Q A lot of that is ascribed to cigarette smoking. Is that right?

A Yes.

Q Ones below that, then, what is the next most common?

A I think colorectal, although prostate is about the same, I think.

Q Colorectal is a very common form of cancer in males. Is that right?

A Yes.

Q What about cancer in the salivary glands? Where does that fall?

A Pretty low.

Q In terms of frequency you're talking about now?

A Yes. It's low in frequency.

Q Would you tell me your understanding concerning what the medical community knows about the cause of colon cancer?

A Yes. There's some feeling that diet is involved, asbestos, some chemical associated other than asbestos.

Q What chemicals?

A Some of the polycylic aromatic hydrocarbons, some tars and pitches, acrylonitrile, some familial forms of cancer.

Q You're talking now about genetics, right?

A Genetics, yes, some association of cancer with a disease like ulcerative colitis. That's prob-