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First Name	Hilliard M.
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IN THE COURT OF COMMON PLEAS

SUMMIT COUNTY, OHIO

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MANOHAR LAL, etc.,)

Plaintiffs,)

vs.) Case No. CV92-04-1665

SUMMA HEALTH SYSTEM,)

et al.,)

Defendants.)

- - -

Deposition of HILLIARD M. LAZARUS, M.D., a Witness herein, called by the Defendants for cross-examination pursuant to the Rules of Civil Procedure, taken before me, the undersigned, William S. Bish, an RPR/CM and Notary Public in and for the State of Ohio, at the office of Hilliard Lazarus, M.D., University Hospital, 2074 Abington Road, Cleveland, Ohio, on Wednesday, the 16th day of December, 1992, at 2:20 o'clock p.m.

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APPEARANCES:

On Behalf of the Plaintiffs:

Messrs. Scanlon & Gearinger

By: Timothy F. Scanlon, Attorney at Law
1100 First National Tower
Akron, Ohio 44308

On Behalf of the Defendant St. Thomas Hospital Medical Center:

Messrs. Roetzel & Andress

By: Thomas A. Treadon, Attorney at Law
Suite 520
220 Market Avenue, South
Canton, Ohio 44702-2106

On Behalf of the Defendants Dr. Mubashir and Dr. Marquinez:

Messrs. Reminger & Reminger

By: Peter W. Marmaros, Attorney at Law
Suite 700
113 St. Clair Avenue
Cleveland, Ohio 44114

ALSO PRESENT:

Bashar L. Mubashir, M.D.
Manohar Lal, M.D.

- - -

I N D E X

HILLIARD M. LAZARUS, M.D.

of lawful age, a Witness herein, having been first duly sworn, as hereinafter certified, deposed and said as follows:

CROSS-EXAMINATION

(Defendant's Exhibit 1 was marked for identification.)

BY MR. TREADON:

Q. Doctor, my name is Tom Treadon, I represent St. Thomas Medical Center in this litigation. Have you met everyone here or --

A. Yes.

Q. Okay. And Mr. Marmaros, sitting to my right, is an attorney representing Dr. Mubashir and Dr. Marquinez, and I'm sure he'll have some questions when I'm completed.

Would you state your full name and your business address, please.

A. Hilliard Michael Lazarus, Department of Medicine, University Hospitals, 2074 Abington Road, Cleveland, Ohio 44106.

Q. And your occupation?

A. Physician.

Q. And, sir, you have provided us a copy of a curriculum vitae which has been marked as

Defendant's Exhibit 1. Is this a current --

A. Yes, it is.

Q. -- CV? Just briefly, and I know it's rather extensive, could you just tell me about your medical training?

A. I was -- I went to medical school at the University of Rochester. I did my internship, my residency and my fellowship at the Case-Western Reserve University. I've been on the faculty at Case-Western Reserve University in medicine, in the Department of Hematology and Oncology, since 1979.

Q. And you're Board certified in what specialty, sir?

A. I'm Board certified in internal medicine, hematology and also in medical oncology.

Q. Those are three separate --

A. Yes.

Q. -- Boards?

A. Three separate Boards, right.

Q. Okay. Are you aware there is a lawsuit pending?

A. Yes, I am.

Q. Okay. And how did you become aware of that?

A. I don't recall exactly whether I heard

from Dr. Mubashir or Dr. Lal or Mr. Scanlon, but I believe I heard early, and I heard from a number of sources that there was a potential for litigation in this case.

Q. All right. Have you reviewed any material prior to today relative to the care and treatment provided to Sharad Lal at St. Thomas Medical Center?

A. The only information that I have reviewed is I have looked over in -- in general fashion, when Mr. Scanlon contacted me, our hospital records on Sharad that relate predominantly to his -- his treatment and follow-up at University Hospitals.

I have not seen, per se, any specific records that relate to his subsequent admission or follow-up at St. Thomas, although I think I've seen -- I think I had a note from Dr. Hazra, I have had some follow-up over the phone with her when she assumed his care. I believe -- I don't know if I have it in here. I do believe I've seen some follow-up describing the fact that what his disease status was a while ago.

Q. All right. What do you have there in your hand?

A. This is the medical record from the

University Hospitals of Cleveland, the Ireland Cancer Center.

Q. Is that the entirety of the records you have?

A. Yes, this is his chemotherapy admission, his bone marrow transplant admission and his post transplant follow-up to, I think -- I forget the last entry, I think it was in September if I'm not mistaken.

Q. September of this year?

A. No, I think September of -- of '91. I'll tell you in a second. It's quite a lengthy document, series of documents, as you can well imagine. Here, this is it. My last note was September 19th, 1991.

Q. Now, you've met with Mr. Scanlon concerning this case?

A. Yes, briefly, just for him to point out to me that -- that there was this litigation and just in general what my -- I'm sorry, did I say September 19th?

Q. You said September of '91, I believe.

A. Okay. Because I do have -- I don't know where the letter is. I usually send a letter when I see a patient. It may be in this file. I had --

the last note that I have here is October 3rd, 1991.

Q. Now back to your discussions with Mr. Scanlon, what was that --

A. We -- pardon --

Q. What were you asked to --

A. I think Mr. Scanlon --

Q. -- what were you advised your participation would be in this case?

A. I indicated to Mr. Scanlon that I was concerned as a practicing physician that this would represent a potential conflict and a potential -- how should I say this -- I'm not in the habit of interacting, you know, of -- of --

Q. With lawyers?

A. Well, in malpractice. I mean, I try to stay out of that sort of thing if possible; and certainly Dr. Mubashir has referred us cases, and I didn't want to be in an adversarial relationship with him, and I made that very clear to Mr. Scanlon, who informed me that my involvement in this case would be one predominantly of what I had thought about Sharad's care after diagnosis, and our involvement in his care, as opposed to what happened subsequent to that.

Q. So you've not been asked to render any opinions concerning the care Sharad received while at St. Thomas Medical Center?

A. That is correct.

Q. And you don't have any opinions I take it?

A. Oh, I do have opinions, but I -- I'm bas-- I don't have the -- the facts -- I did not review the records from -- but I do have opinions if I'm asked about what I understood about the care, et cetera, but I didn't -- I'm basing this on secondhand information.

Q. And my next question then is what is -- where did you get your understanding of what happened at St. Thomas?

A. Well, Dr. Lal telephoned me, I guess, shortly after Sharad was -- he was supposed to -- I think Sharad was supposed to see me on a Thursday or Friday, and he was admitted the day before, and I believe they had called to tell me that he wasn't keeping the appointment and some data surrounding why he would not be keeping that appointment.

And subsequently they -- he has -- both Mrs. Lal and Dr. Lal related various bits and pieces of what had transpired to me, and then Dr. Hazra has -- had talked with me on several

occasions, basically giving me information about what had happened, and then subsequently Mr. Scanlon has given me -- I guess you've given me the smallest data.

Q. Okay.

MR. TREADON: Tim, can we take it from all of that that it's not your intention to ask Dr. Lazarus any questions at any time in this litigation concerning the care that was provided at St. Thomas?

MR. SCANLON: Yes. What I -- our position hasn't changed from what I told you originally. I told you that it was not our intention to ask Dr. Lazarus any questions about the care and treatment he received, but that if you asked him he has some opinions, but I'm not going to open that door.

MR. TREADON: Okay. And I'm not going to open it either.

MR. SCANLON: I told him that what we would want from him was his testimony, as Sharad's doctor, concerning his diagnosis, his treatment and his opinion as to the prognosis for that leukemia.

MR. TREADON: Fine.

MR. SCANLON: That is what we

discussed.

THE WITNESS: That is correct.

MR. TREADON: Do you want to ask him something?

MR. MARMAROS: No, I'm here to listen to what opinions he's going to be offering.

MR. TREADON: I thought you were going to say something. I'll give you that opportunity.

MR. MARMAROS: No.

BY MR. TREADON:

Q. Doctor, I'm not going to ask you any questions about the standard of care or the treatment provided to Sharad during his stay at St. Thomas Hospital Medical Center. Can you tell me how you first became involved in his care?

A. Well, let me ask one more time.

Q. Sure.

A. I don't want to be in -- I don't want to be in an unusual -- in an awkward position. And if -- if this is the intent of any of you gentlemen, that you want me to render an opinion, I will be willing to do so but only if I'm provided with that information, unless you want an opinion.

Q. In other words, the charts from the hospital?

A. Yes. I think that that would be only appropriate, that would only be fair.

Q. And I agree with you.

A. Okay.

Q. I agree with you. When did you first become involved, and certainly you can refer to all the charts that you have there in front of you --

A. Thank you.

Q. -- with Sharad's care? Am I pronouncing that right, Sharad, or is it Shirad?

MR. SCANLON: How do you pronounce it?

DR. LAL: Sharad.

MR. TREADON: Sharad, all right.

THE WITNESS: Okay, all right. I believe I saw Sharad for the first time on February the 5th of 1991.

BY MR. TREADON:

Q. And how -- how did you become involved, was this a consultation?

A. This is as a consultation, that's correct.

Q. From whom, from which physician?

A. From Dr. Mubashir, as well as Dr. Francis, who is an infectious disease specialist involved in his care.

Q. All right. Tell me about what you did.

A. Well, I evaluated Sharad as a potential candidate for a bone marrow transplant procedure, which is a particular treatment option that has prospects of providing therapy with a curative intent.

One of -- you didn't go through my credentialing which is detailed in my -- in my CV, but for a number of years I have run the transplant program for the Case-Western Reserve University, and this is one of our tertiary care areas of expertise. And as the Director I evaluate many such patients for that particular type of therapy.

Q. All right. And what was the result of your evaluation?

A. I thought that he would be a very good -- really be an excellent candidate to undergo a bone marrow transplant, and discussed that procedure in specific detail with -- with his -- I believe his mother was there as well, both his father and his mother were all in the initial visit.

DR. LAL: Yes.

BY MR. TREADON:

Q. All right. And what -- what is the criteria, if you could in a summary form, for your determination that he was an excellent candidate?

A. Well, first of all he was -- he had acute myeloid leukemia. Leukemia is broken down into two major types, I'm talking about acute leukemia, myeloid leukemia and lymphoid leukemia.

Myeloid leukemia patients who have no active disease -- the words are complete remission -- who undergo marrow transplantation at that time have a very good chance of being cured of their disease.

Now, he was in what we would term the first complete remission, meaning that he was diagnosed, he received chemotherapy at St. Thomas Hospital and very promptly went into a complete remission, meaning that all signs and symptoms referable to the disease had disappeared. That's obviously the first step in determining that his disease is sensitive and that he could be a candidate.

Now, he was otherwise an excellent candidate in that he was a young man. He was 19 years of age, he had no other organ dysfunction or other medical problems, for example a heart failure or diabetes that couldn't be controlled or things of that nature, so that in my opinion that this was a very clear-cut case of a young man who could

tolerate this therapy with the prospects of being cured of this otherwise lethal disease.

Q. And did you make that recommendation to Dr. Mubashir?

A. I believe I sent Dr. Mubashir a long letter which, as our records indicate, I did, I sent Dr. Mubashir on February the 5th, 1991 a two-page letter describing his course, my findings and my recommendations for how to proceed. And the prescription that I -- that I offered was followed and subsequently he did undergo a bone marrow transplant.

Q. Okay. And that was done here at the University Hospitals?

A. Yes, in fact we provided interim chemotherapy to further lower the leukemia cell burden in his body. If you look at people who have leukemia, when they are diagnosed they have overt disease. After therapy the disease disappears, but we know that the disease will come back very, very quickly thereafter.

So we made the recommendation that he get additional therapy, which he received, and then he went on to a transplant. And both the transplant and the interim chemotherapy, which is

referred to as consolidation chemotherapy, were administered at University Hospitals.

Q. Could you describe for me what takes place when you do a bone marrow transplant?

A. The concept of transplantation is that larger doses of medication will get rid of more disease than smaller doses, but in administering larger doses of medication one damages normal tissues. Chemotherapy is not specific for malignant tissues and spares normal tissues, it's shades of gray.

And while normal tissues can tolerate chemotherapy significantly better than malignant tissues, there is damage and -- and one of the organs that is damaged most severely is the bone marrow, which is the organ that manufactures blood. So without regard for damage to the bone marrow, if a person received very high doses of therapy, that might eliminate disease but would result in the permanent inability to manufacture blood.

By putting bone marrow back into a patient's body after the completion of a high dose therapy, that will enable the patient to get around that marrow damage problem, that is, the bone marrow will grow back and the ability to

manufacture blood will return.

There are many ways of providing those cells, and they go by various names. If a person receives bone marrow from another person, generally a brother or a sister, who has the same bone marrow type we refer to as a -- as an allogeneic bone marrow transplant. As part of our initial determination we determined that Sharad did not have a bone marrow match among his brother -- among his family members.

Another option is to use a person's own bone marrow, which is referred to as an autologous bone marrow transplant, and that is a little bit different strategy. In that case the bone marrow is not normal, that bone marrow theoretically could still have leukemic cells contained therein, and what is done is that bone marrow, after it's removed from the patient, is treated with chemotherapy just as the patient is treated with chemotherapy, and that bone marrow is then given back at a later time.

And that part, the giving back of bone marrow, whether it's a brother's marrow or a sister's marrow or your own marrow, is the transplant. That -- that has little, if anything,

to do with -- well, that has little to do with the -- with the elimination of the leukemia. What eliminates the leukemia is chemotherapy, and high dose.

Q. As I understand it you removed Sharad's bone marrow?

A. That's correct. After he had recovered from the chemotherapy that we had administered, I believe six or eight weeks later -- I have to refer to my notes to be specific -- his bone marrow -- we attempted to collect his bone marrow and treat it with chemicals and then freeze it. It turned out that because of all of the treatment that he had received that we came up with what we thought was not sufficient bone marrow that would make us comfortable, in other words that we didn't have the wide margin of safety that we wanted, so we did two bone marrow harvests on Sharad.

In that -- and in that period of time we collected sufficient bone marrow that we were very confident that we would not have problems with that bone marrow growing back when we put it back in the patient. Again I remind you that the reason that this is of concern is that we are damaging the marrow by treating it with chemicals in order to

eliminate any potentially remaining malignant cells.

Q. Where do you harvest the bone marrow from, what site?

A. Bone marrow is harvested from the back of the hip bones, what we refer to medically as the posterior iliac crests. That's done in an operating room generally -- under general anesthesia. It's a very straightforward procedure.

Q. All right. And then how long do you treat the harvested bone marrow before it's implanted?

A. Well, the bone marrow, when it's obtained in the fresh state, is treated in the laboratory with chemicals, and that usually takes the better part of a whole day to do. Then the marrow is very carefully frozen.

If you've seen my laboratory next door, all the hardware to do that and the technical personnel are all under my supervision. That marrow is frozen and could be stored for long periods of time.

Then the patient is treated with very high doses of chemotherapy. The bone marrow is removed from these freezers where it's frozen about 300 degrees below zero Fahrenheit, and then that

bone marrow is infused, will recirculate through the blood stream and then start to produce blood cells.

Q. It is infused where, Doctor?

A. It's given through what's referred to as a central venous catheter. What that is is a semipermanent plastic intravenous device that's inserted into the shoulder that goes into the great vessels, and it's tunneled under the skin, and that allows us not only to give the bone marrow back, but it allows us very easy venous access for us to give the antibiotics and the many transfusions and the intravenous feedings that are necessary as part of the transplantation process, in other words to sustain the patient during the period when he or she has experienced lots of damage from the chemotherapy, the inability to eat and diarrhea, sores of the mouth, low blood counts and the risk of infection, et cetera, that -- that is how we provide supportive care.

And those central venous catheters, when they're maintained properly, can be -- can remain in a patient for months at a time and will -- and can be used on an outpatient basis to continue to administer transfusions or other things

that may be necessary as a result of the transplant procedure.

Q. How long does this procedure take, or how long did it take in this case from start to finish?

A. You mean the hospitalization?

Q. No, the -- from the time of harvesting the -- the bone marrow until the time it was then replaced back in -- into his body?

A. It's usually about ten days. It's a day to harvest the bone marrow and freeze it, and in Sharad's case he received eight days' of chemotherapy, and then there is a day of rest and then the bone marrow is put back in. So it's approximately ten days. I don't recall whether he --

Q. All right.

A. -- immediately got started on chemotherapy or whether it was another day of rest in there or not. I don't recall.

Q. Okay. After the bone marrow is -- is placed in his body then what happens in the course of treatment?

A. Then, as I detailed to you, the supportive care is critical because not only are we waiting for the bone marrow cells to recover, to grow back,

which generally takes, even with very sophisticated techniques, 30, 40 days to start to grow back, but we have to wait for the damage to the other tissues to wear off.

For example, there may be damage to the liver, there may be damage to the lung, there may be damage to the gastrointestinal tract as a result of the high doses of therapy, and with time these will -- these damaged organs will repair themselves. And when they are -- when the blood counts have returned to a sufficient degree, and the organ damage has lessened, then those patients are discharged and they're followed very closely in the ambulatory setting.

Q. Okay. Were there any postoperative reports -- complications in the case of Sharad?

A. He had a number of problems during the transplant period, some of which reflected his problems that he had had earlier. As I indicated to you, Dr. Francis was concerned that he might have had a -- an infection in his liver that would be of some concern, and I believe we did a liver biopsy to document that the liver bi- -- that the liver was in good shape.

He -- he had low blood counts. Can I

read to you from my --

Q. Well, did he have anything --

A. -- note?

Q. -- that you would not expect as a result of this procedure?

A. In other words, did he have any out of the ordinary --

Q. Yes, sir.

A. -- problems?

No, he had the usual stormy course, and that's why this is done at tertiary centers, centers that have lots of experience in dealing with these very sick people. But he did not develop anything that we would have considered unusual or out of the ordinary.

Q. How do you then determine the success of the -- or failure of the bone marrow transplant procedure? How do you monitor that and how do you gauge your success?

A. Well, it's -- it's a procedure that one has to define ultimately as a success being that the leukemia does not recur at any time. That's the -- that's our ultimate goal. This is designed as a curative -- this is a therapy with curative intent.

We perform analyses in the post transplant period, really monitoring that, that the toxicity of the therapy resolve. In fact, most of -- the toxicities were resolving quite nicely because, as I indicated in my last note to Dr. Mubashir, that I thought that Sharad could probably start back to college full-time in January of 1992, and that we would monitor him with diagnostic bone marrow examinations to ascertain whether the leukemia was -- was detectable.

If the leukemia were to come back at any time then that would reflect, you know, that the transplant did not eradicate all the cells. And my understanding is that he has, even to -- even till now has no evidence of -- of leukemia.

Q. Okay. You -- you noted before, or you testified before that your last note was October of '91. I presume, Doctor, that you continued to follow Sharad after he left the hospital?

A. I may -- you may have misinterpreted what I said. Let me clarify that. I said that I followed Sharad before his -- you know, at the beginning before his transplant, after his chemotherapy, and then after the transplant, and he had his bone marrow transplant, I think, on July

19th. Yes, he had his transplant on July 19th, 1991 and he went home, and I did see him in follow-up in conjunction with Dr. Mubashir.

Our policy at our center has always been to continue to maintain good contact with the referring physician, and have the patient make -- maintain good contact with the referring physician, so we generally follow patients jointly. We might see them the first week and the third week of the month, and then they might be seen by their local doctor the second and fourth week, something along those lines.

So we did continue to follow him after discharge, in conjunction with Dr. Mubashir and his group, but the last time that I believe I had actually seen him -- again this is now three months after -- the transplant was on October 3rd, 1991, at least that's what my last note in the chart is.

Q. Okay. And what was done on the October, 1991 visit, what were your findings?

A. I indicated here that he was two and a half months after the transplant, that we were continuing to administer med- -- medication to prevent the development of recurrence in his spinal fluid, what we call intrathecal therapy, where

methotrexate medicine is put into the spinal fluid as a preventive measure and that --

Q. For what purpose?

A. Again to prevent the development of leukemia in an unusual location. And he received that at that visit. I thought that -- that he was doing quite well other than the fact that he had the usual very slow recovery of -- of blood counts. His blood counts were still on the low side, but that was not totally unexpected given the difficulty that we had in collecting bone marrow from him.

Q. What is the significance of the difficulty?

A. Well, as I pointed out to you, there are some people who are more sensitive to chemotherapy than other people, and you like to collect an amount of bone marrow.

Q. Excuse me, Doctor, sensitivity as far as curative or as far as the toxicity, or the adverse --

A. Actually both --

Q. Oh, all right.

A. -- okay? His disease was sensitive to chemotherapy, as evidenced by the fact that he went

into remission quite promptly.

We can digress for a minute and describe the fact that there are types of leukemia wherein the disease does not go into remission -- does not go into remission promptly, requiring multiple courses or maybe perhaps more intensive courses, so his disease itself was sensitive.

Similarly, his bone marrow was sensitive to the toxicity of the chemotherapy in the sense that it required us two separate bone marrow harvest procedures to collect what we believed to be a safe dose of bone marrow to use. We did not do the bone marrow transplant after the first harvest because we didn't think we had enough cells, and we did a subsequent harvest, so we did two.

And so the fact that his blood counts when I saw him on October the 3rd, 1991 were still low was consistent with the fact that his blood counts reflected, you know, the toxicity from the treatment, and it was going to be a while before his blood counts came back up.

In point of fact we have a very lengthy experience, as do others, and some people it takes six, nine months. Some people linger until they

really get an adequate amount of blood counts. This is a very intensive treatment.

Q. Now, you indicated that you use diagnostic bone marrow biopsy, is that what you said, to determine if the leukemia has returned?

A. That's the -- the only tried and true way we have of assessing whether there is remaining disease in any patient, we do -- this is an outpatient ambulatory procedure.

Q. Was that done in October of '91?

A. If you'll permit me, I don't believe that I did a bone marrow at that time. I think he had -- I believe we had done one, I just have to refer to my notes here. Let's see. The last one I have that I did was on September 19th, 1991, which showed no evidence of leukemia.

Q. What's that procedure called, a diagnostic --

A. This is called a diagnostic bone marrow aspirant biopsy. So in my -- in his visit on -- on September 19th, 1991 I performed that exam, and that was -- that showed no evidence of leukemia.

Q. From where do you aspirate the bone marrow?

A. Again, from the back of the hip bones.

Q. And how often are the bone marrow biopsies typically done after the transplant procedure?

A. Well, it depends on the -- on the disease and depends on the type of treatment. In his situation probably every two or three months would have been the usual way that we would follow him.

Q. Was that done, to your knowledge --

A. Um-m --

Q. -- "that" meaning the diagnostic?

A. -- I know that he had had a couple of bone marrows subsequently, according to Dr. Hazra. Whether they did them religiously every two or three months I don't recall, because of his condition being what it was.

Q. Would that be the most definitive way to determine if there had been a recurrence of the leukemia?

A. They -- that's a way that gives you lead time. In other words, if someone has recurrent leukemia it has to start somewhere, and it starts in the bone marrow. If you do not do a bone marrow examination and you just ignore it, within a month, or certainly within two months, the blood counts would begin to reflect the leukemia, the blood counts would -- would be essentially back where you

started, either you'd have circulating leukemia cells that would be easy to find or the blood counts would -- well, I mean, you probably would have circulating leukemia cells.

Q. I guess you just lost me with that.

A. All right, I'll come back to that. If you choose not to do bone marrow examination, the bone marrow is where the leukemia lives. If and when the leukemia starts up again it will return and grow in the bone marrow.

Q. All right.

A. It grows in the bone marrow and grows in the bone marrow and grows in the bone marrow, and because the bone marrow has a blood supply, with time the leukemia cells in the bone marrow leave the bone marrow through the blood and circulate in the blood stream. So if someone has leukemia and you do not do a bone marrow exam within a month, or at the latest probably two months, you could detect a leukemia activity by just doing a blood test.

Q. All right.

A. We do this bone marrow examination for a variety of reasons. For one thing it gives us some lead time. In other words, we would know a month or two before it got really out of control, we

would be able to detect it in its more incipient stages of recurrence. Did that clarify?

Q. Yes, it does.

A. Okay.

Q. The last one that you were involved in, the biopsy, was in September of '91. Did you get reports from --

A. Yes.

Q. -- either Dr. Hazra or Dr. Mubashir --

A. Oh --

Q. -- with regard to subsequent biopsies? In other words, did you continue to follow that aspect of this patient's care?

A. I don't believe -- I could be wrong. I did not look through the chart with that intent. I do not believe I actually saw a report from Dr. Hazra, unless it's misfiled, that said his -- his leukemia is not active. Dr. Hazra did tell me on -- over the telephone, you know, that his -- that she had done a bone marrow, I believe, and there was still no evidence of leukemia.

Q. Do you remember -- do you recall when that phone conversation took place?

A. No, I'm sorry, I don't recall exactly. But it was a while later, I --

Q. It was sometime after November of 1991?

A. Yes, yes.

Q. All right.

A. That's correct.

Q. All right.

A. And I don't have a copy of that record. In my chart we try to get the referring physicians to send us data. Sometimes that's easier than others. We always try to provide a detailed letter when we evaluate a patient, on all visits.

Q. I've not gone through your chart in detail, Doctor, but what is the last activity as far as University Hospital is concerned or your involvement in Sharad's care?

A. I think again the October 3rd, 1991 is the last clinical note that I have on his care at this institution.

Q. All right. Do you have an opinion today as to Sharad's prognosis?

A. Well, I can tell you that he has not demonstrated evidence of relapse as far as I can tell from what I've been told by Dr. Hazra. He is -- his transplant was in July of 1991, so he has essentially a year and a half since undergoing his transplant, and if you review the data that we have

published, and others published in this area, the likelihood of relapsing after a year in -- in remission after transplant is vanishingly small. So my opinion is that I think beyond a shadow of a doubt -- I mean, it's beyond medical -- let me rephrase that, whatever the language is, beyond medical --

Q. You use the language you want to use, Doctor.

A. I don't want -- there is a possibility that lightning can strike this window.

Q. Well --

A. But I'm saying that it is extremely rare that people will relapse after this period of time having undergone a bone marrow transplant, such that I would say I would -- I would feel reasonably confident in saying that he is cured of his leukemia at this point.

Q. Define cure for me.

A. Cure meaning that -- that the leukemia will not recur in his lifetime, and hopefully under normal circumstances we would have liked to have seen him live another 50 or 60 years. I don't mean to say that I can guarantee you --

Q. I understand.

A. I want to rephrase that. I don't mean to say I can guarantee to you the disease will never come back. I think the probability of his disease recurring at this point is vanishingly small. It's very small given the numbers, in other words, when relapses may occur after this treatment.

Q. Assuming a normal life expectancy, you're sating then that at least as far as the leukemia is concerned you would not anticipate, or you think the chances would be very, very small that it would recur?

A. Yes, that's what I meant to say, correct.

Q. All right. You said it's rare that people, after a bone marrow transplant, will relapse after this period of time. I assume you're referring to the year and a half?

A. Year and a half, that's correct.

Q. Now my next question you've partially answered. Do you have any statistical data to -- well, let me ask it this way. What is the basis of your opinion?

A. The basis of my opinion is that there have been large numbers of patients treated in this fashion in remission, that is, people that have leukemia who go into remission, who get a bone

marrow transplant, that receive the type of treatment that we administered.

And I know these data because my -- as my -- my professional interest is in marrow transplantation I am active in publishing, active in participating in trials, and am a member of several of the national and in fact international boards that interact and present data. And the likelihood of relapsing, you know, for any treatment in leukemia is -- is something that's published, and this particular regimen has been very effective.

In fact again, our own personal experience along with that published in the literature would corroborate the statement that I made that it is quite uncommon for people to have late relapses after a bone marrow transplant using this approach.

Q. How long has bone marrow transplant been a procedure that's been used in the treatment of leukemia?

A. The earliest studies were done in the late 1960's, and systemically I guess from the early 1970s on larger and larger numbers of patients have undergone transplantation for leukemia, so that I

would say as a clinical tool this has been in practice at large centers routinely for more than 20 years.

Q. Do you have any specific studies you can refer us to that we could look at to -- that again support your opinion that there is an infinitesimal -- I can't recall the exact word you used -- very small chance --

A. Very small.

Q. -- of a relapse?

A. Yes, I can provide you with --

Q. Do any come to mind?

A. Well, we published a study in Leukemia reviewing the ECOG experience. ECOG is the Eastern Cooperative Oncology Group, which is a large consortium of prestigious medical centers that interact to do trials, clinical trials in oncology patients that include Johns Hopkins University, Mayo Clinic, University of Pennsylvania, Albert Einstein, a lot of prestigious centers, Stanford.

And our trial, which was essentially what Sharad -- Sharad was treated, in fact very similar, showed that -- that approximately -- that the long-term disease re survival was quite substantial. I can provide that to you. That was

published in Leukemia of this year.

There have been a number of studies published in the European literature looking at thousands of patients in the European transplant consortiums -- I'll get it in a second -- there have been studies in this country from Johns Hopkins. There are lots and lots of trials that -- where this has been looked at. I mean, if you gave me time I could provide you with easily a half a dozen of those references.

Q. If you wouldn't mind doing that I would like to see those, at your convenience.

A. Do you want me to do that now or at my convenience?

Q. No, at your convenience.

A. All right.

MR. SCANLON: I'll write him a letter reminding him for a list of references, and I'll pass it on to you.

BY MR. TREADON:

Q. And maybe what you consider some of the leading sources, and yours included, of course.

A. Are we talking about the specific type of treatment that Sharad received --

Q. Yes.

A. -- or just leukemia and transplantation in general?

Q. If you could make it more specific to his case.

A. I will provide you with whatever you want. I will provide you with a half a dozen or more articles describing the fact that relapse late in a transplant is quite uncommon after you're out a ways. I'm not saying in the early period. When you're out a year and a half, that's a pretty significant event.

Q. Okay. Yes, if you could do that, and Mr. Scanlon suggested --

A. Mr. Scanlon will remind me.

Q. Yes, he will. And I'll remind him if he doesn't remember.

A. Okay.

Q. Are you familiar with Sharad's current medical status aside from the leukemia?

A. By secondhand I'm familiar.

Q. Okay. You've not seen any of those records?

A. I've not seen any of that information.

Q. And you've -- strike that.

Absent the events that occurred at

St. Thomas Medical Center in November of 1991, what would you anticipate Sharad's course of treatment would be, or follow-up with regard to the leukemia?

A. In other words, if -- if this --

Q. After, from November on?

A. -- if they had gone on to returning?

Q. Yes.

A. In my last letter, if I can tell you what -- I --

Q. Certainly.

A. -- can tell you what I thought was going on. I wrote --

MR. MARMAROS: September 5th.

THE WITNESS: Let's see. I think -- I think I said that I anticipated that he would start school in January of 1992. And what did I say? Let me try to find the letter.

That would have been my -- my guess is that he would have returned to school and hopefully would have gotten on with his life. He still would have needed to have close medical follow-up for --

Q. That's what I'm asking.

A. -- blood counting, bone marrow examinations and the like.

Q. How --

A. We talked about that at length on several of the visits, about --

Q. What would be the frequency of those?

A. -- probably, again, for the first two years every -- every two or three months a marrow examination, blood counting, that -- that sort of thing.

Q. I note in your -- do you have your September 2 or, excuse me, September 5, 1991 letter there?

A. September 5?

Q. Directed to Dr. Mubashir.

A. September 5? I have September 19. September 5, okay, okay.

Q. Well, apparently there is a --

MR. TREADON: Excuse us for a moment.

(Short recess had.)

BY MR. TREADON:

Q. In your September 5 correspondence I note in the last full paragraph on the first page you indicate, and I quote, "As you know Sharad also had high risk for central" --

A. "Sanctuary site central nervous system relapse."

Q. What -- did you mean to say also at high

risk or had high risk?

A. No, exactly what I said I meant. And I described this to you earlier, that we had administered -- because this particular kind of leukemia, when it comes back, it can come back in the spinal fluid. And as a means of prevent- -- and it might not come back elsewhere. As a means of preventing that we administered chemotherapy after the transplant, and in fact one of the decisions as to how to treat him was to administer chemotherapy at this institution prior to the admission prior to the transplant with medication that would penetrate the spinal fluid, high rate cytosine arabinoside.

As part of our plan this is what we had done, the high rate cytosine arabinoside and later after the transplant methotrexate, which as a matter of fact I gave him on a couple of occasions. We did not demonstrate, by the way, that he ever had spinal fluid involvement, and as evidenced by clear spinal fluids all along.

Q. Is that spinal fluid involvement at a later time, would that be part of the -- of your opinion relative to reoccurence? In other words, could it reoccur in the central nervous system as

opposed to in the bones?

A. Oh, yes, certainly.

Q. Okay. Now, as I understand it the data you have relates to about 20 years of experience with bone marrow transplant, is that fair?

A. Well, the data that I've quoted to you are the world's experience in bone marrow transplantation where -- where beginning in about 1970 the patients with leukemia were systemically treated. And as the supportive care improved, and our understanding of treatments improved, new agents, et cetera, we got better and better and better such that in the late 60's, early 70's when we were -- and I wasn't doing this till the mid-70's -- people who had advanced end stage disease were being treated, and some of whom were being cured that this therapy got moved earlier and earlier and earlier into the disease -- into the course of the illness.

Q. Have these studies been able to follow patients for 20 year periods, is that what you're --

A. Well, some of the earlier studies clearly have -- have -- some of the very early studies have been followed, have patients that have been

followed for 20 years. The more recent studies --

Q. Obviously don't?

A. -- of course not. But -- but I like to -- in fact, if you permit me, I give a lot of lectures, I can show you a slide --

Q. Sure.

A. -- of a patient --

Q. I'd love to see it.

A. -- who, you know, of what we sort of expect. Here it is. I can show you some of -- again historically this is important to point out of what things look like.

This is a slide that I made that I need to update, it's an old slide, and it shows -- it's from 1983. It shows the treatment of these people who had really bad disease that was active, refractory end stage, who were alive now. Once they got -- most of these patients -- now, this is from 1983.

All of these patients are still in remission now, nine years later. The last one is eight years. So almost all of these patients are out 20 years if you can look at that slide, and that's from -- that's not -- those are not my data, those are data from the Fred Hutchinson Cancer

Center in Seattle. But from 1983, every one of those patients are still alive.

Again, starting -- again, those -- those patients started to be entered in 1970. I apologize I don't have a projector to show you.

Q. That's all right, I didn't anticipate that you would.

MR. TREADON: Doctor, that's all the questions I have.

MR. MARMAROS: I have a few, if I could.

- - -

BY MR. MARMAROS:

Q. Doctor, from going -- from going through your records the last letter I see that you authored was the one we talked about, I believe, on September 19th, is that correct, or --

A. Yeah. It's unclear to me why I didn't write a letter, or why I didn't have a letter in the file from October 3rd, but that's -- that's -- that's correct. The letter is the one I -- at least this chart is September 19.

Q. Let me, if that's okay --

A. As far as I can tell that's correct.

Q. Fine, okay. Let me start with -- and I'm

going to be a little more basic, and maybe that's because I need a little more basic. But let me start with your letters and see if I can understand a couple things.

On February 5 of '91, your letter, you talk about -- and we know that Sharad ultimately had an autologous bone marrow, correct?

A. Correct.

Q. All right. Did someone such as that, who has to have an autologous bone marrow, do they statistically or through your studies have a worse prognosis?

A. That -- that -- no. As it stands right now it is not at all clear that receiving -- this is what I defined for you earlier. An allogeneic transplant from a brother or a sister is preferable to an autologous transplant. Those kind of studies have not been done, they can't be done.

Q. Why is it -- go ahead. Why is it that always the first course of action is to see if there is a suitable donor instead of -- why don't you always do it autologous?

A. Well, that's a very complicated question to answer. I guess historically because allogeneic bone marrow transplant has been performed for a

longer period of time, and because it's -- I don't know -- maybe more scientifically appealing for some to do that. That's the general strategy.

Most studies -- and I am involved in one of the -- I was involved in the writing of the national study. There is a -- the United States has a big trial that's -- that's testing that exact concept, it is comparing allogeneic bone marrow transplants to autologous bone marrow transplants or other forms of therapy; and by -- I guess by tradition is a little strong for 20 years, but just by the practice that's how it's generally approached, that a patient under the age of whatever who has a brother or a sister that is a match is generally referred for an allogeneic bone marrow transplant.

That is not always the case, number one; and number two, there are individuals in whom have been reported -- and we have had our own experience -- who have gotten a bone marrow transplant from a brother or sister and have relapsed, and gotten bone marrow from themselves that have gone into remission and remained in remission longer than the first transplant. So they are not mutually exclusive, they are merely

complimentary.

Q. So you're not aware of any studies as we speak that talk about the lower instance of relapse when receiving a bone marrow transplant from a brother or sister as opposed to autologous?

A. No, I didn't say that, you're absolutely correct. Let me rephrase that.

Q. Okay.

A. These are -- there are more problems with doing allogeneic bone marrow transplants. There is the problem of what's called graft versus host disease where the donor bone marrow may attack the patient and may result in his or her death, and that's a much -- the people -- the early deaths from allogeneic bone marrow transplantation are much higher than with autologous bone marrow transplantation. So that's problem number one.

So if we put things on a ledger, and we say what are the advantages and disadvantages of both of these -- and this gets complicated -- an allogeneic bone marrow transplantation has the disadvantage of having graft versus host disease. You don't get that with autologous bone marrow transplantation.

So there is not going to be a problem

of either the bone marrow not growing, which is what we call failure to ingraft, which can happen with a brother or sister transplant, or the problem of graft versus host disease where the bone marrow may -- may severely damage or even kill the patient, you don't see that on the autologous.

On the other hand, the allogeneic bone marrow the donor is a totally normal person, so it is a normal bone marrow; and the autologous setting the bone marrow is not normal. As I told you, it's damaged bone marrow to begin with, and we damage it further by giving -- by giving chemicals, so the blood counts come back slower.

The other advantage -- the other disadvantage is that while there is graft versus host disease there is also what we call graft versus leukemia, meaning the normal bone marrow circulating in a patient, if it finds -- and I'm oversimplifying for purposes of illustration -- if it finds malignant cells still in the patient it may kill those cells, so that the people who get an allogeneic bone marrow transplant have a much lower risk of relapse --

Q. That's what I'm --

A. -- than an autologous, but they have a

much higher chance of dying of a complication, of an infection, because you have to use more immunosuppression for graft versus host disease than autologous, so when you start balancing things the advantages and disadvantages are such that it appears that they are similar in terms of overall -- overall outcome.

I cannot tell you that one is preferable to the other. I mean, people will argue well, it's a little better; no, it's a little worse. You can get the people -- but most people you can get to agree, based on recently published data, they're comparable, and it depends whether you have a donor or not.

Q. Well, all things being equal though, if you have your choice as the treating physician, because of the increased risk of relapse, aren't you going to opt for the identical or -- the identical bone marrow, to get it from a brother or sister, aren't you going to opt for that route?

A. Well, let me -- first of all no one has those data. I can tell you what the best situation we used to state was to have an identical twin. If you had an identical twin you have no graft versus host disease and you have normal marrow to put back

in. And in point of fact the relapse rates are highest with an identical twin, they are higher than with an autologous bone marrow transplant, so that there is something about --

Q. Okay.

A. -- getting autologous bone marrow also that is likely to result in a lower relapse rate, so that in fact is not accurate.

Q. Okay. The relapse rates that -- do you have literature with which you were going to provide Mr. Treadon --

A. Yes, I can provide you with that information.

Q. -- which relay higher incidence of relapse rates but lower --

A. Lower incidence of death due to complications.

Q. Understood.

A. Yes.

Q. Okay. In your March 22nd, 1991 transmittal, and I'm sorry, it's a transmittal from Dr. Gersden --

A. Say again, what?

Q. There is a transmittal of March 22nd, 1991 from Dr. Gersden.

A. Okay.

Q. Dr. Gersden indicates in the first full paragraph, it says, "Of note is the presence of a chromosomal translocation."

A. Uh-huh.

Q. He says T-911. What -- how does that impact upon prognosis, if at all? Maybe you can just explain to me what all that means.

A. Okay. Let me just put this in two broad categories.

Q. Okay.

A. When a person walks in the door off the street with leukemia -- and again I like to be on record to say that statistics are helpful if you happen to be a hundred people and you're in -- you know, so many are in one group and so many are in the other, but you can't be in both groups, you can't be a little bit pregnant. When we give people statistics it's useful, but it doesn't say which group you're going to be in.

When someone walks in the door we like to have an idea of, one, the natural history of the disease. Are there things we should be doing now so that when we get down the road we don't say "Gee, wouldn't it be nice, we should have thought

of this, you should have done that"; and second of all to get an idea of is someone at a high risk, a good risk, a low risk, should we be starting to gauge our therapy to do more intensive, less intensive.

In other words, it's just as bad to treat with a howitzer when you can use a fly swatter and vice versa. When they walk in the door we do a whole bunch of things, determine what their disease is, in this case leukemia, determine what sub-type of leukemia in broad categories, in this case myeloid leukemia rather than lymphoid.

And then to go further that there are seven or eight different kinds of myeloid leukemias, okay? It is not altogether clear that any one of them is any worse than any of the other ones, although there are unusual associations, one of which is the fact that Sharad had the so-called Fab M-5 myel- -- myeloid leukemia, which means that his particular kind of leukemia is a myositic leukemia, it's usually fingerprinted, we can look right into the cell and blueprint the cell with the chromosomes.

He has a translocation 911. In other words, those two go hand in hand, one is the

phenotype, one is the genotype. In other words, one is what the cell looks like, and the other is what the cell is on a blueprint, you know, the DNA.

The reason that's important is that, as I said earlier, he was at high -- he is early on at higher risk for central nervous system involvement, hence the need to look in his spinal fluid, hence the need that we would give him medicine that would get into his spinal fluid. That's why that was done. That's why he pointed that out, as did I, in dealing with such a patient you need to know that.

Once a person goes into remission it already tells us that the biology of the disease is that it is a sensitive disease, and all these things that predict good, bad or indifferent really are only useful when they walk in the door.

Once they've gotten treated and they're now in remission most of those things don't mean anything anymore. In other words, it's a whole set of different circumstances.

Q. Even if the patient continues to need transfusion?

A. Has nothing to do with that.

Q. Has nothing to do with that?

A. No, they're in remission. There is no

active disease. In other words, if he did not go into remission and his disease did not respond then you can say "Well, he had a monocytic leukemia, a Fab M-5, a risk resistant disease." You know it's a worse disease.

In fact it's a bell shaped curve. Some people are going to do well and some don't, and you can shift that curve based on prognostics. The fact that he went into remission quite easily, and that he has remained in remission for two years is -- you know, attests to the fact that he has a sensitive disease. And the fact that his -- that he was needing transfusions is more a reflex of the sensitivity of his normal tissues as well as his malignant cells to the treatment. That's not related to the leukemia.

Q. Okay. Like I said, I'm just listening.

A. I mean, if you want me to clarify it, if you need additional clarification I'd be happy to provide that for you.

Q. Well, my understanding is that someone who presents -- or someone who is diagnosed with acute monocytic leukemia has a more poorer, excuse my terms, poorer prognosis than a person who presents with a leukemia that is related to -- the term you

used was lymph- -- lymph- --

A. Let me back up. Let me clarify one step at a time.

Q. Okay.

A. Someone that presents with acute monocytic leukemia is -- is an, in quotes, poor prognosis leukemia, that is correct. That means that it's possible that they may not go into remission, or if they do so they may relapse early. That's clearly the case, okay?

Q. All right.

A. However, once you go into remission and you stay in remission that falls by the wayside. In other words, if I told you theoretically that you only had a 40 percent chance -- well, I'm making numbers up. Let's say you had a 40 percent chance of going into remission, and you had a 60 percent chance you weren't --

Q. Right.

A. -- based on all the predictors, and you went into remission. For you you're a hundred percent in remission. So once you go in remission those predictors fall out on an individual patient, it's not helpful anymore, you're in remission or you're not. That's what I -- the point I made

about being a little bit pregnant.

Q. So if the year is the cutoff --

A. I can't say a year is a cutoff. I think it -- that's not accurate. The -- this is complicated. The likelihood of someone relapsing after transplant takes all comers, okay?

And most of the data that you would look at, at least in our data anyways, it's less common to find someone relapsing, irrespective of what kind of leukemia they had, because I just told you once you go into remission all those things don't -- don't matter anymore.

Q. Okay.

A. And I'm not making it a black and white you get to 366 days you can breathe a sigh of relief, as opposed to 364 days. It doesn't work quite that way. But the longer you go in remission the less likely you are, especially after a transplant, of having the disease recur.

Q. Explain to me what is extramedullary involvement?

A. Okay. That's again an organ outside of the bone marrow, the bone marrow and the blood. The leukemia starts, we think, in the bone marrow, and spreads to the blood. And usually the disease

will -- well, extramedullary means the disease is now starting to involve organs that are not normally involved with leukemia, for example the lung, that's an extramedullary. "Medullary" is marrow, "extra" outside the marrow. A lung that's filled with leukemia, that would be an extramedullary. And in what context did you use that?

Q. Well, the reason I wanted to know is the type of leukemia that Sharad presented with, I want to say the mon- --

A. Monocytic leukemia.

Q. It's a monocytic variant of ANL?

A. That's correct.

Q. Okay. Does that carry with it a higher incidence of extramedullary involvement?

A. Yes, especially --

Q. Okay.

A. -- the brain.

Q. Are you aware of any data that is available for this type of leukemia in terms of survivability and cure and remission and --

A. If we -- if we separate that subset out?

Q. Yes.

A. If -- if we were discussing Sharad's case

three months after his transplant, I think it would be the arguments that you're making are -- are compelling. We don't know, we are basing that he is at high risk, et cetera, et cetera.

The fact of the matter is we are now looking at him a year and a half down the road, so most of those things start to fall -- you know, have really fallen out. There are studies --

Q. Okay.

A. -- that have reported monocytic leukemia as being a poor -- a worse prognosis leukemia.

Q. But -- but again that's a factor of time?

A. Again it's predicting -- if you asked me in the first quarter who is going to win the football game and I tell you, and then after the game is over you're going to ask me who is going to win the football game, I think that they obviously have different significance if we talk about a prognosis.

Q. Yes, but I guess what I'm asking is when is the game over with Sharad?

A. Well, what I'm trying to tell you is that in my opinion, and based on the opinion of others, that getting a year and a half out after transplant is in my -- is tantamount to the game being over.

I mean, maybe -- maybe there are ten seconds left to go or something along those lines, but it's pretty near the end, I mean as far as the cutoff of -- of feeling certain that the likelihood of the leukemia coming back is quite small. It's not zero, but it's small.

Q. Are you aware of any studies out there which -- I mean from reputable centers, you know, I'll name some of them, University of Michigan, Indiana University, University of Chicago, which disagree with that?

A. Which disagree with what?

Q. With what -- in terms of a long-term prognosis with a patient -- with patients who present with a monocytic variant of ANL in terms of survivability, relapses, all that?

MR. SCANLON: Well --

THE WITNESS: There are lots of studies. I think probably Minnesota, there is Stanford, and we can start listing centers. Again, many of the centers will report -- let's say you report a hundred patients, and fifty relapse or fifty are in remission, okay?

I mean, I'm not debating that there is a possibility that these things can happen; but if

we take -- if we follow the guy that's in remission and he goes two, three, four years, then I don't care what his prognosis was. If he's not relapsed, then he's not relapsed.

I mean, I -- there is literature -- if you want I can get some more information and we can look over the histologic variant as far as a predictor and how those people fair, but the fact is that if they're still in remission it doesn't matter what their risk was, they're doing well.

Q. Do you think the events as you understand what occurred at St. Thomas, not so much the events but Sharad's current condition, does that have any effect upon prognosis, in your mind?

A. I'm not sure I understand.

MR. SCANLON: The fact he's in a semi-vegetative state?

MR. MARMAROS: Yes.

THE WITNESS: The fact that he's in a semi-vegetated state, is that interfering in any way with what?

MR. TREADON: Does it impact?

BY MR. MARMAROS:

Q. Does it impact, does it improve, does it not, or how does it have any impact on his

prognosis, if any?

A. Well, I'm not an expert in -- in the coma vigil or persistent vegetative state, or the terms whatever a neurologist would use. I'm not a neurologist. I don't know if he's at higher risk for thromboembolism, pneumonias. I mean, I can't really render an opinion as far as --

Q. I mean --

A. -- as far as he's not active.

Q. I don't want to ask you that.

A. His life expectancy is diminished.

Q. As it relates to the leukemia.

A. As relates to the leukemia, I'm not aware of any studies where one can look at that.

Q. Like a lower metabolism rate, would that have any impact, for example, in your mind on --

A. I'm not sure he has a lower metabolism. I mean, he's not -- I don't know what his MET -- I don't know there is any data that says lower metabolism influences leukemia in any way, otherwise we'd be treating leukemia with thyroid medications and the like rather than cytotoxic drugs.

Q. Okay. Doctor, there was a bone marrow aspiration and biopsy done on September 19th of '92

which showed "Patchy cellularity five to fifty percent with hypoplasia involving all three cell lines." You wouldn't have that? I'm sorry, I thought you did.

A. I have that report if you'll permit me --

Q. Sure.

A. -- to refer to it, I did see it. It's in here somewhere.

MR. SCANLON: Are you talking about '91?

MR. MARMAROS: It must be '91. I'm reading from my notes.

THE WITNESS: It's September, 1991. Yes, I have that note.

BY MR. MARMAROS:

Q. Okay. Now, this -- if I'm not misunderstanding, okay, this -- this finding despite the fact that it's felt that Sharad's in complete remission at that time?

A. I -- I'm confused. This -- this report really reflects the fact he has no active leukemia.

Q. Okay. I'm going from notes, unfortunately, but the fact that --

A. Well, I can read you the report.

Q. Go ahead if you would, because I don't

have all the records here.

A. What is done in these cases is they always make a comment as to whether they -- how many blasts, leukoblasts they see. And under -- on the first page of that the pathologist says, "Blasts comprise less than five percent of cells seen by definition." That's less -- that's not leukemia. Would you like to look at the report?

Q. Could I?

A. This is what I read, right here where my thumb is.

Q. What is it -- can you explain that to me, I'm sorry, "blasts comprise less than five percent of cells"?

A. One of the definitions of leukemia or leukemia relapse is having more than five percent blasts in the bone marrow.

Q. Okay.

A. And they -- the pathologist put in there -- put in there indicating that there aren't more than five percent blasts, meaning there is no active leukemia as far as they can tell in that sample.

Q. Okay. Go to the second page though and explain that, if you would, to me where it says

under cellularity.

A. Okay. This is a marrow that's still growing back.

Q. It says --

A. "Cellularity was quite variable," meaning some of the areas of the bone marrow had grown back normally, some of the areas of the bone marrow were still regenerating from the cells we had put in previously, and that's why there is a marked variation.

The biopsy clot -- I'm sorry, the aspirant clot describes the cellularity as being twenty to fifty percent, and the -- the core biopsy, the actual biopsy -- again these are complimentary pieces of data -- varied from five to forty percent. So there are areas that were normally grown back and areas that were still thinned out because they hadn't grown back yet.

Q. I'm sorry, bear with me if you can. Where it says "Patchy" on there --

A. Yes --

Q. -- "With patchy cellularity" --

A. -- yes --

Q. -- "five to fifty percent" --

A. -- yes.

Q. -- "with hypoplasia involving all three cell lines," what does that mean?

A. That means that the bone marrow hasn't grown back completely. Some of the areas that -- there are three major cells in the bone marrow, three types of cells, and in the blood. There are the red blood cells that carry oxygen --

Q. Okay.

A. -- the white blood cells that fight infection --

Q. Platelets?

A. -- and platelets that aid in coagulation.

When someone says tri-lineal hypoplasia that means three, tri. The red cells haven't grown back completely, the white cells haven't grown back completely, the platelets haven't grown back completely. That's a descriptor that says the bone marrow is still thinned out.

I'm not sure why you're confused. Can you tell me what information --

Q. Well, because I interpreted that as being sort of -- sort of being contra to being that the fact that the patient was in complete remission at that time. I mean, that -- that set of interpretation that the patient that the

cellularity was patchy with -- and I won't restate -- it was sort of contra to the patient being in complete remission at that time. And if it's not, it's not.

A. I'm not sure exactly what your confusion is other than when we say someone is in remission do they have to have the marrow grow back? If that's what you're asking me, they have to have -- at the time the blood counts still weren't -- weren't totally normal, and the bone marrow had not grown back completely.

So if you're asking me does this fulfill the definition, at this point in time I would have to say no because the blood counts hadn't come back yet. I mean, they're still borderline low. But this is only two months -- not even two months after the transplant.

Q. Okay.

A. But there is no leukemia demonstrated at this point, and subsequently my understanding is there has never been leukemia demonstrated in this patient subsequently.

Q. From your records when did the -- did you begin the intrathecal methotrexate treatment?

A. I think we began that -- I think we only

gave him a few courses because we were concerned about suppressing his marrow further. I don't think he had a lot of intrathecal methotrexate treatments. I think he only received a few in the hospital and a few in the ambulatory area.

That was one of the reasons that we gave him the consolidation treatment with high doses of -- of cytosine arabinoside. That's a medication we have published and demonstrated excellent central nervous system transference. If you give it by vein, that drug goes right in the brain, even if you give it by vein. That's very effective in preventing of disease, as well as sticking the medication right into the spinal fluid.

I don't recall exactly how many intrathecal treatments of chemotherapy he had, I'd have to dig that out. I don't have that at my fingertips.

Q. Okay. In your June 24th, '91 transmittal there is reference to Sharad contracting hepatitis B, June 24th of '91.

A. Yes, I have that. Now, this is my note?

Q. Is it -- I didn't look who sent it. I think you signed it.

A. Yes, I signed it. Okay. Now, I said --

Q. Go ahead and read it because I just want to get an understanding of it if I can.

A. I believe -- okay. I'm not sure -- well, let me -- let me read this note out loud if you will. Let's see, well, I said -- I said here I saw Sharad -- I'm paraphrasing now.

Q. Sure, go ahead.

A. Pardon?

Q. Paraphrase, go ahead.

A. Oh. I said I saw Sharad on June 24th, 1991. He was diagnosed in December of 1990, he achieved a complete remission and he received intensive consolidation with cytosine arabinoside. He was to undergo a marrow transplant and harvest in May of '91, but insufficient marrow was obtained at that admission. He underwent a second marrow harvest in June of '91.

He comes in today to undergo marrow examination in anticipation of marrow harvest procedure scheduled for June 28th. We arranged for him to donate two units of whole blood as an outpatient.

I received notification from the American Red Cross that one of his own units is

reactive for hepatitis B surface antigen. This was of concern since when I saw him on May 23rd that he had a negative hepatitis surface antigen -- negative hepatitis C antigen on May 30. It is not clear to me whether this is a recent finding or artifact. Essentially I'm saying that he is now surface antigen positive liver -- hepatitis positive.

I have asked -- again I am skipping over this letter.

Q. Sure.

A. I asked Dr. Fred Webber of our G.I. service to consult on this patient when he's admitted on Thursday, June 27th, 1991. The regimen that we plan to use is that of busulfan -- this is for the transplant -- busulfan and cyclophosphamide. This regimen is highly effective in the treatment of leukemia as well as hepatic veno occlusive disease and hemorrhagic cystitis, and I give this reference in that article to Mr. Scanlon, busulfan stroke cyclophosphamide, but was not -- but was associated with increased incidence of hepatic veno occlusive disease, but there was no indication that other conditions such as hepatitis B surface antigen positivity was a risk factor.

Then I cited another reference. A recent review from the Fred Hutchinson Cancer Research Center in Seattle indicated patients positive with surface B antigen were not at increased risk for increase of severe liver disease after transplant. In fact, the group of patients reported in that series -- and I give the reference -- underwent allogeneic bone marrow transplant at the start of the test and had no incidence of liver hepatic failure. So basically I said that, you know, that shouldn't be a problem and I wasn't --

Q. Where did it come from, that's what --

A. Where did it come from, the hepatitis?

Q. The hepatitis B.

A. That's a good question. I didn't know at the time I saw him. As you know there is an incubation period, and it's conceivable that he got it from a contaminated unit, that it -- resulting in a subclinical infectious hepatitis infection, and that's what we are left with.

Where did it come from, I don't know. All of our donors are screened. He got blood in Akron, which presumably was also screened, and people can be in the so-called window period where a donor may actually be infectious but would test

negative.

Q. Okay. It's not related though in any event to -- absent the blood transfusion to the leukemia itself?

A. There is no relationship between --

Q. Okay. And is --

A. -- infectious hepatitis and leukemia if that's what you're asking me.

Q. Okay.

A. In fact, in the older studies the patients with leukemia who got infectious hepatitis actually did a lot better than the ones that didn't, and the message there isn't that it's good to get infectious hepatitis. It's if you live long enough with leukemia and you get enough transfusions you'll eventually get hepatitis. So that's not a related event.

Q. And you don't -- and that study supports -- and I have to look it up myself, obviously, but that study supports the fact that's not going to have an impact on his prognosis?

A. That's why -- I think you're getting the message from a pretty straight guy.

Q. I understand.

A. When I make a statement I make the

references to corroborate that statement.

Q. Doctor, if I give you a piece of paper -- and I hope I'm using the right terminology -- can you plot out for me a survival curve for Sharad, I mean upon presentation, and extend it out to however long a period of time you would like? Do you know what I mean by a survival curve?

A. Yes, I know what a survival curve is, but that usually is a population, survival curves like Kaplan-Meier or a survival -- actuarial survival curve, in other words percent surviving on a horizontal axis, and time -- I'm sorry, percent surviving on the vertical axis and the time on the horizontal axis.

Q. Okay. But can't --

A. I mean, that's what -- you usually do that for hundreds or, you know, populations of patients.

Q. Don't you do that for populations of patients who present with acute myositic --

A. Yes --

Q. -- leukemia?

A. -- yes.

MR. SCANLON: What he's saying, you don't do it for one patient.

MR. MARMAROS: But Sharad --

THE WITNESS: Each particular patient -- each mark on the curve is a patient.

BY MR. MARMAROS:

Q. Wouldn't Sharad be a member of that general population? I'm wondering if you can present for me, or draw for me, or give me a survival curve for that type of patient who presents with that type of condition, the same as Sharad when he presented, someone -- someone who has acute myositic leukemia?

A. Acute myo- -- sure.

Q. Monocytic leukemia, I'm sorry?

A. Acute monocytic leukemia, I don't know if -- I'd have to think about the possibility, the -- again, that's a probability though. That's just the probability that -- well, he would be -- he would be on that curve. I mean, he would be out a year -- two years out on that curve.

Q. Well, but do you plot those -- do you plot those out for five years?

A. You plot them out, I just showed you the slide, for 20 years, 25 years, 30 years. I mean, they go on as long as the curve is, as long as the last patient on the curve. If you're doing a study for two years, the curve is two years long. And if

you've -- I just showed you that curve that went out to 15 years. It's going to go as long as the last patient -- the patient who is on the study the longest, or who is in that cohort of patients the longest, that will -- that curve could go 50 years.

Q. I understand it's like liver transplants.

A. Right.

Q. But my -- my point is, and I'd like to see if I can start with your starting date, and if we can take someone like Sharad, who presents with that type of condition, the acute monocytic leukemia, and sure, some of it is retrospective, we may know some of the answers, but I'm wondering if you can plot that out for me in a survival curve, is that possible?

A. Off the top of my head I don't think I could -- I could really do that.

Q. Well, I mean, with -- with the factors that we know, that he has acute monocytic leukemia, that it was not -- well, it may not be important, autologous -- I mean all the factors that present with Sharad, can't we plot those out with the survival curve?

A. You're asking me to off the top of my head come up with a multi-variant analysis with a

probability -- either a Kaplan-Meier or an actuarial survival curve, and I think it would be a big guess on my part. I couldn't sit here and draw you a curve like that.

Q. All right. If I understand those curves, there are two ways to do those curves, it would be a survival curve and also a disease free?

A. Yes, there are a number of ways to do those curves. You can do event free survival, disease free survival, overall survival. Are you going to estimate the probability of survival, are you going to have actuarial survival? I mean, there is a whole statistical literature.

That's why -- I'm not trying to be cute about it, but it is really, you know, quite complex depending on what interventions have been undertaken. The survival of acute monocytic leukemia patients by in large is not great, hence we put them into the bone marrow transplant group.

Q. Okay.

A. And bone marrow transplant is a very powerful tool and good tool and may offset the fact that he had a poor prognosis. In other words, if you have the right tools to get rid of the disease that -- that is the way to go. That's -- that's

how -- that's generally how it's done.

In other words, if you knew someone was already cured if he had it, let's say he had a kind of leukemia and there are not too many of these, let's say there was a leukemia that you knew that -- childhood leukemia for example, okay, you brought this up earlier.

Q. Yes.

A. There are subsets of childhood leukemia patients that we know that they do so well if it's a girl, and it's between the ages of three and ten, and it's got a low white count at admission and doesn't have a mediastinal mass, doesn't have a big spleen, doesn't have an L cell phenotype, is CAL positive mass, normal immunoglobulin -- I can list about 30 different things -- you can create a patient or patients and say these kids are going to do so well that 90 percent plus are going to be cured with standard therapy.

If you knew that you wouldn't put a -- a very low risk patient, low risk for relapse, into a bone marrow transplant. In other words, if you're going to cure -- let's say if you're going to cure 90 percent of the patients the benefit of a transplant is probably not -- it's probably not

going to help you, you're going to be transplanting people that are already cured.

On the other hand you take people that are at very high risk for relapse, who with standard therapies aren't going to do well, get them into good shape, demonstrate they have disease sensitivity and then give your best therapy which is -- which is -- has a morbidity and mortality associated with it and transplant those people, in those people you have changed the natural history of the disease.

I just told you that formerly they were poor prognosis. If you get them into remission and now give them a curative therapy it ain't the same any more, all bets are off because now you're giving them a potentially curative therapy at a time when they're in good shape, and you will have altered the natural history. So that's why it's difficult to do what you're suggesting.

Q. Well, maybe I'm -- maybe I'm analogizing to like a breast cancer case but, you know, they can find no lymph node involvement, they can do anything they want --

A. Okay.

Q. -- 15 years from now.

A. That's absolutely right.

Q. It's right back there.

A. We can talk about diseases like breast cancer. Breast cancer, we talk in terms of ten year disease free survival in breast cancer. We realize women relapse 15, 20, 30 years later. It's common in breast cancer, women have two breasts, the phenomena is metachronous primarily, whatever led a woman to get cancer in this breast. When you treat people with breast cancer you don't do anything about the physiology or the makeup of that patient. How do you know that those same factors that led to the development of cancer in this breast didn't lead to the development of something starting in the other breast.

And in fact in breast cancer we don't really know, we don't have the studies in breast cancer that say by a certain period of time you get well, beyond a certain period of time you're okay or not okay. That's true in that disease.

On the other hand there are diseases like certain kinds of lymphoma, germ cell tumors, where we can say if you go beyond certain periods of time the likelihood of you having disease recurrence is extremely small. Germ cell tumors,

if you go a year after a germ -- I'm talking testicular tumor --

Q. I understand.

A. -- a year after completing your treatments in testicular cancer very, very, very small likelihood of having disease recurrence. And in fact at the University of Indiana their series are such if you go two years it's almost unheard of to have disease recur after two years. Similar data for Burkitt's lymphoma once you've gotten treatment.

So if there are disease models where we know with very narrow confidence levels if you have disease that stays inactive for a period -- finite period of time, the likelihood of cure is very good and we probably say they're cured. Other diseases we are not so sure, and breast cancer is probably the most striking example.

I think that we are dealing with a situation -- a former rather than a latter situation in the transplant. It's less likely that somebody will relapse once they're in remission once they get transplant therapy and once they stay in remission.

Q. Okay. Bear with me, I just have a few

more.

In your May 29th, '91 letter you talk about how you discuss with the parents the risks and benefits of autologous -- or the risks versus benefits of autologous bone marrow transplant?

MR. TREADON: What date?

MR. MARMAROS: March 29th.

THE WITNESS: Give me a second. Which letter is this?

BY MR. MARMAROS:

Q. Sure. March 29th, '91, it's just a one sentence thing. You talked about how you discussed with the parents --

A. March, '91?

Q. Yes. March 29th, I believe.

A. Oh, gee.

Q. Page two, Doctor, second full paragraph.

A. March 29th, okay. I again discuss the risks and benefits of an autologous bone marrow transplant with the patient and his mother.

Q. I just want to know what they are, the risks.

A. Oh, the risks of the transplant?

Q. Yes.

A. Well, we had him sign a consent form for

one thing which describes, you know, in lay language. But again the risks of a transplant are probably a little more substantive but similar to what is -- what are the risks for conventional chemotherapy, infection being first and foremost, bleeding or hemorrhagic manifestations, the potential for damage to the liver. Again, these we believe to be reversible or we couldn't perform this therapy. Damage to the lungs, some bladder -- damage to the bladder, those are the main risks.

There are, of course, other -- other risks, allergic reactions, the failure of the bone marrow to -- to grow properly and -- and/or the failure of the -- the transplant to eliminate the leukemia. Those are sort of --

Q. Okay.

A. That's encapsulated.

Q. May 23, '91 you wrote in there, and I'll paraphrase for you --

A. Please.

Q. -- that you gave Sharad at that time an -- approximately a fifty percent long-term disease free survival.

A. May --

Q. 23 of '91. First page, the last full

paragraph.

A. Gee, unfortunately I don't have that letter. I go from --

Q. Here, you can use mine.

A. Can I use yours?

Q. Sure.

A. It's probably in the other chart. Okay. Okay, that's the data I'm quoting from our ECOG study.

Q. Okay. When does that change?

A. I'm sorry, I don't follow your question.

Q. Okay.

A. I'm having problems this time.

Q. That's okay. At this point in time you gave Sharad approximately a fifty percent -- I don't want to misquote you -- a fifty percent. What did you say in the letter, a fifty percent --

A. I guess --

Q. Okay.

A. -- long-term disease free survival.

Q. Your percentages on the disease obviously changed. I want to know when it changed, at what point in time?

A. It changed because he hadn't done the transplant yet. What I was saying, out of a

hundred Sharad Lals brought in to my office in first remission, if we were subsequently to do a bone marrow transplant that half of them would eventually relapse or whatever, die of the treatment, succumb to the disease, and approximately half of them would stay in remission, okay?

Now we have one of those, one of those Sharads. We take and we say "Okay, where is he?" Well, he's still in remission a year and a half after his transplant.

Q. Okay.

A. That's why I think --

Q. I guess that's what -- that's what I -- I've probably never fully understood is two and a half years after remission, is that where you can safely say in your mind that that --

A. There are --

Q. Is there a distinct cutoff point in which you can say he progresses from not having a chance -- a significant risk of having a relapse to having a risk?

A. I don't think that it's -- I don't think it's ever black and white. I think it's -- it's a series of probabilities at all times. I mean, we

are -- you know, we are always faced with probabilities. The more patients you have in a study, the longer they're followed, the more information you have, the greater the certainty, in other words, the narrower the confidence interval you can say.

But that is again only useful when you talk about populations of patients. Anyone who is on a curve who is out a ways is probably a different patient than someone who is just starting.

Q. How far out a ways do you have to be in the curve, that's all I want to know?

A. How far out a ways? Our own data would probably suggest a year and a half to two years is pretty good.

Q. Okay.

A. I will provide you with -- I will -- I can't promise I'll get it to you tomorrow.

Q. That's okay. I can't promise you I'll read it tomorrow either.

A. I will get you a large series. I'll again point out to you there are two issues here of note. One, if you look at people who did not undergo a bone marrow transplant in leukemia that there

probably is not this -- this window that I've described. In other words, if you look at people who have leukemia who didn't get a transplant, those people may continue to relapse down the road. This is not seen in the transplant group, that there is something about that therapy.

Q. Is there something about that category of people that --

A. There is something about those people that you have changed the natural history of the disease. That's the point I'm trying to make, that really throws things --

Q. Okay.

A. -- into a different level. And the second thing is, again, it's a frustrating concept but you're always -- there is always a probability and, you know, for any one individual you just don't know whether they're going to be a zero or a one. In fact, it really comes down to a binary thing. So that's a tough concept. I'm not trying to be evasive.

Q. I'm not suggesting you are. On your curriculum --

A. This is yours.

Q. -- on your curriculum vitae you have a

number of articles that you've authored. Are any of the articles that you authored on point in terms of the subject matter we have been talking about?

A. Yes.

Q. Prognosis?

A. Oh, on prognosis for leukemia?

Q. Yes.

A. Prognosis, I think indirectly. I don't think that's been my focus. My main focus is treatment as opposed to prediction.

Q. Why don't you, if you can, if you can just read them by number off your CV in terms of which articles are on point?

A. Say again. You have my current CV.

Q. I don't think I do, but --

A. I just gave it to you.

MR. TREADON: Here it is. There were 120.

BY MR. MARMAROS:

Q. Are we talking about like nine percent of these articles are on --

A. I'm a transplanter. Most of my career is in terms of treatment --

Q. Okay.

A. -- with the results of what happens as

opposed to predicting how it's -- in other words playing the game as opposed to --

Q. Okay.

A. -- forecasting before the game.

Q. Okay.

A. I have a -- you know, I have a fairly long publication.

Q. I'm not going to ask you on 21 articles, obviously. I want to know if there are one or two articles that -- that you considered to be --

A. Relevant to him?

Q. Yes, relevant or representative of what we have been talking about.

A. Okay. This last article here, this one on page -- let's see, our ECOG experience, page -- what is it?

Q. 27?

A. 13.

Q. Okay. It's number 120?

A. Number 119.

Q. 119?

A. Uh-huh.

Q. This is my last question, and if you've answered this already you'll tell me and I won't -- and I'll be satisfied with that. In terms of -- of

quality of life down the road was Sharad, although being in remission, what -- what does he have to look forward to as relates to the leukemia in terms of treatment, et cetera?

A. Well, when we undertake a transplant it's with the understanding that this is the final insult, if you will. In other words, if -- if you get somebody into as low a tumor burden as possible to reduce the leukemia so it's no longer measurable, keep treating it, get it to the lowest level, come in with very intensive treatment with the hope and the realization in some patients you eliminate the disease and it will never come back. If we are successful in doing that he should have been restored to a productive, full life in the community, going on to college and going on to pursue whatever he wanted to do.

Q. My question is, is in terms of your involvement with that type of patient, I mean, does he come back to you on a yearly basis, do you --

A. Oh, he would -- we would probably gradually lengthen the interval. And again, as I stated earlier, we interact with the referring physician. There are still patients that -- that -- I mean, I don't want -- I don't know if I should

name names --

Q. No, you shouldn't.

A. -- in a deposition.

Q. You shouldn't.

A. But there are patients, that we followed with Dr. Mubashir, who come back to see us on a twice a year basis who are fairly far out in their disease. They see them, we see them. You know, we still keep following them. They always need to be under the peripheral care perhaps at this point of -- of a -- of someone in that regard.

Q. Who is Sharad's current physician who is fulfilling a role of Dr. Mubashir at the current time?

A. You mean right now --

Q. Yes --

A. -- at this point in time?

Q. -- yes.

A. I'm not aware. I understood it was Dr. Hazra. Is that not the case, or is that accurate?

DR. LAL: Yes, Dr. Hazra is following.

THE WITNESS: Dr. Hazra.

DR. LAL: You know, basically things have changed since this incident.

MR. TREADON: I understand that.

MR. MARMAROS: I understand.

BY MR. MARMAROS:

Q. It's Dr. Hazra?

DR. LAL: And Dr. Madlin. H-a-z-r-a. Madlin is M-a-d-l-i-n. She's a neurologist.

MR. MARMAROS: Okay. Fine, thank you. Do we -- this is off the record -- well, are you done? I'm sorry.

- - -

BY MR. TREADON:

Q. Just, believe it or not, I have a couple more questions. But really just a couple more.

Mr. Marmaros was asking you about drawing a curve, a survival curve. I think you answered this, but when do you go from a reasonable degree of medical certainty that there is a cure? Is there a -- is it a year or is it two years or is it a year and a half or -- or can you give me a --

A. Well, I don't think -- I don't think there have -- I don't think you can do that with a high degree of certainty. I think you can infer based on data. Our own data are such that a year, a year and a half in remission after transplant --

Q. Okay.

A. -- is pretty good. We have seen very few

relapses after that point. I did not say we saw none, but we saw few.

Q. I understand. What is your degree of certainty right now, 90 plus percent, 80 plus percent?

A. Certainly more than -- I would say it's probably in that range, somewhere around there.

Q. 90 plus?

A. 80, 90 percent, something like that.

MR. TREADON: That's all. Thank you.

Bill, if you could keep this, make it a part of this record.

Doctor, I'd like to have you read this if it's typed.

THE WITNESS: I plan on reading it.

MR. TREADON: Okay.

- - -

(Deposition concluded at 4:00 o'clock p.m.)

- - -

I, HILLIARD M. LAZARUS, M.D., do verify that I have read this transcript consisting of ninety-one (91) pages and that the questions and answers herein are true and correct with corrections as noted on the errata sheet.

_____
HILLIARD M. LAZARUS, M.D.

Sworn to before me, _____, a Notary Public in and for the State of _____, this _____ day of _____, 19__.

_____
Notary Public in and for the State of _____.

My commission expires _____.

C E R T I F I C A T E

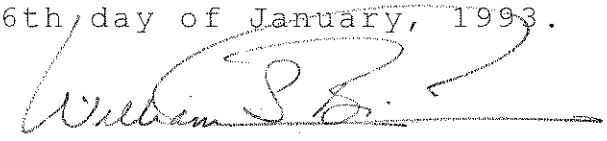
STATE OF OHIO,)
) SS:
SUMMIT COUNTY.)

I, William S. Bish, RPR/CM and Notary Public within and for the State of Ohio, duly commissioned and qualified, do hereby certify that the within named witness, HILLIARD M. LAZARUS, M.D., was by me first duly sworn to testify the truth, the whole truth and nothing but the truth in the cause aforesaid; that the testimony then given by the witness was by me reduced to Stenotypy in the presence of said witness, afterwards transcribed upon a computer; and that the foregoing is a true and correct transcription of the testimony so given by the witness as aforesaid.

I do further certify that this deposition was taken at the time and place in the foregoing caption specified, and was completed without adjournment.

I do further certify that I am not a relative, counsel or attorney of either party, or otherwise interested in the event of this action.

IN WITNESS HEREOF, I have hereunto set my hand and affixed my seal of office at Akron, Ohio on this 6th day of January, 1993.



William S. Bish, RPR/CM and Notary Public in and for the State of Ohio.

My Commission expires November 4, 1994.