

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MARYLAND**

JEFFREY HOBRATH et al)	
)	
Plaintiffs)	
)	
v.)	Civ. No. DKC 12-cv-0226
)	
YOUNGSIK MOON, M.D. (P.A.) et al)	
)	
Defendants)	

**MEMORANDUM OF LAW IN SUPPORT OF MOTION IN LIMINE
(DAVID ETTINGER, M.D.)**

This Memorandum of Law is submitted by Plaintiffs in support of their motion *in limine* concerning the testimony of David Ettinger, M.D., Defendant’s causation expert.

The case before this Court is a medical malpractice case which arises out of Defendant’s negligent failure to follow up on an abnormal chest x-ray dated 4/10/10 respecting Marion Hobrath, Decedent, and the radiologist’s recommendation that Defendant obtain a CT scan to evaluate the lung abnormality. Plaintiffs have alleged that Defendant’s negligence resulted in a 14 month delay in the diagnosis of Decedent’s cancer, and that the delay adversely affected decedent’s treatment options and prognosis. Plaintiffs have further alleged that Defendant’s negligence is the proximate cause of decedent’s death on 12/18/11.

Dr. Ettinger's Expert Testimony

Dr. Ettinger, a Johns Hopkins medical oncologist, has opined in his Rule 26(a) expert report that decedent already had Stage 3 lung cancer in April 2010.¹ Because Stage 3 lung cancer is incurable, Dr. Ettinger has opined that timely diagnosis of Decedent's cancer in April 2010 would not have affected her already poor treatment options or prognosis. Dr. Ettinger has further opined that timely diagnosis and treatment would not have prevented decedent's death on 12/18/11.

The basis of Dr. Ettinger's opinion is twofold: (1) his "doubling time" methodology which he used to extrapolate backwards from the date that Decedent's cancer was first diagnosed in June 2011 to estimate the date on which Decedent's lung cancer first spread to the mediastinal lymph nodes; and (2) his general knowledge and years of experience as an oncologist.

"Doubling time" is how long it takes a tumor, through the process of cell division and propagation, to double in volume. The concept is a component of the exponential model of tumor growth:

This hypothesis was first suggested by Collins *et al* in 1956. The hypothesis assumes a tumour to start from a single cell. This cell then divides to become two cells, each of which divide to become four, eight, sixteen and so on. If this process goes on at a constant rate, then the tumour growth will be exponential and its volume at any time can be easily calculated. The simplest way to describe the

¹ Stage 3 lung cancer is cancer that has spread regionally to the lymph nodes. At his deposition, Dr. Ettinger testified that Decedent actually had Stage 4 cancer in April 2010. Stage 4 lung cancer involves distant metastasis. Stage 3 patients have a somewhat longer life expectancy than Stage 4 patients. Both Stage 3 and 4 lung cancer, though, is incurable. Dr. Ettinger's Rule 26(a) report is attached hereto as **Exhibit A**.

growth rate is the volume doubling time – the time taken for the tumour volume to double. Exponential tumour growth is analogous to the exponential decay of a radioactive isotope. Growth is described by doubling time where decay is described by half-life.

DM Geddes, “The Natural History of Lung Cancer: A Review Based on Rates of Tumour Growth”, Br. J. Dis. Chest (1979) 73, 1 [hereinafter “Geddes”].²

The doubling time concept has a variety of applications in clinical medicine. For example, in the context of cancer screening or surveillance, if the observed doubling time of a suspicious nodule exceeds a designated threshold value, the patient may be referred for further diagnostic testing. A tumor’s doubling time may also be used to determine treatment options for some types of cancer (not including lung cancer) [Ettinger Depo. 87:12 – 88:1].³ As will be explained more fully below, none of the accepted uses of doubling time methodology in clinical medicine involve extrapolation backwards in time to estimate the date on which a cancer may have originated.⁴

Because the actual growth rate of the cancer in Decedent’s mediastinal lymph node is unknown, Dr. Ettinger had to make an assumption concerning this variable.⁵ He selected a doubling time of twenty (20) days [Ettinger Depo. 54:19 – 55:5]. Not

² Dr. Ettinger attached the Geddes article to his expert report as a reference.

³ Dr. Ettinger’s deposition transcript is attached hereto as **Exhibit B**.

⁴ Geddes points out that the exponential growth model assumes that tumor growth is a straight line. This assumption can lead to bizarre results. For example, some tumors have observed doubling times that are so long that backwards extrapolation leads to the absurd conclusion that the tumor began many years before the individual was even born.

⁵ The growth rate of Decedent’s primary tumor can be estimated, using the size of the tumor in April 2010 (as shown on the chest x-ray) and in June 2011 (as shown on CT scans obtained at that time). During this 14 month period, the volume of the primary tumor doubled approximately every 60 days.

surprisingly, this value supports his conclusion that Decedent had a small number of cancer cells in the mediastinal lymph node - “nine, ten cells there” – in March 2010.

[Ettinger Depo. 84:6-7]. Dr. Ettinger explained his methodology as follows:

... At the time of surgery the mediastinal lymph node was 2.2 centimeters at its greatest diameter, and actually about 30% of it was necrotic, and that’s where the tumor was. I assumed 30 percent of the 2.2 centimeter lymph node that contained cancer was actual cancer, so one-third of .66 centimeters, and then I calculated assuming a 20 day doubling time, which is one-third of [the primary tumor doubling time] because usually the metastatic component goes faster. I went down to 3/10 and she had some cells in the lymph node then. On 4/10 there were even more cells, and I did the calculations for that.

[Ettinger Depo. 51:19 – 52:10].

The fatal flaw in the doubling time methodology, as applied to the case *sub judice*, is that no facts or data support Dr. Ettinger’s *assumption* that the doubling time of the cancer in Decedent’s mediastinal lymph node was 20 days. As will be explained more fully below, there is no evidence in Decedent’s medical record that supports this assumption. Moreover, there is no medical literature, research, study, or data which describes the range of observed growth rates for metastatic lung cancers. In short, the growth rate of lung cancer in the lymph nodes is unknown. ⁶

Argument

Rule 702 of the Federal Rules of Evidence sets forth criteria to be applied when a court determines whether to allow expert opinion testimony:

⁶ Dr. Ettinger also made an assumption concerning the size of the malignancy in the mediastinal lymph node in June 2011, based on the size of the necrotic area within the lymph node. Because there are no direct measurements of the size of the cancer in the lymph node, Dr. Ettinger’s assumption is an additional source of potential error in his analysis.

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

(a) the expert’s scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;

(b) the testimony is based on sufficient facts or data;

(c) the testimony is the product of reliable principles and methods; and

(d) the expert has reliably applied the principles and methods to the facts of the case.

When evaluating proffered expert testimony, trial judges act as gate keepers to “ensure that any and all scientific testimony ... is not only relevant, but reliable.” *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 588 (1993). A trial judge, faced with a proffer of expert scientific testimony, must conduct “a preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue.” *Daubert*, 509 U.S. at 592 – 93. When making this assessment, the court may not rely on the expert’s opinion that his methodology is reliable. A more probing inquiry is required. The proponent of the testimony must establish its admissibility by a preponderance of proof. *Id.* at 592 n.10.

Daubert sets forth a non-exclusive checklist of factors the trial court may consider when determining the reliability of expert testimony. These factors include: (1) whether the expert's technique or theory has been tested; (2) whether the technique or theory has been subjected to peer-review and publication; (3) the known or potential rate of error applicable to the technique or theory; (4) the existence of standards and controls

applicable to the technique or theory; and (5) whether the technique or theory is generally accepted in the scientific community. *Daubert*, 509 U.S. at 593-94.

In *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 150 (1999), the Supreme Court noted that the factors discussed in *Daubert* are neither definitive nor exhaustive. The Court explained that particular factors may or may not be pertinent in assessing reliability, depending on the nature of the issue, the expert's particular expertise, and the subject of his testimony. *Id.* The Court further emphasized that the objective of *Daubert's* gate keeping requirement is to "make certain that an expert ... employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field. *Id.* at 152.

The Fourth Circuit Court of Appeals has emphasized two sometimes competing principles that should guide the trial court's Rule 702 review of proffered expert testimony. On the one hand, Rule 702 was intended to liberalize the introduction of relevant expert evidence. Thus, the court's gate keeping function does not require it to determine whether the expert's opinion is irrefutable or certainly correct. On the other hand, the court must recognize that because it is difficult to evaluate expert evidence, expert witnesses have the potential to be both powerful and quite misleading. Given the potential persuasiveness of expert testimony, proffered evidence that has a greater potential to mislead than to enlighten should be excluded. *See Westberry v Gislaved Gummi AB*, 178 F.3d 257 (4th Cir. 1999); *United States v. Dorsey*, 45 F.3d 809, 815-16 (4th Cir.1995).

Dr. Ettinger's testimony reveals that his opinion respecting the date when Decedent's primary cancer spread to the lymph nodes is not supported by any facts or data.

Thus, Dr. Ettinger has acknowledged that the point in its natural history when a localized lung cancer spreads to the lymph nodes is unknown:

Q. Would you agree with me that there is no medical literature that establishes at which point in its natural history a primary non small cell lung cancer spreads to the nodes?

* * * * *

A. I don't know of any literature that talks about at what point in time it spreads. We have data on how fast tumors grow and things like that, but specifically when it spreads ... I don't know the answer to that. I have not seen that in the literature.

[Ettinger Depo. 42:4 – 43:3]

Dr. Ettinger has further acknowledged that metastatic cancer in the lymph nodes grows at a faster rate than the primary tumor:

Q. The growth rate of a metastasis can be different than a primary tumor?

A. It usually is. Solid tumors are heterogenous, meaning they have mixed types of cells. The faster component usually metastasizes.

[Ettinger Depo. 75:1 – 75:5].

There is no medical literature, data, or statistics, though, that describes the growth rate of metastatic non small cell lung cancer:

Q. Is there any literature, data, or statistics that describes the growth rate of non small cell lung cancer in the nodes?

A. Not that I know of.

[Ettinger Depo. 76:7 – 76:10].

Accordingly, Dr. Ettinger concedes that the 20-day doubling time upon which he based his analysis is an *assumption* which is unsupported by any facts or data:

Q. Did I hear you testify that as to the nodes, there was a 20-day doubling time?

A. Metastatic disease is a 20-day doubling time.

* * * * *

Q. Is there any data or literature that would support that?

A. *No data*. I could have taken the 60 days, and there would be more cells there. I could have took (*sic*) the 30 days, and there would be more cells there. Could it be ten days doubling time? It's highly unlikely. That would be almost like a leukemia.

Q. But the one-third or the 20 day is an assumption?

A. Yes.

[Ettinger Depo. 54:20 – 55:19]. Thus, although metastatic tumors are known to grow faster than primary tumors, how much faster they grow is unknown. Also unknown is the relationship, if any, between the growth rate of a primary tumor and its metastasis.

Although Dr. Ettinger stated his belief that a doubling time faster than 20 days is “unlikely”, the admitted absence of any literature, research, data, or statistics concerning the growth rate of lung cancer metastases means that he has no reliable basis for his belief.

Furthermore, the growth rate of an individual tumor is not constant over time. A tumor's growth rate is faster during the unobservable microscopic phase than during the clinically visible mature growth phase:

Q. Is it true that the growth rate for lung cancer can vary over time with patients?

A. Normally actually it grows fast initially and then gets slower as it gets bigger ... That's correct, it varies over time. It's what they call Gompertzian growth, fast, slow, fast, You're absolutely correct.

[Ettinger Depo. 72:20 – 74:10].⁷ As will be explored more fully below in connection with an examination of Dr. Ettinger's actual doubling time calculations, he did not take into account the variability in individual tumor growth rates over time. This is a further indication that his doubling time methodology is overly simplistic and misleading. His methodology is analogous to clocking the speed of a car in heavy city traffic, and then using the measured speed to determine when the car started its trip a number of miles away on an open highway.

The *Daubert* factors also weigh heavily against a determination that Dr. Ettinger's doubling time methodology is reliable:

- ***Whether the expert's technique or theory has been tested.***

Dr. Ettinger admits that the doubling time methodology, when used to extrapolate backwards in time, has not been and can not be tested:

Q. The doubling time methodology ... involving extrapolation backwards, that can not be tested, can it?

A. It probably can not be tested, that's correct.

Q. Because we cannot go back in time to perform a biopsy to see whether there was a cancer present or not?

A. That's correct.

[Ettinger Depo. 91:5 – 9].

⁷ According to Geddes, the Gompertzian model, in which tumor growth slows as the tumor gets larger, describes tumor growth more accurately than the exponential model which Dr. Ettinger used.

- ***Whether the technique or theory has been subjected to peer-review and publication.***

Dr. Ettinger admits that the doubling time methodology has not been subjected to peer-review and publication:

Q. Well, would you agree with me that the mathematical model that you use for doubling time in this case for determining the presence of a tumor at a remote point in time in the past, that methodology has not been subject to peer review

–

A. That's correct.

Q. – or publication?

A. There are articles written on the doubling time, but it's not in the journals that normally you look for it, like the Journal of Clinical Oncology. It's probably more *legal journals or things like that*.

[Ettinger Depo. 90:12 - 91:2].

- ***The known or potential rate of error applicable to the technique or theory.***

Because doubling time methodology, when applied retrospectively, can not be tested, there is no known error rate applicable to this technique. Because there is no literature, research, data, or statistics concerning the growth rate of lung cancer in the lymph nodes, the potential rate of error applicable to the retrospective doubling time methodology is enormous.

- ***The existence of standards and controls applicable to the technique or theory.***

There are no standards and controls applicable to the retrospective application of doubling time methodology.

- ***Whether the technique or theory is generally accepted in the scientific community.***

Dr. Ettinger admits that doubling time methodology, when used to extrapolate backwards in time, has no application in clinical medicine:

Q. I'm asking you about extrapolating backwards using doubling times. That has no application in medicine?

A. That's correct.

[Ettinger Depo. 88:2 - 5]. Similarly, doubling time methodology is not used by medical oncologists to determine the prognosis of lung cancer patients:

Q. But the doubling time methodology that you testified to is not used for determining the prognosis of a lung cancer patient?

A. That's correct.

[Ettinger Depo. 89:9 – 12].

There have been a number of cases in which either the court or a testifying expert has criticized the doubling time methodology when used to extrapolate backwards to determine when a cancer first appeared. These cases buttress the conclusion that the methodology is not generally accepted in the medical community. *See, e.g., Maher v. Quest Diagnostics, Inc.*, 269 Conn. 154, 847 A.2d 978 (2004)(applying *Daubert* standard, court concluded in cervical cancer case that doubling time methodology is not accepted as well established principle within relevant community of gynecology or oncology).⁸

⁸ In *Quest Diagnostics*, the court collected cases in which either the court concluded or a medical expert testified that doubling time methodology is not generally accepted in the medical community. *See Keir v. United States*, 853 F.2d 398, 403 (6th Cir. 1988)(expert witness testimony that doubling time for intraocular cancer is “elusive, as some grow quickly and others grow slowly”); *Waffen v. United States Dept of Health & Human Services*, 799 F.2d 911 (4th Cir. 1986)(plaintiff’s expert conceded that lung cancer doubling time was not recognized generally by medical community as method for determining prognosis or modality of treatment; defendant’s expert indicated that doubling time was “widely unaccepted for prognosis because it was speculative and had

The Advisory Committee Notes to the 2000 Amendments to F.R.Evid. 702 enumerate additional factors that are applicable to the determination whether a proposed expert's methodology is reliable:

- ***Whether experts are proposing to testify about matters growing naturally and directly out of research they have conducted independent of the litigation, or whether they have developed their opinions expressly for purposes of testifying.***

Dr. Ettinger admits that doubling time methodology, when applied retrospectively, is only used for litigation purposes:

Q. Is it true that the doubling time methodology to determine whether a tumor existed at some point in the past is performed for legal purposes only?

A. That's correct....

[Ettinger Depo. 87:6 – 11].

- ***Whether the expert is being as careful as he would be in his regular professional work outside his paid litigation consulting.***

Attached hereto as **Exhibit C** is the Appendix to the Geddes article. The Appendix sets forth both the exponential and Gompertzian growth model equations for

essentially no clinical data to validate its application to any one individual”); *Crane v. Scribner*, 369 Md. 369 (2002)(plaintiff's expert testified that doubling times could be used to give theoretical estimate as to date tumor begins growth but that such estimate was not “exact science” because “many cancers are not truly spherical and ... doubling times may not be constant through the process”); *Hebert v. Parker*, 796 So.2d 19 (La. App. 2001)(plaintiff's expert testified that doubling time theory is problematic in that it presupposes that tumors are all homogenous cell type with same growth rate while in reality tumors are heterogeneous with different growth propensities); *Thors v. Boska*, 38 Cal. App. 3d 558 (1974)(expert witness testimony that doubling time theory for plaintiff's breast cancer was unreliable “in any single human case” because many different factors affect growth rate of cancer).

determining a tumor's doubling time. These mathematical formulas are obviously complex and beyond the ken of anyone who is not a skilled mathematician.

Attached hereto as **Exhibit D** is Dr. Ettinger's handwritten calculation of the doubling time of the cancer in Decedent's mediastinal lymph node. This calculation is the basis of his opinion that Decedent's tumor had already spread to the lymph nodes in April 2010. Comparison of the mathematical equations in Geddes with Dr. Ettinger's handwritten calculation reveals that Dr. Ettinger did not even attempt to use the applicable mathematical formulas when he calculated the doubling time of Decedent's metastatic cancer. When asked about this, Dr. Ettinger candidly admitted that he is not a mathematician and does not know how to use the applicable formulas:

Q. So you did all your calculations by hand; right?

A. Yes.

Q. There is no computer software involved or formulas or equations?

A. *I wouldn't know how to use it.* I'm not a mathematician. That's why I went into medicine.

[Ettinger Depo. 86:12 – 86:18]. Dr. Ettinger's testimony reveals that he did not even attempt to apply the doubling time methodology in a reliable manner. His superficial and overly simplistic work product would be rejected as inadequate and unprofessional by his colleagues in the medical community. Dr. Ettinger's doubling time analysis does not reflect the same high degree of care that he would apply to his regular professional activities at The Johns Hopkins University.

Scientific data, research, or analysis that is spurious is commonly referred to as junk science. Notably, Dr. Ettinger admitted that he himself may have testified in other

cases that the doubling time methodology which he utilized in the case *sub judice* is junk science:

Q. My question is whether you've ever testified that doubling time methodology is junk science.

A. I may have said that.

[Ettinger Depo. 92:3 – 6]. Dr. Ettinger's candid admission that his methodology is unscientific should dispel any lingering doubts that this Court may have concerning the unreliability of Dr. Ettinger's causation opinions.

Dr. Ettinger has further testified that he performed a doubling time analysis only to confirm his belief that Decedent's cancer had spread to the lymph nodes in April 2010. He contends that his causation opinion does not rely on his doubling time analysis

[Ettinger Depo. 85:1 – 2]. When asked to provide the basis for his opinion, other than his doubling time analysis, Dr. Ettinger essentially testified that his opinion is based on his knowledge and years of experience as oncologist:

Q. I'm asking about facts and data other than the doubling time analysis that would inform your clinical experience as a doctor in reaching a conclusion that Ms. Hobrath, her cancer had spread to the lymph nodes as of April of 2010.

A. As I said, the data is that she had a large – the alleged delay is 14 months. She had an enlarged lymph node in the mediastinum. It had to get to that size in the mediastinum. In my opinion based on how tumors grow, what I know about lung cancer, what I know about her tumor specifically, do I think to a reasonable degree of medical probability that lymph node was involved with cancer? The answer is yes. Was it smaller in amount? The answer is yes, but it was there. What data do you want?

Q. Well, that's what we're here to find out. What is the basis? What is the data?

A. That's the data, my knowledge and what I know about her cancer.

[Ettinger Depo. 60:16 – 61:14].

If the witness is relying solely or primarily on his experience, then the witness must explain how that experience leads to the conclusion reached, why that experience is a sufficient basis for the opinion, and how that experience is reliably applied to the facts. There is nothing in either *Daubert* or the Federal Rules of Evidence that requires a district court to admit opinion evidence that is connected to existing data only by the *ipse dixit* of the expert. See *Kumho Tire Co. v. Carmichael*, 119 S.Ct. 1167, 1176 (1999).

If the doubling time analysis is stripped away, the only remaining basis for Dr. Ettinger's causation opinion is his *ipse dixit*. In essence, the basis of Dr. Ettinger's opinion that Decedent's cancer had already spread to the lymph nodes in April 2010 is "because I said so". This is an insufficient basis for admitting an expert's opinion.

For all of these reasons, Plaintiffs respectfully request that this Court enter an order in limine excluding Dr. Ettinger's expert testimony in its entirety.

Date: 2/22/2013

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