

Exhibit 517

Expert Report of Richard F. Ambinder, M.D., Ph.D.
Allan Howard v. United States
7:23-cv-00490
U.S. District Court for the Eastern District of North Carolina

Prepared By:

A handwritten signature in black ink, appearing to read 'R. F. Ambinder', written in a cursive style.

Richard F. Ambinder, M.D., Ph.D
April 8, 2025

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Expert Report of Richard F. Ambinder, MD, PhD

I have prepared this report in response to the United States' request for my opinion as a medical oncologist specializing in lymphoma and hematologic cell transplantation as to the cause of Allan Howard's diffuse large B-cell lymphoma. Based on my review of Mr. Howard's case history, I conclude that it is unlikely that exposure to contamination in water at Camp Lejeune, where Mr. Howard was stationed from September 1977 to February 1979, caused Mr. Howard to develop diffuse large B cell lymphoma. In my opinion, the origin of Mr. Howard's diffuse large B-cell lymphoma is idiopathic.

Qualifications

I am a board-certified medical oncologist specializing in lymphoma and hematologic cell transplantation. I lead the Hematologic Malignancies and Bone Marrow Transplant Program at the Johns Hopkins Oncology Center, and the Lymphoma Clinical Service at the Johns Hopkins Hospital. I am a full professor with an endowed chair: the James B. Murphy Professor of Oncology. I graduated from Harvard College with a Bachelor of Arts degree with honors and the Johns Hopkins School of Medicine with an M.D. degree, again with honors. I earned a Ph.D. in Pharmacology at the Johns Hopkins School of Medicine, and I trained in Internal Medicine and Medical Oncology at the Johns Hopkins Hospital. I am board-certified in Internal Medicine and in Medical Oncology. I have received many honors including the Leukemia Lymphoma Society Scholar Award and the Stohlman Scholar Award. In addition, I am a member of two honorary societies: the American Society for Clinical Investigation, and the American Association for the Advancement of Science. While each of these awards and honors are somewhat different, they all attest to the quality of the research that I have done in the field of lymphoma. I have published many chapters in medical textbooks focused on lymphoma and its treatment including in UpToDate. I am an organizer of national and international meetings, give lectures at national and international meetings, and lead many lymphoma-focused grants. I have been awarded research grants from the National Cancer Institute totaling more than 25 million dollars over the years including \$8 million dollars for studies related to the diagnosis of lymphoma for the years 2023-2028.

I teach courses for medical students and graduate students in the Johns Hopkins Medical School, and lecture in courses in the Johns Hopkins School of Public Health and the Johns Hopkins School of Nursing. I have led the Lymphoma Clinical Service at Johns Hopkins since 1995. I supervise the clinic at which lymphoma patients are seen at Johns Hopkins, and the clinical training of resident physicians and hematology and oncology fellows in the treatment of lymphoma. I also lecture in courses to update community oncologists and internists. I treat patients in clinic and consult on questions from physicians in the community relating to lymphoma. I serve on the National Cancer Center Network guideline panels that make recommendations for the diagnosis and treatment of cancer including panels focused on non-Hodgkin lymphoma, Hodgkin lymphoma, and AIDS malignancies. I also sit on the National Cancer Institute Lymphoma Steering Committee that helps prioritize clinical research studies.

My current curriculum vitae is attached as Appendix A. It includes a list of my publications for the last ten years and a list of all other cases in which, during the previous four years, I have testified as an expert at trial or by deposition.

Preparations & Methodology

I base these opinions on my review of relevant literature and case materials, including the Complaint by Mr. Howard, medical records relating to Mr. Howard's case, deposition transcripts, medical literature relating to causes of lymphoma, and expert reports submitted by both the United States and plaintiffs' counsel. In reaching my opinions, I relied on my clinical experience in the care of patients with lymphoma and other hematologic malignancies; my experience investigating the biology and the epidemiology of lymphomas in the laboratory and in clinical, pharmacologic and epidemiologic studies, and on my reviews of the scientific and medical literature. Additionally, I employed a differential diagnostic approach to systematically consider and exclude known causes of non-Hodgkin lymphoma.

My opinion relies on the United States' general causation report by Goodman, *Trichloroethylene, Perchloroethylene, Benzene, Vinyl Chloride, and trans-1,2-DCE Exposure and NHL Risk*, February 7, 2025; and the United States's specific exposure and risk assessment reports for Mr. Howard, *Expert Report of Judy S. LaKind*, April 8, 2025; *Expert Report of Dr. Lisa Bailey*, April 8, 2025. My opinion also considers the United States' general causation reports by McCabe, *General Causation Report Camp LeJeune Water Volatile Organic Chemicals and Non-Hodgkins Lymphoma and Leukemia*, February 7, 2025, Lipscomb, *Expert Report of John C. Lipscomb*, February 7, 2025, and Shields, *General Causation*, February 7, 2025. I have also reviewed the January 20, 2017, ATSDR Public Health Assessment for Camp Lejeune Drinking Water, United States Marine Corps Base Camp Lejeune, North Carolina, and the report by Dr. Hoppe that was submitted by plaintiffs' counsel.

Compensation

I charge \$700 per hour for case review, \$1,000 per hour for deposition testimony, and travel expenses.

Lymphoma Background Information

Lymphomas are cancers of lymphocytes[1]. Lymphocytes are part of the body's immune system. There are several classification systems: World Health Organization (WHO)[2] and the International Consensus Classification (ICC)[3] have each published classifications in 2022. Malignant cells proliferate and accumulate in lymph nodes or extranodal tissues. When the proliferation/accumulation occurs in solid masses this is typically referred to as lymphoma. When the proliferation/accumulation is primarily in the blood, it is typically referred to as leukemia. As elaborated below, many entities may involve solid masses and blood and so the classification system of lymphoma, leukemia and some related lymphoid related diseases overlaps.

Hodgkin lymphoma (HL) and non-Hodgkin lymphoma (NHL) are the two main types of lymphoma. HL is characterized by the presence of Reed-Sternberg cells, which

are recognized by their distinctive appearance. NHL lack Reed-Sternberg cells and have a different appearance under the microscope. NHL is subclassified based on the cell of origin (B-cell, T-cell, NK-cell), the patterns of arrangements of cells under the microscope (which we refer to as histological features), and genetic characteristics such as chromosomal translocations and specific mutations. More than 60 types of NHL are recognized including chronic lymphocytic leukemia (CLL). The most common type in adults is diffuse large B cell lymphoma (DLBCL).

Each type of lymphoma has distinct characteristics, and the prognosis and treatment options vary depending on the specific type and stage of the disease.

Incidence

NHL accounts for approximately 4% of cancer diagnoses in the United States[4]. B-cell NHL comprise 85-90% of NHL cases. There are approximately 100,000 new cases B-cell NHL including CLL diagnosed in the United States each year[5]. In the United States population, the lifetime risk of developing B-cell NHL is approximately 2%.

Pathogenesis

In terms of pathogenesis, it is important to understand a bit about B lymphocytes, what they do and how they develop [6]. B-cells may be likened to factories that produce antibodies, which are special proteins that help fight off diverse invaders like viruses and bacteria. In order to generate antibody diversity, B cells undergo somatic hypermutation and class switch recombination during their development. These processes involve breaking and rejoining of DNA strands which create opportunities for genetic errors that can lead to development of lymphomas.

Chromosomal translocations where chromosomes break and rejoin other chromosomes are frequently identified in B-NHL. These translocations often involve the immunoglobulin loci and various genes that regulate cell proliferation and cell death. Follicular lymphoma, Burkitt lymphoma and mantle cell lymphoma all have associated characteristic chromosomal translocations. These translocations are thought to result from errors in normal developmental processes that involve breaking and rejoining DNA strands. In addition to translocations, the processes for generating antibody diversity also lead to mutations. The enzyme that produces these mutations usually acts on particular regions of the immunoglobulin genes, but can act on distant genes and in so doing also contribute to lymphoma development.

Staging

It is standard practice to assess how widespread the lymphoma is at presentation and whether there are specific symptoms associated with the lymphoma[7]. This is called staging. Lymphomas are typically staged according to the **Ann Arbor staging system**.

Stage I: Involvement of a single lymphatic area (e.g., one lymph node region or one extranodal site).

Stage II: Involvement of two or more lymph node regions on the same side of

the diaphragm, or one lymph node region and a nearby extranodal site.

Stage III: Involvement of lymph node regions on both sides of the diaphragm, which may also include the spleen or a nearby extranodal site.

Stage IV: Disseminated involvement of one or more extranodal organs, such as the bone marrow, liver, or lungs, in addition to lymph node involvement.

When there is direct extension from a lymph node to an extra-lymphatic site such as bone, that is referred to as an E-lesion.

Performance Status

The functional or performance status of patients is typically evaluated at the beginning and during therapy[8]. Several different scales are often used, but among the most widely used is the ECOG (Eastern Cooperative Oncology Group) performance status. It is a scale to measure the patient's ability to perform daily activities.

ECOG Performance Status Scale

- 0: Fully active:** Able to carry on all pre-disease performance without restriction
- 1: Restricted in physically strenuous activity:** Ambulatory and able to carry out work of a light or sedentary nature (e.g., light housework, office work)
- 2: Ambulatory and capable of all self-care:** Unable to carry out any work activities. Up and about more than 50% of waking hours
- 3: Capable of only limited self-care:** Confined to bed or chair more than 50% of waking hours
- 4: Completely disabled:** Cannot carry on any self-care. Totally confined to bed or chair
- 5: Death**

Causation

In most instances the causes of NHL are poorly understood [9]. Genetic mutations are associated with many cancers including lymphomas. These mutations may be inherited or may develop specifically in the cells that will ultimately become cancerous. There is increased risk of lymphoma in people with first degree relatives (parent, child, sibling) with lymphoma but most people with lymphoma do not have first degree relatives with lymphoma. When there are family members with lymphoma, typically predisposing mutations are not identified but there are exceptions [10]. Thus individuals with the Li-Fraumeni syndrome (mutations in TP53) inherit a predisposition to lymphoma, although other cancers are much more common in this syndrome [11]. Similarly, mutations in BRCA1 and 2 have also been linked to increased risk of lymphoma, especially in children and adolescents—but these mutations are more commonly linked to breast and ovarian cancer.

When causes of lymphoma are known, they are often associated with particular types of lymphoma rather than lymphoma in general. Consider Epstein-Barr virus (EBV) [12]. This virus was first discovered in African Burkitt lymphoma, a specific type of non-Hodgkin lymphoma. Because viral DNA is consistently found in African Burkitt lymphoma cells, it is generally accepted that the virus is a cause of African Burkitt lymphoma. However, the story is much more complicated. See Expert Report of Michael McCabe (February 2025) at pp. 15-16.

We know that almost all adults worldwide (>90%) are infected by the virus, and once infected, the virus never leaves the body. We also know that if you test the saliva of a general population on any given day, approximately 40% will be shedding the virus in their saliva. What seems to make children in certain regions of Africa especially susceptible to this lymphoma is that they live in areas where almost everyone has malaria. How malaria, the virus, and perhaps other factors interact to cause the tumor is a subject of ongoing research, but the answers aren't very clear.

What is clear is that most people diagnosed with lymphoma have this cancer-causing virus in their bodies[13]. However, the virus isn't the cause of most lymphomas; it is associated with only a small subset. This subset doesn't represent a percentage of all the different types of lymphomas but relates to particular types of lymphoma. For example, in people living with HIV before the advent of effective antiretroviral therapy, the risk of lymphomas of the brain (primary central nervous system lymphomas) was increased hundreds or thousands of times[14]. These lymphomas always carried EBV. However, in people without HIV, these lymphomas are very rarely associated with the virus. Moreover, most lymphomas in the world are not related to EBV, even though most people in the world are infected by the virus.

HIV infection and Hepatitis C are two other viral infections linked to B cell lymphomas[15, 16]. There is a broad consensus that splenic marginal zone lymphomas may be hepatitis C related but there are some investigators who believe that virtually any sort of B-cell NHL may be hepatitis C related. Other NHL that involve T cells are associated with a virus called HTLV1[17]. This is a virus that is prevalent in very specific geographic regions (certain areas of Japan, central Africa, Caribbean islands, certain native populations in South America). Among individuals who have been infected by this virus, approximately 2-5% will develop adult T-cell leukemia/lymphoma. Worldwide, most T-cell NHL is not associated with this virus.

Breast implant-associated anaplastic large cell lymphoma is rare lymphoma is associated with particular types of breast implants [18]. This type of lymphoma only occurs in people with breast implants—but the great majority of people with breast implants never develop this type of lymphoma.

A few B-cell NHL types have been linked to bacterial infection, most notably gastric MALT lymphoma which is linked to *Helicobacter pylori* [19]. Infection with this bacteria which lives in the stomach is usually not associated with symptoms or disease,

and more than 40% of the adult population is infected by the bacteria [20]. When it causes symptoms these are usually ulcers. But in a tiny fraction of those infected, MALT lymphoma of the stomach develops. Often these lymphomas can be treated and even cured with antibiotics. Most MALT lymphomas of the stomach are associated with this bacteria [21]. However, MALT lymphomas occurring elsewhere in the body are not associated with this bacteria and treatment with antibiotics to eradicate this bacteria have no effect on these other lymphomas. This is despite the fact that many people with MALT lymphomas outside the stomach are also infected by the bacteria.

When considering age as a risk factor for lymphoma, the particular type of lymphoma is important. For example, while it is true that diffuse large B cell lymphoma occurs more commonly as people age (median age 67 with 30% of patients are older than 75)[22, 23], the same cannot be said for primary mediastinal B cell lymphoma which usually occurs in younger patients (median age 37)[24]. And Burkitt lymphoma in equatorial Africa occurs mainly in children ages 3-15[25].

The same is true for sex [26]. Primary mediastinal B cell lymphoma is less common in men than women (0.71 incidence ratio) while diffuse large B cell lymphoma is more common in men than women (1.56 incidence ratio).

With regard to studies of environmental exposures to benzene, trichloroethylene, perchloroethylene, and vinyl chloride, I have relied on the expert report prepared by Goodman. In particular, Dr. Goodman noted that among the four studies that evaluated NHL risk at Camp Lejeune, there were no consistent associations reported for NHL overall or any specific type of lymphoma. See Goodman (February 2025) at pp. 44-49.

When trying to identify the cause of a lymphoma, it is essential to consider the specific type of lymphoma and the evidence that a particular factor is associated with that specific type. The oversimplification that all lymphomas or all NHL share the same causation leads to serious errors. See Expert Report of Michael McCabe (February 2025) at pp. 26-27.

Diffuse Large B Cell Lymphoma (DLBCL)

DLBCL is the most common lymphoma in the United States [27]. It is typically diagnosed by biopsy of a mass. It is estimated that there are 77,240 new cases of NHL in the United States annually and that 30-40% are DLBCL. The rate in White males in the United States is 6.7 per 100,000 per year[28]. Most cases occur between the ages of 65 and 74. A recent review listed established risk factors for DLBCL in a table reproduced below as Exhibit 1[29].

Established risk factors for DLBCL	
Risk factors	Risk association
	* = OR <2.0
	*** = OR >2.0
Family and person history	
Family history for any heme malignancy	*
Family history of DLBCL	***
Personal history of cancer	*
Genetic susceptibility	
Inherited immunodeficiency syndrome	***
Organ transplants	
Autoimmune conditions	*
Sjogren's syndrome	
Systemic lupus erythematosus	***
Rheumatoid arthritis	*
Infections	
HIV	***
KSHV/HHV8	*
HCV	*
HBV	*
Anthropometric measures	
Adult BMI	*
Young adult BMI	*

Exhibit 1: Established Risk Factors for DLBCL

The same review indicates that the risk of developing DLBCL increases with age as shown in Exhibit 2 below [29].

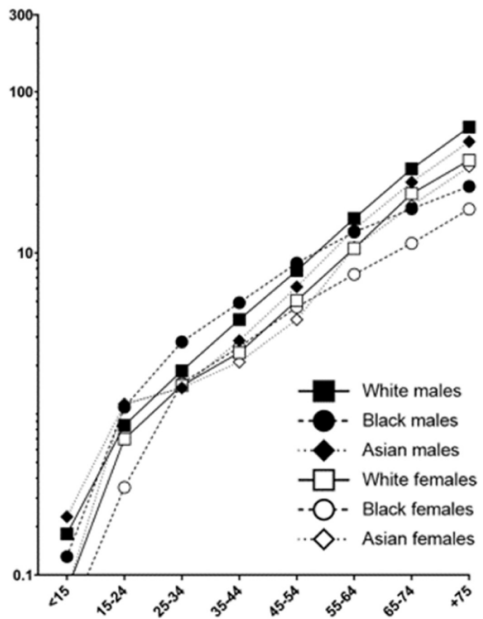


Exhibit 2: Incidence of DLBCL by Age

People with compromised immune systems are at a higher risk of developing DLBCL[29]. Among them are transplant recipients, people on immunosuppressive medications, and people with genetic immunodeficiency syndromes.

Autoimmune conditions are also associated with increased risk of lymphoma [30, 31]. These include rheumatoid arthritis, systemic lupus erythematosus, Sjogren syndrome, and autoimmune thyroid disease. A study of patients with autoimmune thyroid diseases showed that 7% developed lymphoma with DLBCL being the most common [32].

Certain infections are also linked with risk of DLBCL[29]. Epstein-Barr virus (EBV) and Kaposi sarcoma herpesvirus (KSHV, also known as HHV8) are linked with DLBCL, especially in conjunction with HIV infection or other immunocompromise. As in the table above, the risk associated with HIV is particularly high. The risk of DLBCL in HIV patients is 10.3-fold greater than in the general population. Before there was effective antiretroviral therapy it was estimated to be 650-fold greater. Hepatitis C virus (HCV) has also been linked to DLBCL with a recent estimate of a 2.7-fold increased risk. Bacterial infection with *Helicobacter pylori* is specifically related to gastric lymphoma including DLBCL.

Family history of DLBCL or other lymphoid malignancy is also associated with increased risk[32].

Obesity is a risk factor[28-30]. In a multivariate model to predict the risk for diffuse non-Hodgkin's lymphoma in patients with a high BMI (>35 kg/m²), compared with a normal BMI (<25 kg/m²), the OR was 2.15 (CI, 1.09–4.25) [31].

With regard to the hypothesis that exposure to certain chemicals and substances may increase the risk of DLBCL, I have relied upon the report from Goodman who concluded that there was no consistent association reported for DLBCL and such exposures.

Prognostic Factors.

Analysis of patients treated with RCHOP led to a prognostic classification referred to as the Revised International Prognostic Index (R-IPI)[34] that is widely used to assess DLBCL risk groups. Patients are divided into 3 risk groups according to number of risk factors. Risk factors are age >60, elevated LDH, Ann Arbor stage III/IV disease, ECOG performance status ≥ 2 , and >1 extranodal involvement site, as shown in Exhibit 3, below.

Risk Group	4-year progression-free survival, overall survival
Very Good (0 factors)	94%, 94%
Good (1-2 factors)	80%, 79%
Poor (3-5 factors)	53%, 55%

Exhibit 3: Revised International Prognostic Index DLBCL Risk Groups

Treatment

DLBCL is often curable with combination chemotherapy and sometimes with

radiation or chemotherapy combined with radiation [27]. A standard chemotherapy is R-CHOP (rituximab, cyclophosphamide, doxorubicin, vincristine, and prednisone)[35]. Each of these drugs except the prednisone is administered intravenously. Typically, there is one treatment every 3 weeks (one cycle) for a total of 6 to 8 cycles. There are some variations that are also used for treatment involving many of the same drugs. One of these is Pola R CHP which is approved for patients with IPI ≥ 2 [36]. Outcomes are shown in Exhibit 4 below.

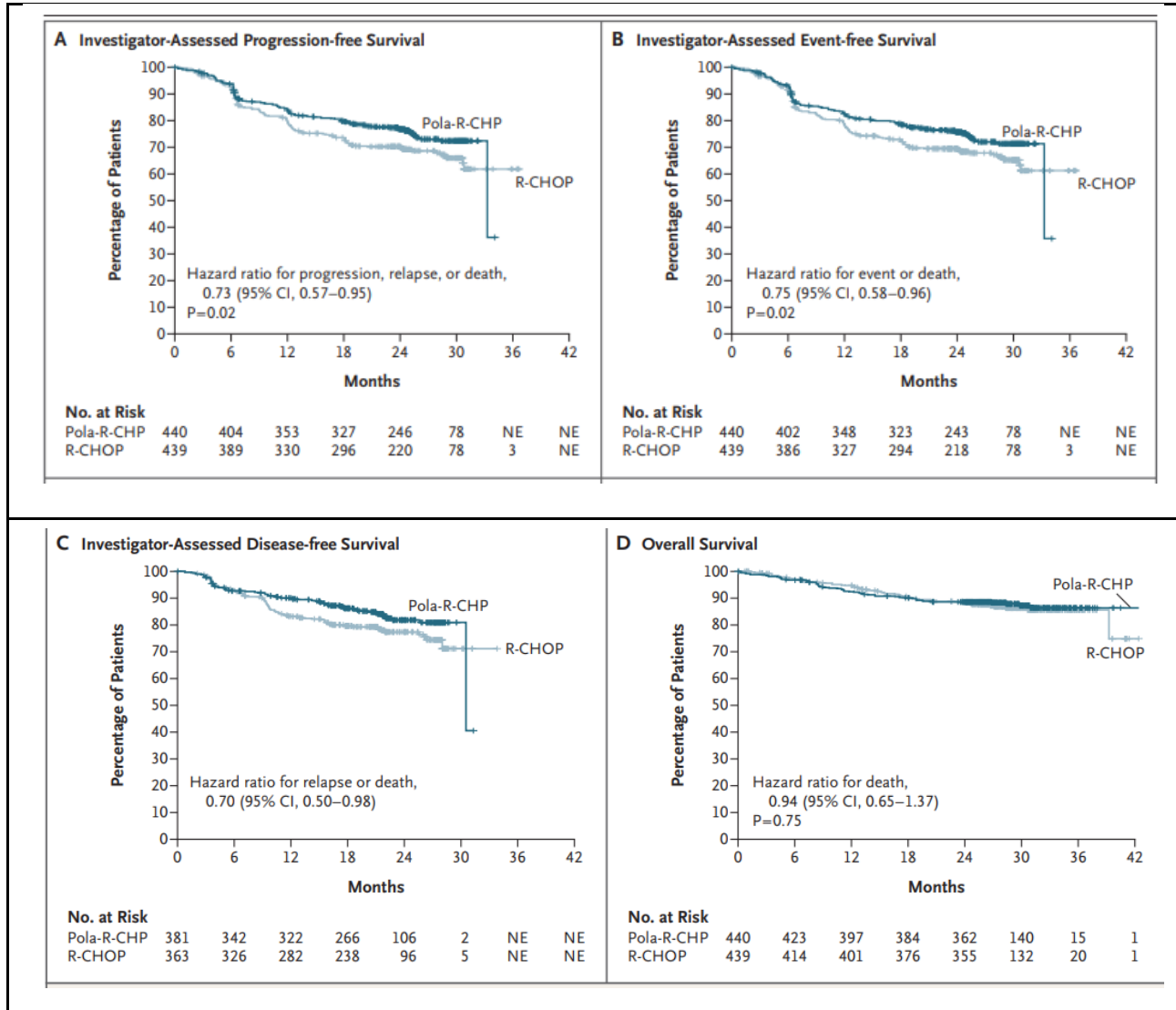


Figure 2. Kaplan–Meier Estimates of Efficacy End Points. In the analysis of investigator-assessed progression-free survival, investigator-assessed disease progression and disease relapse or death from any cause were counted as events. In the analysis of investigator-assessed event-free survival, an event was defined as investigator assessed disease progression or relapse, death from any cause, initiation of any antilymphoma treatment that was not specified in the protocol, or biopsy-confirmed residual disease after treatment completion. In the analysis of investigator-assessed disease-free survival, investigator-assessed disease relapse or death from any cause were counted as events. Tick marks indicate censored data. NE denotes not able to be evaluated

Exhibit 4: Kaplan-Meier Estimates of Efficacy End Points by Treatment

For those who fail to achieve a complete remission (disappearance of all evidence of tumor on physical exam and scans) or who relapse there are further therapies to try to achieve cure or slow down the progression of the lymphoma [27]. These may involve more combination chemotherapies with other agents, hematopoietic cell transplantation, genetically manipulated T cells that attack the tumor, and bispecific antibodies. Many of these approaches to treatment are new within the last several years and the outlook for patients with these lymphomas who have failed initial therapy has substantially improved very recently.

When tumor is no longer apparent on physical exam and by imaging studies, we refer to that as “remission”. Among those who achieve and maintain remission for 2 years with RCHOP, achieving event-free survival at 24 months, the cumulative risk of relapse at 5 years is 9.3%, and at 8 years, 10.3%[37].

Allan Howard’s Pertinent Medical History

Mr. Howard was stationed at Camp LeJeune from September, 1977, to February, 1979.

In 2008, at age 49, he was diagnosed with renal cell carcinoma and underwent right radical nephrectomy. He did not receive chemotherapy. Thereafter he underwent routine surveillance imaging.

In 2015, he was diagnosed with hypothyroidism and subsequently started on levothyroxine replacement

In 2020 he suffered a cardiac arrest, was resuscitated and found to have a saddle pulmonary embolus.

In summer 2023, at age 63, he was found to have enlarged inguinal lymph nodes that did not respond to treatment with antibiotics. Further evaluation with CT scan 8/14/23 showed enlarged nodes in the left neck and supraclavicular region. Biopsy suggested a B-cell lymphoma and PET CT on 9/25/23 showed lymphadenopathy above and below the diaphragm. Right inguinal node core biopsy on 10/9/23 showed DLBCL, GCB type. FISH studies did not show rearrangement of BCL2, BCL6 or MYC. LDH was normal. He was treated with a combination chemotherapy regimen Pola-R-CHP. PET-CT after 2 cycles of therapy showed a complete metabolic response, meaning the cancer could not be detected (11/22/23). Subsequent scan after cycle 5 confirmed remission (2/9/24). His last chemotherapy was 2/19/24.

Opinion

With regard to risk factors, Mr. Howard was typical of DLBCL in terms of age and sex. The cause or causes of DLBCL in general, and in his case, are largely unknown. However, he had hypothyroidism which is commonly a manifestation of autoimmunity and is associated with an increased risk of lymphoma, including DLBCL..He was not obese. He had been a smoker. He likely had some exposure at Camp Lejeune to trichloroethylene (TCE), tetrachloroethylene, and benzene but none of these exposures

have been convincingly linked to DLBCL lymphoma.

With regard to Mr. Howard's specific risk from exposure to chemicals in water at Camp Lejeune, I have relied upon the reports from LaKind, who estimated Mr. Howard's exposure to PCE, TCE, DCE, VC, and benzene, and Bailey, who used LaKind's exposure estimate to evaluate risk. Bailey concluded that "at the highest potential exposure for Mr. Howard, and applying conservative, health-protective assumptions, Mr. Howard's exposures to chemicals in the Camp Lejeune drinking water did not increase his cancer risk by more than 0.007% over his background cancer risk. This excess lifetime cancer risk is within US EPA's acceptable risk range." Bailey report p. 36. As described above in the Incidence section, the lifetime risk of all B-lymphomas like DLBCL is about 2%. It follows that based on Bailey's risk assessment, Mr. Kidd's background risk of B-lymphomas is 285 times higher than his increased risk of *all* cancers – not just B-lymphomas – from exposures at Camp Lejeune.

In terms of prognosis, the outlook is excellent. The regimen this patient was treated with (Pola R CHP) is a variant of RCHOP that appears to be an improvement in terms of disease-free and overall survival. However, because it is relatively new there is no long term follow-up as of yet. However, as noted above, among those who achieve and maintain remission for 2 years with RCHOP, the cumulative risk of relapse at 5 years is 9.3%, and at 8 years, 10.3%[37]. Given the superiority of Pola R CHP over RCHOP at 2 years, it seems reasonable to presume that long term outcomes will be at least equal to those achieved with RCHOP. For those who do relapse, there are now many new options including CART cells, bispecific antibodies, and various transplant strategies that offer the promise of achieving long term 2nd remissions and cures.

The late effects of chemotherapy such as Pola R CHP and RCHOP are modest. Doxorubicin, which Mr. Howard received as part of his lymphoma therapy, was recognized early on to cause heart damage when patients receive high cumulative doses. All modern chemotherapy regimens limit the cumulative dose of doxorubicin and related drugs. The relationship of the cumulative dose of doxorubicin and the development of heart failure is shown in the graph below, Exhibit 5, from [38]. As can be seen at the dose of 300 mg/m² that Mr. Howard received, the risk of heart failure is barely detectable. As shown in the Table below, Exhibit 6, from the same paper, the percentage of people who developed heart failure at the dose Mr. Howard received was 1.7% (circled).

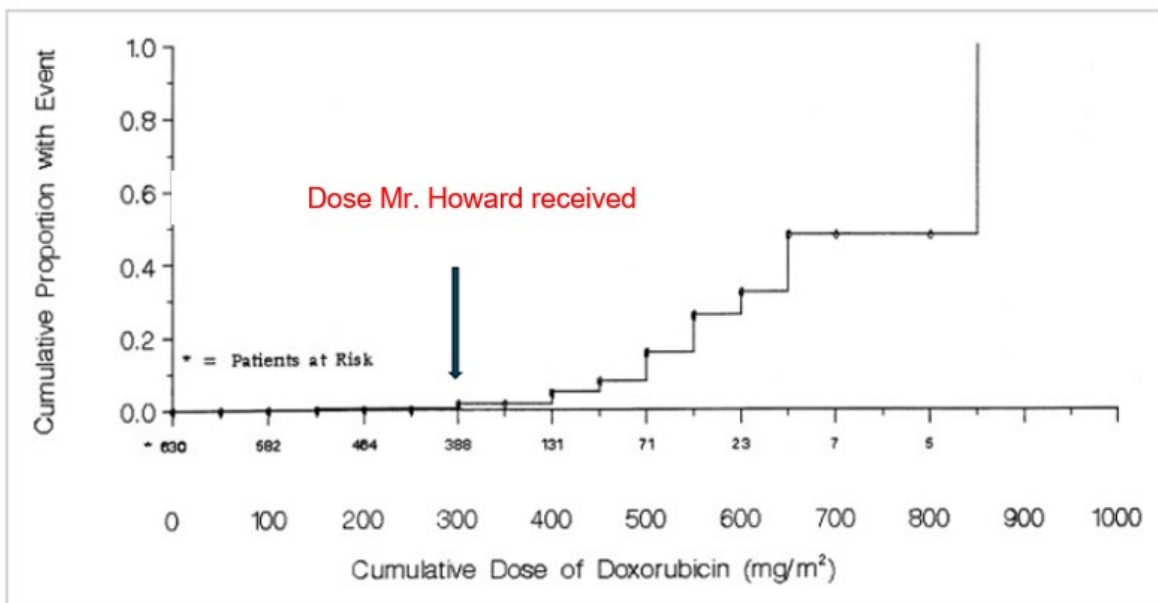


Exhibit 5: Risk of Heart Failure by Cumulative Doxorubicin Dose

Dose (mg/m ²)	Cumulative percentage and SE							
	Study 088001 (n = 348 patients, 21 events)		Study 088002 (n = 111 patients, 6 events)		Study 088006 (n = 171 patients, 5 events)		All studies (n = 630 patients, 32 events)	
	%	SE	%	SE	%	SE	%	SE
150	0.3	0.3	0.0	—	0.0	—	0.2	0.2
300	2.1	0.9	3.2	2.2	0.0	—	1.7	0.6
400	5.7	2.2	7.6	4.8	0.0	—	4.7	1.6
450	5.7	2.2	19.2	8.7	5.0	4.9	7.9	2.4

Exhibit 6: Estimated cumulative Percentage of Patients with On Study or Off Study, Doxorubicin-Related Congestive Heart Failure, by Cumulative Dose

Dr. Hoppe cites a French paper that reported on cardiovascular complications of RCHOP chemotherapy [39]. “The cumulative incidence of cardiovascular events at 5 years among patients treated with standard chemotherapy for diffuse large B-cell lymphoma is 11.4%.” However, it should be noted that this paper included “early-onset” cardiovascular events which occurred within 6 months of starting therapy, and “subacute” events which occurred within 12 months of starting therapy. Only “late” events which occurred more than 12 months after therapy are relevant to Mr. Howard

given that he is now more than 18 months past the start of chemotherapy and has not shown any cardiovascular effects thus far. Only 31% of the events described in that paper were after 12 months. Thus, the highest, reasonable estimate from that paper applicable to Mr. Howard's situation would be 3.5%. The authors of that paper further analyzed their results with a logistic regression model to identify risk factors. Only two risk factors were identified: valvular heart disease and ischemic heart disease. Neither of these are present in Mr. Howard's case, who has tolerated his chemotherapy treatment well. In conclusion with regard to cardiovascular complications, while there is a risk of cardiovascular complications of chemotherapy, given the absence of problems to date, it is likely to be fairly small.

Dr. Hoppe goes on to comment on "long-term impaired immune health" and cites a very interesting and thoughtful paper to support his assessment [40]. These long-term immune health risks are also speculative in Mr. Howard's case. The findings in that paper warrant consideration of the details. The authors studied records of 21, 690 survivors of DLBCL. As Dr. Hoppe noted, they found "elevated incidence rate ratios (IRRs) for many immune-related conditions in survivors of DLBCL compared with other cancer survivors, including significantly and consistently elevated IRRs for viral and fungal pneumonias (up to 10.8-fold), meningitis (up to 5.3-fold), as well as humoral deficiency (up to 17.6-fold) and autoimmune cytopenias (up to 12-fold). IRRs for most conditions remained high even in the late survivorship period (5-10 years after cancer diagnosis). The elevated incidence could not be explained by exposure to chemotherapy, stem-cell transplantation, or rituximab, except for IRRs for humoral deficiency, which were consistently higher after the incorporation of rituximab into DLBCL treatments." One of the most interesting aspects of the report is that they compared DLBCL survivors to breast cancer survivors, prostate cancer survivors, head and neck cancer survivors, and melanoma survivors. These other groups of cancer survivors did not have the same risks for viral and fungal pneumonias, meningitis, or autoimmune cytopenias. The report was accompanied by an editorial noting that "Overall, the results of Shree et al support the intriguing hypothesis that certain lymphomas and immune-related medical conditions may have shared etiology, perhaps on the basis of intrinsic immune characteristics" [41]. The suggestion is that these problems may be the result of underlying immune dysfunction just as the lymphoma itself may be the result of the same immune dysfunction. To the extent Mr. Howard exhibits an immune dysfunction, the paper Dr. Hoppe cites suggests that it is likely to be the same underlying immune dysfunction that led to Mr. Howard's thyroid disease and later to his lymphoma, rather than a novel immune dysfunction.

As is true for the great majority of patients with lymphoma, the cause of Mr. Howard's lymphoma is unknown.

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Attachment A – Curriculum Vitae

CURRICULUM VITAE



Richard F. Ambinder, MD, PhD

April 7, 2025

DEMOGRAPHIC AND PERSONAL INFORMATION

Current Appointments:

University: Program Co-Leader, Hematological Malignancies and Bone Marrow Transplantation
James B. Murphy Professor of Oncology
Professor, Department of Pharmacology and Molecular Sciences
Professor, Department of Pathology
Professor, Department of Medicine
The Johns Hopkins University School of Medicine

Hospital: Active Staff
The Johns Hopkins Hospital
The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins
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Education and Training:

Undergraduate:
1972-75 B.A., Biochemistry, *cum laude* in General Studies, Harvard College, Cambridge
Massachusetts

Doctoral/Graduate:
1975-79 M.D., Johns Hopkins University School of Medicine, Baltimore, Maryland

Postdoctoral:
1979-81 Residency in Internal Medicine. Johns Hopkins Hospital, Baltimore, Maryland
1981-82 Fellowship in Medicine, Johns Hopkins Hospital, Baltimore, Maryland

1982-84 Fellowship in Oncology, Johns Hopkins University School of Medicine, Baltimore, Maryland
1985-89 Ph.D., Pharmacology and Molecular Sciences, Johns Hopkins University School of Medicine, Baltimore, Maryland

Professional Experience

1981-84 Assistant, Department of Oncology, Johns Hopkins School of Medicine, Baltimore, Maryland
1981-84 Associate Staff, Oncology, The Johns Hopkins Hospital, Baltimore, Maryland
1984-89 Instructor, Department of Oncology, Johns Hopkins School of Medicine
1984-present Active Staff, Oncology, The Johns Hopkins Hospital, Baltimore, Maryland
1989-93 Assistant Professor of Oncology, The Johns Hopkins University School of Medicine, Baltimore, Maryland
1991-93 Assistant Professor, Pharmacology and Molecular Sciences, The Johns Hopkins University School of Medicine, Baltimore, Maryland
1993-98 Associate Professor of Oncology, The Johns Hopkins University School of Medicine, Baltimore, Maryland
1998-present Professor, Oncology, Pharmacology and Molecular Sciences, Pathology, Medicine, The Johns Hopkins University School of Medicine, Baltimore, Maryland
2000-present Director, Division of Hematologic Malignancies (Lymphoma, Myeloma, Leukemia, BMT), Department of Oncology
2000-present James B. Murphy Professor of Oncology
2002-2010 Director Johns Hopkins Lymphoma SPORE
2017-present NCCN Cancer in HIV Positive Patients Panel, The Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, Baltimore, Maryland
2017-2020 Associate Editor for the Journal of Clinical Investigation
2018-present Editorial Board for Infectious Agents and Cancer

RESEARCH ACTIVITIES

Publications: Peer-reviewed Original Science Research

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Extramural Funding

Current Grants:

- | | |
|-------------------------------------|---|
| 4/1/20-3/31/25
Molecular Markers | Hodgkin Lymphoma in PLWH in South Africa: TB, EBV, and Tumor
R01CA250069
NCI
\$4,336,949
Role: PI: 17% |
| 9/8/20-8/31/25 | AIDS Malignancy Consortium
UM1CA121947
NCI
\$23,700,979
Role: Johns Hopkins site PI
PI: J. Sparano: 9% |
| 3/31/22-3/30/26 | BMT CTN Protocol 1903 (AMC-109) Administration of HIV-specific T cells to HIV+ Patients Receiving High Dose Chemotherapy Followed by Autologous Stem Cell Rescue -Auto-RESIST
1903
National Marrow Donor Program
\$130,028
Role: PI: 4% |
| 5/1/22-4/30/27 | Johns Hopkins Center for AIDS Research (JHU CFAR)
2P30AI094189-11
NIAID
\$19,515,902
Role: Administrative Core Co-Leader
PI: RE Chaisson: 15% |
| 6/20/22-5/31/27 | Regional Oncology Research Center- Sidney Kimmel Comprehensive Cancer Center (SKCCC) at Johns Hopkins
2P30CA006973
NCI
\$40,213,299 |

Role: Program Co-Leader for Hematologic Malignancies
PI: WG Nelson: 5%

9/8/23-9/7/28 Investigating the EBV methylome in PLWH: Discovery and Development of Novel EBV Diagnostics in Plasma and Saliva
U01CA284811-01
NIH
\$3,369,145
Role: PI: 15%

4/01/24-3/31/29 Enrichment for Tumor-derived Cell-free EBV DNA: Towards a Diagnostic Assay for Endemic Burkitt Lymphoma
1U01CA271252-01A1
NIH
\$1,720,211
Role: PI: 10%

EDUCATIONAL ACTIVITIES

Johns Hopkins Teaching Experience

1983 Physical Diagnosis (course for medical students), The Johns Hopkins University School of Medicine

1984-present Attending Physician, Bone Marrow Transplant Unit, The Johns Hopkins Hospital

1985 Attending Physician, Leukemia Service, The Johns Hopkins Hospital

1985-present Lecturer, Virology (Course director, Keerti Shah), The Johns Hopkins University School of Hygiene and Public Health

1989-present Organizer Weekly Multidisciplinary Lymphoma Conference, The Johns Hopkins Hospital

1991-present Tutorial leader, Medical Student Pharmacology (Course Directors, Paul Lietman and Thomas August), The Johns Hopkins University School of Medicine

1991-present Case Discussant, Clinico-Pathological Conference (CPC) The Johns Hopkins University Medical School

1992-present Course Director, Antiviral Pharmacology (graduate students), Dept of Pharmacology and Molecular Sciences, The Johns Hopkins University School of Medicine

1995-2010 Lecturer, EBV and KSHV in the Medical Student Microbiology, The Johns Hopkins University School of Medicine

1995-2001 Small Group Leader, Vaccines Section, Medical Student Pharmacology (Organizer, Charles Flexner), The Johns Hopkins University School of Medicine

1995-2001 Lecturer, Herpesvirus Pathogenesis, Advanced Virology Course (Course Director, Marie Hardwick), The Johns Hopkins University School of Hygiene and Public Health.

1998-present Research in Progress Graduate Training Program Seminars in the Department of Pharmacology, The Johns Hopkins University School of Medicine.

2000-present Lecturer, Antiviral Chemotherapy in the Graduate Student Pharmacology Course.

2000-2010 Course Director, Introduction to Clinical Pharmacology for Graduate Students

2002-2010 Lecturer, Monoclonal Antibodies and Gene Therapy in the Medical Student Pharmacology Course

2002 Centennial Celebration of Dorothy Reed's Description of the Reed-Sternberg Cell in Hodgkin's Disease, Symposium Organizer

2004-present Lecturer, Ethics and Clinical Research, Department of Pharmacology
 2008-2010 American Society of Clinical Oncology Education Committee Member
 2008-present Lecturer, Viral Oncology Course (School of Medicine)
 2010-2021 Course Co-director, Lecturer, Small Group Leader, Hematology/Oncology, First Year Medical Student Curriculum.

Mentoring, coaching, and advising

Laboratory Training

1990-1991 Eithne MacMahon, M.D., Postdoctoral fellow. Projects: Characterization of EBV in primary central nervous system lymphomas. Present position: Consultant Virologist, Guy's and St Thomas' Hospital Trust Honorary Senior Lecturer, UMDS Guy's and St Thomas' Medical & Dental Schools.

1990-1992 Tzzy-Chou Wu, M.D., Ph.D., Pathology resident. Project: In situ hybridization to detect EBV in clinical specimens. Present position: Associate Professor, Department of Pathology, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

1992-1993 Judy Ryon, M.D., Postdoctoral fellow. Project: Characterization of EBV lytic infection in clinical specimens. Present position: Research Associate, Department of Neurology, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

1992 Douglas Kingma, M.D., Visiting pathology fellow from the National Cancer Institute. Project: In situ hybridization to detect EBV in Hodgkin's disease. Present position: Staff Hematopathologist, National Cancer Institute, Bethesda, Maryland.

1992-1994 Marcie Weil, M.D. Postdoctoral fellow. Project: EBV and Hodgkin's Disease. Present position: Private practice oncology.

1992-1994 Paul Murray, Ph.D. Visiting graduate student from the University of Wolverhampton. Projects: EBV gene expression in various tumors. Present position: Principal Lecturer in Biomedical Science, School of Health Sciences, University of Wolverhampton, 62-68 Lichfield Street, Wolverhampton, WV1 1SB, United Kingdom.

1993-1996 Keith D. Robertson, Ph.D. Graduate student, Pharmacology and Molecular Sciences, Graduate Program. Dissertation: "Analysis of the Role of DNA Methylation in the Regulation of the Epstein-Barr virus *BamHI C* Promoter." Present position post-doctoral fellow, University of California at Los Angeles, Los Angeles, California.

1993-1996 M. Victor Lemas, Ph.D. Project: EBV Immune Response. Present position, Research Associate, Department of Oncology, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

1993-1996 Rimas J. Orentas, Ph.D. Postdoctoral fellow. Project: EBV Cytotoxic T Cells. Present position, Assistant Professor, Medical College of Wisconsin, Milwaukee, Wisconsin.

1993-1995 Sen-Tien Tsai, M.D. Postdoctoral fellow. Project: PCR and in situ hybridization for detection of EBV in nasopharyngeal carcinoma. Present position: Associate Professor, Department of Surgery, National Cheng Kung University Medical College, Tainan, Taiwan.

1995-1999 Stacy M. Moore, Graduate student, Pharmacology and Molecular Sciences, Graduate Program, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

1995-1999 Qian Tao, Postdoctoral fellow. Project: EBV Gene Expression in Tumors. Present position: Assistant Professor in Oncology at The Johns Hopkins University School of Medicine, Singapore.

1995-2001 Jie Yang, Graduate student, Pharmacology and Molecular Sciences, Graduate Program, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

1995-2000 Jennifer S. Cannon, Graduate student, Pharmacology and Molecular Sciences, Graduate Program, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

1996-1997 Ian Flinn, M.D. Postdoctoral fellow. Present position: Assistant Professor, The Johns Hopkins Oncology Center, Baltimore, Maryland.

1998-2001 Wen-Son Hsieh, M.D. Clinical postdoctoral fellow, The Johns Hopkins School of Medicine, Baltimore, Maryland.

1999-2001 Meghan Higman, M.D., Ph.D. Postdoctoral fellow. Present position: Assistant Professor, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

1999-2001 Olivia Y. Hwang, Graduate student, Pharmacology and Molecular Sciences, Graduate Program, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

2002-2003 Alvin Wong, M.D. Research postdoctoral fellow. National University of Singapore, Singapore.

1999-2005 Lan Lin, Graduate student, Pharmacology and Molecular Sciences, Graduate Program, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

1999-2004 Yvette Tanhehco, Graduate student, Biochemistry and Molecular Biology, The Johns Hopkins University School of Medicine, Baltimore, Maryland.

2002-2007 Jianmeng Chen, Graduate student, Pharmacology and Molecular Sciences, The Johns Hopkins University, Baltimore, Maryland.

2006-2013 Andrew Dufresne, Graduate student, Pharmacology and Molecular Sciences, The Johns Hopkins University, Baltimore Maryland

2008-2012 Courtney Shirley, Graduate student, BCMB, The Johns Hopkins University, Baltimore Maryland

2012-2012 Courtney Shirley, Postdoctoral fellow, BCMB, The Johns Hopkins University, Baltimore Maryland

2008-2014 Suntra Biswas – Graduate student, BCMB, The Johns Hopkins University, Baltimore Maryland

2009-2014 Nene Kalu – Graduate student, BCMB, The Johns Hopkins University, Baltimore Maryland

2011-2013 Jennifer Kanakry - Postdoctoral fellow, Virally-related lymphomas, The Johns Hopkins University, Baltimore Maryland

2011-2012 Songmei Wang, Postdoctoral, DNA damage and EBV lytic activation. Fudan University, China.

2012- 2017 John Kosowicz, Graduate Student, BCMB, Stony Brook University, Stony Brook, NY

2013-2019 Jaeyeun Lee, Graduate Student,

2014-2015 Genevieve M. Crane (Eve), Resident, Anatomic Pathology, PGY3, The Johns Hopkins Hospital, Baltimore, Maryland.

2015-2018 Samantha Vogt, Clinical Fellow, Medical Oncology, Johns Hopkins Hospital, Baltimore, MD.

2019-2022 Maggie Li, Undergraduate, Johns Hopkins University, Baltimore, MD.

2019-2022 KC Rappazzo, Clinical Fellow, Medical Oncology, Johns Hopkins Hospital, Baltimore, MD.

2020-present Logan George, Graduate Student, Pathobiology, Johns Hopkins School of Medicine, MD.

2021-2022 Cole Sterling, Clinical Fellow, Medical Oncology, Johns Hopkins Hospital, Baltimore, MD.

2022-present Sydney Ghoreishi, Graduate student, Biochemistry and Molecular Biology PHD Program, The Johns Hopkins University, Baltimore, MD.

Training Grant Participation

1992-present Pharmacology and Molecular Sciences Graduate Training Grant (Graduate)

1993-present Biological Chemistry and Molecular Biology Graduate Training Grant (Graduate)

1994-present Laboratory Research Training Grant in Pediatric Oncology/Hematology (Postdoctoral)

1997-2017 Graduate Training Program in Cellular and Molecular Medicine (Graduate)

2002-present Graduate Training Program in Clinical Investigation

2006-present Graduate Training Program in Pathobiology

CLINICAL ACTIVITIES

Certification

1979 FLEX Exam (6/12/1979)
1979 License to Practice Medicine, State of Maryland (#D23887)
1979 National Board of Medical Examiners
1982 Board Certified in Internal Medicine (September 15, #86149)
1985 Board Certified in Medical Oncology (November 19, #86149)

ORGANIZATIONAL ACTIVITIES

Institutional Administrative Appointments

1992-1995 Oncology Fellowship Admissions Committee
1993-present Graduate Student Steering Committee, Pharmacology and Molecular Sciences
1998-2000 Johns Hopkins Cancer Committee
1998-2002 Appointments & Promotions Committee
2000-present Sidney Kimmel Cancer Center Research Council

National/International Committees:

1993-2001 Co-Chair, Eastern Cooperative Oncology Group (ECOG) AIDS Committee
1994-2000 Co-Chair, NIH/NCI AIDS Malignancy Bank Research Evaluation and Decision Panel
1995-2001 Chair, AIDS Malignancy Consortium Laboratory Committee
1996-2002 Member, AIDS Malignancy Conference Program Committee
1996-2002 Member, National Comprehensive Cancer Network (NCCN) Panel for the Development of Guidelines for the Treatment of Non-Hodgkin's Lymphoma
1998-2018 Eastern Cooperative Oncology Group (ECOG) Lymphoma Core Committee
2002-2004 Vice President, AIDS Malignancy Consortium
2004-2019 Laboratory Committee Chair, AIDS Malignancy Consortium
2012-2018 Editorial Board, Blood
2013- CFAR Leadership Committee, Johns Hopkins Center for AIDS Research
2004-2019 Chair, Translational Research Working Group, AIDS Malignancy Consortium
2019-present Hematologic Malignancies Working Group Chair, AIDS Malignancy Consortium
2016-present JHH Antimicrobial Stewardship Committee Meeting
2017-present Member of the National Cancer Institute (NCI) Board of Scientific Advisors ad hoc Subcommittee on HIV and AIDS Malignancy
2020-present NCI Lymphoma Steering Committee Member
2020-present Chair, Hematologic Malignancies Working Group, AIDS Malignancy Consortium
2018-present National Comprehensive Cancer Center Guidelines Panel for Cancer in People Living with HIV

Professional Societies

American Association for the Advancement of Science
American Society for Clinical Oncology
American Society of Hematology
American Society of Microbiology
Epstein-Barr Virus Society

RECOGNITION

Awards, Honors

1978	John W. Graham Award
1979	Henry Strong Denison Scholarship
1979	Alpha Omega Alpha
1979	Phi Beta Kappa
1985-1990	Physician Scientist Award (NIH K11)
1994-1999	Scholar, Leukemia Society of America
1996	Visiting Professor, Chinese University of Hong Kong
1999	American Society for Clinical Investigation
2000-2001	Director's Basic Sciences Teaching Award, Johns Hopkins Oncology Center
2001	Stohlman Scholar, Leukemia Society of America
2001	James B. Murphy Professorship in Oncology
2002	American Society for Clinical Investigation
2002	Fellow of the American Association for the Advancement of Science
2002-2010	Director, Johns Hopkins Lymphoma SPORE
2008-2009	Director's Basic Sciences Teaching Award, Johns Hopkins Oncology Center
2009	Director's Clinical Sciences Teaching Award, Johns Hopkins Oncology Center
2014-2015	Director's Basic Sciences Teaching Award, Johns Hopkins Oncology Center
2017-2018	Director's Basic Sciences Teaching Award, Johns Hopkins Oncology Center

Invited Talks

1991 Educational Session at the American Society of Hematology, December 6-9, Denver, CO. "AIDS Primary Central Nervous System Lymphoma."

1991 Invited speaker at the Annual Meeting of the Laboratory of Tumor Cell Biology, National Cancer Institute, September 1-8, Bethesda, MD. "EBV and AIDS Primary Central Nervous System Lymphomas."

1991 Tutorial Leader at the Annual Meeting of the Laboratory of Tumor Cell Biology, National Cancer Institute, September 8, Bethesda, MD. "Human Herpesviruses: Pathogenesis, Oncogenic Potential."

1992 Invited speaker at the AIDS Lymphoma Meeting sponsored by the National Cancer Institute, May 11-12, Bethesda, MD. "Epstein-Barr Virus Gene Expression in Lymphoma."

1992 University of Maryland Hematology Conference, October 26, Baltimore, MD. "Epstein-Barr Virus and Hodgkin's Disease."

1992 Invited speaker at the Hemophilia Malignancy Study Group Meeting, November 20, Atlanta, GA. "Epstein-Barr Virus and Malignancy."

1993 Invited speaker at the AID-Related Malignancy Strategies Meeting sponsored by the Cancer Therapy Evaluation Program, National Cancer Institute, January 11, Bethesda, MD. "Treatment of AIDS Central Nervous System Lymphoma."

1993 Invited speaker at the AIDS Lymphoma Coordinating Group Meeting sponsored by the Epidemiology and Biostatistics Program, National Cancer Institute, March 8, Bethesda, MD. "Epstein-Barr Virus and Lymphoma."

1993 Invited speaker of the "AIDS Malignancy Task Force, Meeting sponsored by the National Cancer Institute, Orlando, FL, May 16." "5-Azacytidine for AIDS Lymphomas."

1994 Invited speaker at the Biology of B-Cell Malignancies Biology Meeting, sponsored by the National Cancer Institute, April 19. "New Approaches to EBV Lymphomas."

1994 Invited speaker at the NATO Workshop on The Etiology of Hodgkin's Disease, Glasgow, Scotland, United Kingdom, May 4. "EBV-Associated Hodgkin's Disease."

1994 Invited speaker at the Epstein-Barr Virus and Associated Diseases Meeting at Cold Spring Harbor (Cancer Cells Series), September 11. "New Approaches to the Therapy of EBV-Associated Malignancies."

- 1995 Invited speaker at Topics in Pediatric Hematology/Oncology: Update 1995 in New York, for Tomorrow's Children's Institute, April 26-27. "EBV and Hodgkin's Disease" and "Hodgkin's Disease and Bone Marrow Transplantation."
- 1995 Invited speaker at the New Aspects of the Diagnosis and Treatment of Hodgkin's Disease Meeting, Cologne, Germany, September 21. "New Approaches to EBV-Associated Hodgkin's Disease."
- 1995 Chair of the Biology Session at the New Aspects of the Diagnosis and Treatment of Hodgkin's Disease."
- 1995 Invited speaker at the College of Physicians & Surgeons, Columbia University, Department of Pathology, New York, NY, November 6. "Epstein-Barr Virus and Malignancies."
- 1996 Invited speaker at the Molecular Characterization of Lymphoid Neoplasia Workshop, Bombay, India, February 21-26. "In-Situ Hybridization, Epstein-Barr Virus and Hodgkin's Disease."
- 1996 Invited speaker at the First Hong Kong Cancer Institute Annual Scientific Symposium on EBV Related Tumors, Hong Kong, March 4. "Novel Approaches to Treatment of EBV Tumors."
- 1996 Invited speaker at the Hong Kong University, Hong Kong, March 5. "EBV Tumors."
- 1996 Invited speaker at the Special Symposium on AIDS Related Malignancies, Albert Einstein College of Medicine/Montefiore Medical Center, New York, NY, March 25-27. "Treatment of AIDS-Related Lymphoma."
- 1996 Symposium organizer and invited speaker at the 32nd Annual Meeting American Society of Clinical Oncology, Philadelphia, PA, May 18-21. "Epstein-Barr Virus and Malignancy."
- 1996 Invited speaker at the Annual Meeting of the Institute of Human Virology, Baltimore, MD, September 7-13. "EBV and B Cell Lymphoma."
- 1996 Invited speaker at the University of Virginia, Pathology Department, Charlottesville, VA, October 8. "EBV and Malignancy."
- 1996 Invited speaker at the Prince of Wales Hospital, Chinese University of Hong Kong, November 13. "High Dose Therapy with Bone Marrow Rescue for the Treatment of Lymphoma."
- 1996 Invited speaker at the Prince of Wales Hospital, Chinese University of Hong Kong, November 20. "EBV and Hodgkin's Disease."
- 1996 Invited speaker at The International Association for Research on Epstein-Barr Virus and Associated Diseases, VII International Symposium, Hong Kong, November 13-16. "Methylation and EBV-associated Tumors."
- 1997 Faculty, National Comprehensive Cancer Network (NCCN), 2nd Annual Conference, Practice Guidelines: From Principles to Practice. Ft. Lauderdale, FL. March 3-5. "Guidelines for the Treatment of Non-Hodgkin's Lymphomas."
- 1997 Invited speaker at the First AACR/ASCO Joint Conference, Basic and Clinical Aspects of Lymphoma, Indian Wells (Palm Springs) CA, January 10-14. "EBV and Lymphomagenesis."
- 1997 Invited speaker at the Keystone Symposium on the Genetics of Human Cancer. Keystone, CO, January 27- February 2. "Epstein Barr Virus and Malignancy: Methylation of the EBV Major Latency Promoter."
- 1997 Invited speaker at the Robert H. Lurie Cancer Center of Northwestern University, Chicago, IL, March 17. "Targeting Epstein-Barr Virus in Malignancies."
- 1997 Invited speaker at the 23rd Annual Symposium, Diagnosis and Treatment of Neoplastic Disorders, The Johns Hopkins Oncology Center, Baltimore, MD, April 3 - 4. "AIDS Malignancies."
- 1997 Invited speaker at Hahnemann Allegheny Hospital, Philadelphia, PA, May 7. "EBV and Post-Transplant Lymphoma."
- 1997 Invited speaker at the 10th Annual Meeting of The American Society of Pediatric Hematology/Oncology, (ASPH/O) San Francisco, CA, September 20. "EBV and Hodgkin's Disease."
- 1997 Invited speaker at 2nd Annual Meeting of the Institute of Human Virology, University of Maryland, Baltimore, MD, September 21. "Cellular Immune Responses and EBV."

- 1997 Invited speaker at Advances in Transplantation, School of Nursing Conference, Washington, DC. September 30. "Lymphoproliferative Disease in Transplant Recipients."
- 1997 Invited speaker at the National Lymphoma Awareness Week Conference, Vienna, VA, October 19. "AIDS-Related Lymphoma."
- 1997 Invited speaker at Massachusetts General Hospital Charlestown Laboratories, Boston, MA, December 1. "Targeting Epstein-Barr Virus in Malignancies."
- 1997 Chair of the Hodgkin's disease session, American Society of Hematology, San Diego, CA, December 8.
- 1998 Invited speaker at the 5th Conference on Retroviruses and Opportunistic Infections, Chicago, IL, February 1-5. "Epstein-Barr Virus and Lymphoma in Patients with HIV."
- 1998 Invited speaker at the International Union Against Cancer, UICC Workshop on Nasopharyngeal Cancer-Issues and Challenges, Singapore, February 12. "EBV and NPC."
- 1998 Invited speaker at the Fifteen Years Viral Oncopathology Symposium of HPV and EBV, Amsterdam, Netherlands, March 5. "EBV Pathology."
- 1998 Invited speaker at the 8th Annual Clinical Care of Patient with HIV Infection, Baltimore, MD, March 31. "HIV-Related Malignancies."
- 1998 Invited speaker at the University of Birmingham School of Medicine, Birmingham, United Kingdom, June 4. "Approaches to Targeting EBV in Tumors."
- 1998 Chair of the Pathology and Pathogenesis Session. International Epstein-Barr Virus (EBV) Meeting, Stockholm, Sweden, June 5.
- 1998 Invited speaker at Progress in Hematologic Malignancies and Bone Marrow Transplantation. Baltimore, MD, September 11. "Aspects of Hodgkin's Disease."
- 1998 Invited speaker at Baylor University, Houston, TX, November 18.
- 1999 Invited speaker at The University of Texas, M.D. Anderson Cancer Center, Houston, TX, March 23 - 25.
- 1999 Invited speaker at The Mount Sinai Medical Center Hematology Grand Rounds, New York, NY, June 10. "Targeting EBV in Malignancies."
- 1999 Invited speaker at 21st International Congress of Chemotherapy, Birmingham, UK, July 4 - 7. "EBV Products as Novel Targets."
- 1999 Invited speaker at Leukemia Society of America, Annual Stohlman Scholar Symposium, New York, NY, November 12 - 13. "EBV Kinases: Novel Targets in EBV-Associated Malignancies."
- 2000 Invited speaker at American College of Epidemiology, Atlanta, GA, September 24-26. "Molecular Aspects of EBV and Lymphoma."
- 2000 Invited speaker at Lymphoma Meeting, Crowne Plaza, Manhattan, NY, October 7-8. "Targeting EBV and Lymphoma."
- 2000 Invited speaker at Cerus Science Retreat, Santa Cruz, CA, October 13-15. "EBV and Transplantation."
- 2000 Invited speaker at American Society of Hematology, San Francisco, CA, December 2-5. "Worldwide Impact of Viral Diseases in Hematology."
- 2001 Invited speaker at University Hospitals of Cleveland, Cleveland, OH, March 16. "Targeting EBV in Tumors."
- 2001 Invited speaker at the 11th Annual Clinical Care of the Patient with HIV Infection Course, Baltimore, MD, March 26-27. "HIV Related Cancers."
- 2001 Invited speaker at the Federation of American Societies for Experimental Biology Summer Research Conference, Snowmass, CO, July 29-30. "Mechanisms in AIDS Malignancies."
- 2002 Invited speaker at the 12th Annual Clinical Care of the Patient with HIV Infection Course, Baltimore, MD, April 15-16. "HIV-Related Cancers."
- 2002 Invited speaker at the 15th Annual Meeting of the American Society of Pediatric Hematology/Oncology, Baltimore, MD, May 2-5. "Targeting EBV in Tumors and Lymphoproliferative Disorders."

- 2002 Invited speaker at the 10th International Symposium on Epstein-Barr Virus and Associated Malignant Diseases, Cairns, Australia, July 16-21.
- 2002 Oncology Translational Research Conference, University of Pennsylvania, Philadelphia, PA, October 22, 2002. "EBV and Hodgkin's Disease."
- 2003 Invited speaker at the 4th International UICC Symposium on Nasopharyngeal Carcinoma, Hong Kong SAR, China, February 14-16, 2003.
- 2003 Invited speaker at Grand Rounds at Dana-Farber Cancer Institute, Boston, Massachusetts, May 13, 2003.
- 2003 Invited speaker at the First Annual Conference: Targeted Therapies for the Treatment of Hematological Malignancies, Kona, HI, July 16-20, 2003.
- 2003 Invited speaker at the Post Transplant Lymphoproliferative Disorder Meeting, Bethesda, MD, September 15-16, 2003. "Vaccination Against EBV."
- 2003 Invited speaker at the Feist-Weiller Cancer Center, Shreveport, LA, October 27, 2003. "Epstein-Barr Virus and Hodgkin's Disease."
- 2003 Invited speaker at the Grand Rounds for the Division of Hematology/Oncology at the Robert H. Lurie Comprehensive Cancer Center of Northwestern University, Chicago, IL, December 12, 2003. "Epstein-Barr Virus and Hodgkin's Disease."
- 2003 Session Chair at American Society of Hematology, San Francisco, CA, December 6th-9th 2003.
- 2004 Invited speaker at the Dermatology Grand Rounds Lecture, Johns Hopkins University, School of Medicine, February 18, 2004. "Kaposi's Sarcoma"
- 2004 Invited Speaker at the AMC Steering Committee Meeting and International Conference on AIDS Malignancies in AIDS and Other Immunodeficiencies, Bethesda, MD April 28th -30th 2004. "Viral Load Assays"
- 2004 Invited Session Chair at the 29th Annual International Herpesvirus Workshop, Reno, NV July 25th-31st 2004.
- 2004 Visiting Professor Yonsei Medical School, Seoul Korea, October 19th -23rd 2004. "Epstein-Barr Virus and Tumors."
- 2004 Invited Speaker at The INTERLYMPH Immunology Subgroup Meeting, Los Angeles, CA, December 3rd 2004. "EBV and Inflammation"
- 2004 Invited Speaker American Society of Hematology Educational Session San Diego, CA, December 4-7th 2004. "Epstein - Barr virus and Hodgkin's Disease: Issues of Causation, Pathogenesis, Prognosis, and Treatment."
- 2005 Invited Speaker at Lymphoma the next questions: Ft. Lauderdale, FL April 7-8 "Allogeneic Transplant for Hodgkin's disease."
- 2005 Invited Speaker at The Rockefeller University, New York, NY, April 6, 2005. "Loaded Questions Regarding Gammaherpesviruses and Tumors."
- 2005 Discussant at ASCO, Orlando, FL May 13-17, 2005. "Hodgkin's Disease Reflections"
- 2006 Invited Speaker at the Tropical Medicine Dinner Club of Baltimore, MD, February 1, 2006 "Gammaherpesvirus Associated Tumors"
- 2009 Invited Speaker at New Directions in Pediatric, Adolescent and Young Adult Lymphoma, July 30-31, 2009, Baylor University, Houston, TX, "Targeted Radiation Therapy for Viral Malignancies"
- 2010 Invited Speaker at the Third Annual Review of the ASH Annual Meeting: Nashville, TN, January 19, 2010 "Updates in the Treatment and Management of Hematologic Malignancies".
- 2010 Invited Speaker at the 14th Biennial Symposium of the Lymphoma International Association for Research on Epstein - Barr virus and Associated Diseases. University of Birmingham, United Kingdom, September 3, 2010, "EBV-Targeted Radiation Therapy."
- 2010 Invited Speaker at 8th International Symposium on Hodgkin Lymphoma, Koln, Germany, October 24, 2010. "The Hodgkin Lymphoma Stem Cell"
- 2010 Invited Speaker at the American College of Veterinary Pathologists, Baltimore, MD, November 2, 2010. "Mechanisms of Herpes Virus-induced Carcinogenesis"

- 2011 Invited Speaker at The Molecular Imaging Seminar, Baltimore, MD September 13, 2011. “Imaging Lytic Induction of Gamma Herpes Viruses in Lymphoma Patients”
- 2011 Invited Speaker at Fourth AACR Conference on The Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved, Washington, D.C. September 19, 2011. “EBV as a cause of Hodgkin’s Disease, Nasopharyngeal Cancer, Gastric Cancer, and Non-Hodgkin’s Lymphomas; New Approaches to EBV Cancer Treatment”
- 2012 Invited Speaker at BMT Tandem “Scientific” Meeting, San Diego, CA, February 4, 2012. “HCT in HIV-1 Infected Patients”.
- 2012 Invited Speaker at AACR Annual Meeting in Chicago, IL, April 3, 2012. Session chair and speaker. “HIV Malignancies: Current Dilemmas and Future Directions”.
- 2012 Invited Speaker at JHU/Brazil HIV/Aids conference in Rio de Janeiro, Brazil, April 13, 2012. “Bone Marrow Transplantation and HIV Infection”.
- 2012 Invited Speaker at Pediatric Lymphoma Symposium in Houston, TX, April 27, 2012. “EBV Associated Lymphoma: Aspects of Diagnosing, Prognosis and Treatment”.
- 2012 Invited Speaker at 9th International CGO Lymphoma Symposium, Chicago, IL, April 28, 2012. “EBV Lymphoma and Viral Load Monitoring”.
- 2012 Invited Speaker at the Department of Molecular Genetics and Microbiology at Stony Brook University in Stony Brook, NY, May 14, 2012. “Targeting EBV: New Approaches and New Agents”.
- 2012 Invited Speaker at the 2012 ASCO Annual Meeting, Chicago, IL, June 2, 2012. Session chair and speaker. “EBV And KSHV In The Epidemiology And Pathogenesis Of Human Tumors”
- 2013 Invited speaker at Hematology/Oncology Grand Rounds at University of Maryland, College Park, MD, February, 8 2013. “Epstein – Barr Virus and Cancer”
- 2013 Invited speaker to Johns Hopkins 23rd Annual Conference on Clinical Care of HIV Infection, Baltimore, MD, March 18, 2013.
- 2014 Invited speaker to Celgene Corporation, San Francisco, CA, July 30, 2014 “Rael (EBV-positive Burkitt's lymphoma cell line”.
- 2014 Invited speaker at Carnegie Institution, Johns Hopkins Homewood Campus, Baltimore, MD., September 6, 2014 “Epstein-Barr Virus and Multiple Myeloma”
- 2014 Invited speaker at The 2nd Annual Robert J. Cotter Hopkins Pharmacology Retreat, Mt Washington Conference Center, Baltimore, MD, September 20, 2014.
- 2014 Invited speaker to Festschrift Honoring Rein Saral, MD, Emory Conference Center Hotel, Atlanta, GA, November 15, 2014 “Allogeneic Bone Marrow Transplantation for Patients with HIV”
- 2015 Invited speaker to the Johns Hopkins Oncology Translational Research Conference, Baltimore, MD, January 7, 2015 “Epstein Barr Virus and Malignancy”
- 2015 Invited speaker to Delhi, India, March 23, 2015 “EBV, HIV and Tumors”
- 2015 Invited speaker to Seattle, WA on August 13, 2015 to speak at the 2nd Annual Conference on Cell and Gene Therapy for HIV Cure “Allogeneic Transplantation for Patients with HIV”
- 2015 Invited speaker to the BMT CTN 2015 Steering Committee in Westin Crystal City, Arlington, VA. on October 23, 2015, “Identification of HIV-Resistant Donors Project”
- 2015 Invited speaker to the 15th International Conference on Malignancies in AIDS and other Acquired Immunodeficiencies in Bethesda, MD on October 26, 2015, “Non-Myeloablative Haploidentical Allogeneic Bone Marrow Transplantation in HIV-Infected Individuals”.
- 2016 Invited Speaker to Hong Kong on May 14, 2016
- 2016 Invited speaker to the The Medical Council of DKMS in Valencia Spain on April 3, 2016 “Advanced Unrelated Donor Selection Based on Polymorphism in Selected Genes.
- 2018 Invited speaker Sjogren’s Syndrome Foundation in Aurora Colorado on April 13, 2018 “Lymphoma: Risk, Treatment and Prognosis”

- 2018 Invited speaker CFAR Cure Symposium, Panel Discussion: “HV Cure; A Reality Check”, October 15, 2018.
- 2018 Invited speaker AMC Investigators Fall Meeting in Reston, VA., October 24, 2018.
- 2019 Invited speaker Hillman Cancer Center Viral Oncology Mini-Symposium at the University of Pittsburg Medical Center, April 15, 2019.
- 2019 Invited speaker Clinical Virology Symposium, Savannah, GA, “Circulating EBV and KSHV DNA for diagnosis and monitoring” May 7, 2019.
- 2019 Invited speaker for IVS presentation at Johns Hopkins Pathology Molecular Diagnostics, Baltimore, MD, October 4, 2019.
- 2019 Grand Rounds, Johns Hopkins University, School of Medicine, Baltimore, MD, October 11, 2019.
- 2019 Invited speaker to the 17th International Conference on Malignancies in HIV/AIDS (ICMH) in Bethesda, MD, October 22, 2019.
- 2020 Invited speaker for the first year medical students, Johns Hopkins University, School of Medicine, Infectious Disease, Baltimore, MD, February 11, 2020.
- 2020 Invited speaker for the resident didactics: Hodgkin Lymphoma, Johns Hopkins University, School of Medicine, Baltimore, MD, 5/1/2020.
- 2020 Invited speaker for the Kaposi Sarcoma meeting, virtual. May 7, 2021.
- 2020 Invited speaker for the Data and Safety Monitoring Board, virtual, June 19, 2020.
- 2020 Invited speaker for the graduate pharmacology students, Johns Hopkins SOM, Pharmacology, Baltimore, MD, September 30, 2020. “Gene Therapy/Antibody Drugs”.
- 2021 Invited speaker for the graduate pharmacology students, Johns Hopkins SOM, Pharmacology, Baltimore, MD, March 3, 2021. “Antivirals”.
- 2021 Invited speaker for ARFD virtual meeting, April 29, 2021.
- 2021 Invited speaker for Simmons Comprehensive Cancer Center Distinguished Lecture Series virtually, UT Southwestern, May 7, 2021. “New directions for lymphoma in HIV patients: Plasma DNA for diagnosis; allogeneic transplant for cure”.
- 2021 Invited speaker to fellows, Johns Hopkins University, SOM, Baltimore, MD. July 16, 2021. “Hodgkin Lymphoma”.
- 2022 Invited speaker for 18th International conference on Malignancies in HIV/AIDS (ICMH), Bethesda, MD., October 24, 2022.
- 2023 Invited speaker for EBV-associated Lymphoma Consortium, Bethesda, MD., 10/16/23.
- 2024 Invited speaker for graduate pharmacology students, Johns Hopkins SOM, Pharmacology, Baltimore, MD., March 14, 2024. “Antivirals”
- 2024 Invited speaker for Department of Molecular Microbiology and Immunology at the Johns Hopkins Bloomberg School of Public Health, Baltimore, MD., September 12, 2024. “Epstein-Barr virus: Facilitating early diagnosis of EBV-associated malignancies”.

Richard F. Ambinder, M.D., Ph.D., Prior Testimony, Depositions 2021-2025

2021--Arbitration - Marvin Smith, Individually and as Administrator of the Estate of Tanya Smith, Deceased v. John Wright, MD, et al., Deposition and Arbitration Testimony

2022—Marvin Smith, Individually and as Administrator of the Estate of Tanya Smith, Deceased v. Annie Kannarkatt, MD, Court Testimony, York County, PA Case number 2018-SU-002317