Testimony of Michelle Hudspeth, M.D.
Chief, Division of Pediatric Hematology/Oncology
Director, Pediatric Blood and Marrow Transplantation at the Medical University of South Carolina
House of Representatives Subcommittee on Health Care, District of Columbia, Census, and National Archives

Chairman and members of the Subcommittee:

Thank you for inviting me to testify today. I am the Chief of the division of pediatric hematology/oncology and the Director of pediatric blood and marrow transplantation for the Medical University of South Carolina in Charleston, SC. I care for close to 75 newly diagnosed children with cancer each year as well as almost 30 children each year from throughout the Southeast who require a bone marrow transplant for their best chance of survival from cancer.

The National Cancer Act (P.L.92-218) in 1971 officially declared the war on cancer. Since that time, the overall survival rate of childhood cancer has dramatically improved from 10% to almost 80%. However, the incidence of childhood cancer has continued to increase over the past 20 years, and cancer remains the leading cause of death by disease in children. In 23 days, we will mark the 40th anniversary of the National Cancer Act being signed into law. Today, unfortunately, we mark the largest number of chemotherapy drugs ever in shortage. The war on cancer has been reduced to a mere skirmish with no weapons and no clear battle plan.

Just a few days ago, I was with a family in crisis in our pediatric emergency room. I had to tell the parents of a 2 year old boy that their son has high risk acute lymphoblastic leukemia. This type of leukemia, known as ALL, is the most common childhood cancer. For his first month of treatment, he needs four chemotherapy drugs plus another two chemotherapy drugs to be injected into his spinal fluid. Five of these six drugs are in shortage. Each of these drugs in shortage is a generic drug. Mercifully, we have the drugs available right now. I held his mother's hand and told her that we will do everything humanly possible to cure her son. He needs three and a half years of chemotherapy treatments- will I be able to tell her the same thing a month from now? 6 months from now? In a year?

The scope of the problem continues to intensify. Between 2005 and 2010, the number of prescription drug shortages nearly tripled in the United States. Currently, 21 chemotherapy drugs are in shortage as well as 2 essential chemoprotectant drugs. The vast majority of drugs in shortage are generic drugs and are used to treat curable childhood cancers. Drugs such as cytarabine, which is essential to cure acute myelogenous leukemia (AML), have absolutely no substitution available. Clearly, the most critical problem is a child being denied curative chemotherapy treatment due to the drug shortages.

Furthermore, the additional downstream effects of chemotherapy shortages have significant ramifications as well. Research cures cancer. The major advancements in pediatric cancer, as well as adult cancer, have occurred through the Clinical Trials Cooperative Group program of the National Cancer Institute. The majority of clinical trials incorporate

elements of standard treatments into one or more treatment groups in the trial. Clinical trial enrollment is currently not allowed unless there is clear access to the chemotherapy drugs included in the trial. As a result, clinical trial enrollment is declining. Not only does this undermine the advancement of cancer treatment, but it comes with a significant financial cost to the taxpayer as well. Cooperative group clinical trials are estimated to have $5-6,000 of regulatory costs per institution that are incurred even if a patient never enrolls on the clinical trial. For instance, the Children's Oncology Group (the Clinical Trial Cooperative Group for pediatric cancer) has 210 member institutions and roughly 100 active clinical trials each year. Consequently, up to 1.2 million dollars could be wasted each year alone for pediatric cancer clinical trials that are never able to enroll any patients due to chemotherapy drug shortages.

A recent study published in the *American Journal of Health-System Pharmacy* reported that the overall personnel costs associated with managing drug shortages costs health systems an estimate of $216 million each year. The increased burden affects pharmacists, pharmacy technicians, physicians, nurses, and information technology personnel. Additional time and effort is spent educating staff about shortages and potential drug substitutions when they exist. Regrettably, most institutions have had to institute a review board, often with involvement of their institutional ethics committee, to develop harrowing plans of how to ration chemotherapy drugs- most of which are generic drugs that have been around for 30 years or more. How do you decide who should be given the chance to live?

In an effort to maintain some semblance of adequate chemotherapy treatment, drug substitutions are being made with less familiar products. Additionally, pharmacies are stocking multiple concentrations of the same drug. A cardinal rule of drug safety is to stock one concentration of any particular drug so that all staff is readily familiar with the preparation. Now, the focus is simply on having drug available and pharmacies have multiple concentrations of the same drug. This can rapidly lead to dosing errors- either underdosing or overdosing- when one concentration of the drug is mixed for the patient as if it is the other concentration of the drug. Chemotherapy agents are high-alert drugs. They have a narrow therapeutic index, meaning there is a small difference in the amount that causes the therapeutic benefit and the amount that causes death. Over a year ago, a national survey by the Institute for Safe Medication Practices noted that 35% of respondents had experienced a "near miss" error due to drug shortages and that 25% reported actual errors that reached the patient. One-third of physician responders reported an adverse patient outcome due to drug shortages.

As with any critical issue, there are multiple reasons for current drug shortage crisis. However, the timing of the current drug shortage is notable. In 2003, the Medicare Modernization Act (MMA) was put into place. In 2004, the FDA reported 58 drug shortages; in 2011, the number is over 200. The intent of the Medicare Modernization Act was to create more transparency in pricing. With the MMA, the reimbursement rate moved from a percentage of average wholesale price to average selling price, which includes all discounts, rebates etc in the sale. Generic prices are driven down by market competition and the current model under the MMA makes it difficult for companies to raise prices more than 6% per year. Product margins have fallen significantly for many generic drugs, leaving companies with little incentive to continue manufacturing the drug or to increase production.

In addition to addressing regulatory and notification issues regarding drug shortages, a key component of the solution is addressing the economic issues underlying the drug shortage crisis. Potential components of the economic solution include offering financial incentives to ensure a steady supply of product as well as increasing the Medicare reimbursement amount.

The current situation is nothing short of a massive national emergency. The burden is on us to resolve the crisis in order to protect our children. None of my patients's families ever thought they would be faced with a diagnosis of childhood cancer. Today alone, the parents of 36 children in the US will be told their child has cancer. Let's act to ensure that these parents can also be told there are chemotherapy drugs available to cure their child.

Curriculum Vitae

Name: Michelle Phillips Hudspeth
Office Address: 135 Rutledge Avenue, Rm 480
Medical University of South Carolina
Charleston, SC 29425
Citizenship: US

Birth Date: 10/05/1973
Phone: 843-792-0381
Fax: 843-792-8912

Education:

Institution	Years	Degree/Date	Field of Study
Wofford College	1991-1995	BS/05/1995	Chemistry
Medical University of South Carolina	1995-1999	MD/05/1999	Medicine
Johns Hopkins Bloomberg School Of Public Health	2004-current		Clinical Investigation

Internship: Pediatrics, Johns Hopkins Hospital	07/1999-06/2000
Residencies or Post-Doctoral: Pediatrics, Johns Hopkins Hospital	07/2000-06/2002
Fellowship, Pediatric Hematology/Oncology, Johns Hopkins Hospital and National Cancer Institute	07/2002-06/2003
Chief Resident, Pediatrics, Johns Hopkins Hospital	07/2003-06/2004
Fellowship, Pediatric Hematology/Oncology, Johns Hopkins Hospital and National Cancer Institute	07/2004-06/2006

Board Certification: Pediatrics 2002, Pediatric Hematology/Oncology 2006

Licensure: SC 2007-current

Faculty Appointment

Years	Rank	Institution	Department
2006-2007	Instructor	Johns Hopkins Hospital	Oncology, Pediatrics
2007-	Assistant Professor	MUSC	Pediatrics

Administrative Appointments:

Years	Position	Institution	Department
2007-	Director, Pediatric Blood and Marrow Transplant Program	MUSC	Pediatrics
2008-	Director, Pediatric Hematology/Oncology	MUSC	Pediatrics
2008-	Director, CH 7B Inpatient Unit	MUSC	Pediatrics
2008-	Quality Director, Adult and Pediatric Blood and Marrow Transplant Program	MUSC	Transplant

Hospital Privileges:

Years	Active/Inactive	Institution
1999-2007	Inactive	Johns Hopkins Hospital
2007-	Active	MUSC

Membership in Professional/Scientific Societies:
American Society of Pediatric Hematology/Oncology
American Society for Blood and Marrow Transplantation
American Society of Clinical Oncology
American Society of Hematology
Children's Oncology Group
Pediatric Blood and Marrow Transplant Consortium, Oncology Committee
Pediatric Blood and Marrow Transplant Consortium, Supportive Care Committee
Center for International Blood and Marrow Transplant Research, GVHD Working Committee
Center for International Blood and Marrow Transplant Research, Pediatric Cancer Working Committee
Center for International Blood and Marrow Transplant Research, Immune Deficiencies/Inborn Errors of Metabolism Working Committee

Scientific Journal Reviewer
Pediatric Blood and Cancer 2006-present
Bone Marrow Transplantation 2011-
Journal of Pediatric Hematology and Oncology 2011-

Extramural Grants/award amount:

2006-2007	Pearl M. Stetler Research Award/$40,000 PI, 75%
2011-2012	Hyundai Hope on Wheels Scholar/$30,000 PI

Intramural Grants/award amount:

2008-2009	SCTR Pilot Project Young Investigator Award/$40,000 PI, 10%

Awards, Honors, Membership in Honorary Societies:
2011 Leukemia and Lymphoma Society Partner in Progress Award
2006 Wofford College Young Alumnus Award
2002 David M. Kamsler Award for Compassion and Excellence in Pediatric Care
1999 Henry Tracy Ivy, M.D. Valedictorian Award
1999 American Medical Women's Association Janet M. Glasgow Award
1998 Alpha Omega Alpha
1994 Phi Beta Kappa

Academic Committee Activities:

Pediatric Oncology Performance Improvement Committee	2008-current
Hollings Cancer Center Executive Council Committee	2008-current
Hollings Cancer Center Clinical Research Oversight Committee	2008-current
Department of Pediatrics Pediatric Advisory Committee	2008-current
Department of Pediatrics Executive Council	2009-current
Hollings Cancer Center American Cancer Society Institutional Research Grant Reviewer	2009-current
South Carolina Clinical and Translational Research Institute K12 Grant Reviewer	2010
Pharmacy and Therapeutics Coagulation Sub-Committee	2011
Pediatric Neurology Search Committee	2011

Major Teaching Responsibilities:
Contributor to College of Medicine Immunology Class IPOPS series

Reviewer and Grader for College of Medicine Immunology Class Papers
Core Pediatric Hematology/Oncology Lecture Series for Pediatric House Staff
Core Lecture Series for Pediatric Hematology/Oncology Fellows
Supervision of medical students, residents, and fellows on inpatient and outpatient pediatric hematology/oncology rotations
Director, Pediatric Hematology/Oncology Sub-Internship
Formal Mentor for Pediatric Residency Program
Clinical Consultant for Curriculum Reform of Medical Student Hematopathology Section
Selected by Pediatric Residents as Preceptor for Communication Curriculum
Mentor for Lea Soderstrom, PhD Candidate in Epidemiology

Major Clinical Interest and Responsibilities:
Bone marrow transplantation for malignant and non-malignant diseases, immune reconstitution, and graft-versus-host disease.
Oncology inpatient attending, pediatric oncology clinic, and bone marrow transplant consults.

Lectures and Presentations

Invited Lectures and Presentations
2005 International Hematopoietic Stem Cell Transplantation Symposium.
National Academy of Medicine/Office of the Secretary of Health/ The Foundation to Share Life. Mexico City, Mexico.
2006 Union Memorial Hospital Pediatric Oncology Conference. Union Memorial Hospital. Baltimore, MD
2007 Johns Hopkins Pediatric Trends. Instructive Cases in Pediatric Oncology. Baltimore, MD
2008 Greenville Memorial Hospital System. Pediatric Grand Rounds. Blood and Marrow Transplantation for Non-Malignant Diseases. Greenville, SC.
2008 MUSC Pediatric Grand Rounds. Pediatric Blood and Marrow Transplantation.
2008 Greenwood Genetic Center Grand Rounds. Pediatric Blood and Marrow Transplantation for Inherited Diseases. Greenwood, SC
2009 MUSC Pediatric Neurosciences Update. Pediatric Blood and Marrow Transplantation for Inherited Diseases. Charleston, SC.
2009 MUSC Schwartz Rounds. Turning the Other Cheek: Compassionate Care in the Face of Anger. Charleston, SC.
2010 Pediatric Blood and Marrow Transplant Consortium. Post- transplant Immunization practices of the PBMTC. Dallas, TX.
2010 Leukemia and Lymphoma Society. Updates on Pediatric Leukemia and Lymphoma. Charleston, SC.
2011 MUSC Pediatric Grand Rounds. Anemia and apnea in a former premature infant: common symptoms, uncommon diagnosis. Charleston, SC.
2011 Advanced Practice Professional and Fellow Conference American Society for Blood and Marrow Transplantation/Center for International Blood and Marrow Transplantation Research Meeting. Growth and Development after Pediatric HSCT. Honolulu, HI.
2011 MUSC Interprofessional Education Institute. Success Factors for the Pediatric Blood and Marrow Transplant Team. Charleston, SC
2011 MUSC BMT Education Conference. Auto, allo, haplo, what? Decision making for BMT. Charleston, SC.
2011 MUSC Pediatric Grand Rounds. When horses turn into zebras: when is it more than a VOC? Charleston, SC.

Submitted Presentations/Abstracts

Hudspeth MP, Cohen K, and Chen AR. Graft-Versus-Brain-Tumor Effect in a Child with Anaplastic Astrocytoma after Cord Blood Transplantation for Therapy-Related Leukemia. Biology of Blood and Marrow Transplantation. 2006; 12(2, Supplement 1): 130-131.

Hudspeth MP, Duffy B, Noga S, Goodman S, Civin CI, Chen AR. Determination of the Maximum Tolerated Dose of Cyclophosphamide in conjunction with High-Dose Etoposide and Carboplatin followed by Autologous CD34+ Hematopoietic Rescue in Pediatric Patients with Recurrent/Refractory Solid Tumors. Blood. 2006; 108 (11): 461b Hudspeth MP, Cohen K, and Chen AR. Graft-Versus-Brain-Tumor Effect in a Child with Anaplastic Astrocytoma after Cord Blood Transplantation for Therapy-Related Leukemia. 2006 American Society for Blood and Marrow Transplantation/Center for International Blood and Marrow Transplantation Research Meeting.

Lewis JA, Jenrette JM, Watkins JM, Kraveka JM, **Hudspeth MP**. Total Lymphoid Irradiation for the Treatment of Refractory Bronchiolitis Obliterans following Allogeneic Hematopoietic Stem Cell Transplantation. Poster Presentation 2010 American Society for Blood and Marrow Transplantation/Center for International Blood and Marrow Transplantation Research Meeting. Orlando, FL.

Lewis JA, Ragucci DP, Nista EJ, **Hudspeth MP**. Performance Characteristics of Galactomannan Enzyme Immunoassay in Pediatric Allogeneic HSCT Recipients. Poster presentation 2010 American Society for Blood and Marrow Transplantation/Center for International Blood and Marrow Transplantation Research Meeting. Orlando, FL.

Michelle P. Hudspeth MD, Codruta Chiuzan, Elizabeth Garrett-Mayer PhD, Elizabeth Nista BA, Jana Robertson MD, and Daynna Wolff PhD. Clonal Evolution is a Stronger Predictor than Disease Status of Disease-Free Survival after Pediatric HSCT. Poster presentation 2011 American Society for Blood and Marrow Transplantation/Center for International Blood and Marrow Transplantation Research Meeting. Honolulu, HI

Michelle P. Hudspeth MD, Travis Heath PharmD, Codruta Chiuzan, Elizabeth Garrett-Mayer PhD, Elizabeth Nista BA, Lori Burton PNP, and Dominic Ragucci PharmD. Folinic Acid Rescue Increases Ability to Deliver Full Course of Methotrexate GVHD Prophylaxis for Pediatric HSCT RecipientsPoster presentation 2011 American Society for Blood and Marrow Transplantation/Center for International Blood and Marrow Transplantation Research Meeting. Honolulu, HI

Publications:

Peer Reviewed Journal Articles:

1. Wiley JL, Compton DR, Dai D, Lainton JAH, **Phillips M**, Huffman JW, Martin BR. Structure-Activity Relationships of Indole and Pyrrole- Derived Cannabinoids. Journal of Pharmacology and Experimental Therapeutics. 1998; 285: 995-1004.

2. **Hudspeth MP**, Raymond GV. Immunopathogenesis of Adrenoleukodystrophy: Current Understanding. Journal of Neuroimmunology. 2007; 182: 5-12.

3. Angotti LB, Post GR, Robinson NS, LewisJA, **Hudspeth MP**, Lazarchick J. Pancytopenia with Myelodysplasia due to Copper Deficiency. Pediatric Blood and Cancer. 2008; 51:693-5.

4. **Hudspeth MP**, Joseph S, Holden KR. A Novel Mutation in Type II Methemoglobinemia. Journal of Child Neurology. 2009: 2010 Jan;25(1):91-3.

5. **Hudspeth MP**, Hill TN, Lewis JA, Van Meter E, Ragucci D. Post-hematopoietic stem cell transplant immunization practices in the Pediatric Blood and Marrow Transplant Consortium. Pediatric Blood and Cancer. 2010 Jul 1;54(7):970-5.

6. Brown E, Hebra A, Jenrette J, **Hudspeth MP**. Successful treatment of late, recurrent Wilms' tumor with high dose chemotherapy and autologous stem cell rescue in third complete response. Journal of Pediatric Hematology/Oncology. Journal of Pediatric Hematology Oncology. 2010; 32: 241-243.

7. **Hudspeth MP**, Brown E, Ragucci D, Dixon T, Turner R. Severe pruritus and hypothermia as the primary manifestations of Human Herpes Virus-6 encephalitis after pediatric cord blood transplantation. Bone Marrow Transplantation. 2011, in press.

8. Post GR, Lewis JA, **Hudspeth MP**, Lazarchick J. Disseminated Neuroendocrine Carcinoma in a Pediatric Patient: A Rare Case and Diagnostic Challenge. Journal of Pediatric Hematology Oncology. 2011, in press.

Non-Peer Reviewed:

1. **Hudspeth M**. Varicella-Zoster Immune Globulin. Pediatrics in Review. 2005; 26: 342-343

Chapters in Scholarly Books and Monographs:

1. **Hudspeth M**, Symons H. Hematology. In: Gunn VL, Nechyba C, editors. The Harriet Lane Handbook. 16th ed. Philadelphia: Mosby; 2002. p. 283-306.

2. **Hudspeth M**, Symons H. Immunology. In: Gunn VL, Nechyba C, editors. The Harriet Lane Handbook. 16th ed. Philadelphia: Mosby; 2002. p. 307-314.

3. **Hudspeth M**, Symons H. Oncology. In: Gunn VL, Nechyba C, editors. The Harriet Lane Handbook. 16th ed. Philadelphia: Mosby; 2002. p.505-511.

Chapters in Scholarly Books and Monographs

1. Burges G, Lewin D, Stuart RK, **Hudspeth MP**, Virella G. Transplantation Immunology. Patient-Oriented Problem Solving (POPS) System. American Medical Association Education and Research Foundation. 2007.

Peer Reviewed Electronic Publications:

1. **Hudspeth MP**, Holden KR, Crawford TO. The "Slurp Test": Bedside Evaluation of Bulbar Muscle Fatigue. Pediatrics. 2006; 118: e530-33.

Committee on Oversight and Government Reform
Witness Disclosure Requirement – "Truth in Testimony"
Required by House Rule XI, Clause 2(g)(5)

Name: Michelle Hudspeth MD

1. Please list any federal grants or contracts (including subgrants or subcontracts) you have received since October 1, 2008. Include the source and amount of each grant or contract.

None

2. Please list any entity you are testifying on behalf of and briefly describe your relationship with these entities.

None

3. Please list any federal grants or contracts (including subgrants or subcontracts) received since October 1, 2008, by the entity(ies) you listed above. Include the source and amount of each grant or contract.

None

I certify that the above information is true and correct.

Signature: Michelle Hudspeth

Digitally signed by Michelle Hudspeth
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