

Dr. Andrew Zimmerman's Full Affidavit

AFFIDAVIT

I, Andrew Walter Zimmerman, M. D. do hereby state under oath as follows:

1. I am a board certified, pediatric neurologist and former Director of Medical Research, Center for Autism and Related Disorders, Kennedy Krieger Institute, and Johns Hopkins University School of Medicine.

2. I was a Reviewer for the National Academy of Sciences 2004 report entitled IMMUNIZATION SAFETY REVIEW: VACCINES AND AUTISM, which was prepared by the Immunization Safety Review Committee, at the request of the Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), and the Institute of Medicine (IOM).

3. A copy of my curriculum Vitae is attached hereto as exhibit A and incorporated by reference.

4. In 2007, I was an expert witness for the Department of Health and Human Services in the Omnibus Autism Proceeding (O.A.P.) under the National Childhood Vaccine Injury Compensation Program.

5. With the assistance of the Department of Justice, I prepared and executed the attached expert witness opinion regarding Michelle Cedillo, on behalf of the Department of Health and Human Services in Cedillo v. H.H.S. My expert opinion in Cedillo v. H.H.S. is attached as exhibit B. It states in pertinent part as follows:

"There is no scientific basis for a connection between measles, mumps and rubella (MMR) vaccine or mercury (Hg) intoxication and autism. Despite well-intentioned and thoughtful hypotheses and widespread beliefs about apparent connections with autism and regression, there is no sound evidence to support a causative relationship with exposure to both, or either, MMR and/or Hg. Michelle Cedillo had a thorough and normal immunology evaluation by Dr. Sudhir Gupta, showing no

signs of immunodeficiency that would have precluded her from receiving or responding normally to MMR vaccine. ”

My expert opinion regarding Michelle Cedillo also states:

“Furthermore, there is no evidence of an association between autism and the alleged reaction to MMR and Hg, and it is more likely than not, that there is a genetic basis for autism in this child.”

6. On Friday June 15th 2007, I was present during a portion of the O.A.P. to hear the testimony of the Petitioner’s expert in the field of pediatric neurology, Dr. Marcel Kinsbourne. During a break in the proceedings, I spoke with DOJ attorneys and specifically the lead DOJ attorney, Vincent Matanoski in order to clarify my written expert opinion.
7. I clarified that my written expert opinion regarding Michelle Cedillo was a case specific opinion as to Michelle Cedillo. My written expert opinion regarding Michelle Cedillo was not intended to be a blanket statement as to all children and all medical science.
8. I explained that I was of the opinion that there were exceptions in which vaccinations could cause autism.
9. More specifically, I explained that in a subset of children with an underlying mitochondrial dysfunction, vaccine induced fever and immune stimulation that exceeded metabolic energy reserves could, and in at least one of my patients, did cause regressive encephalopathy with features of autism spectrum disorder.
10. I explained that my opinion regarding exceptions in which vaccines could cause autism was based upon advances in science, medicine, and clinical research of one of my patients in particular.

11. For confidentiality reasons, I did not state the name of my patient. However, I specifically referenced and discussed with Mr. Matanoski and the other DOJ attorneys that were present, the medical paper, Developmental Regression and Mitochondrial Dysfunction in a Child With Autism, which was published in the Journal of Child Neurology and co-authored by Jon Poling, M.D. Ph.D, Richard Frye, M.D., Ph.D, John Shoffner, M.D. and Andrew W. Zimmerman, M.D. A copy of which is attached as exhibit C.

12. Shortly after I clarified my opinions with the DOJ attorneys, I was contacted by one of the junior DOJ attorneys and informed that I would no longer be needed as an expert witness on behalf of H.H.S. The telephone call in which I was informed that the DOJ would no longer need me as a witness on behalf of H.H.S. occurred after the above referenced conversation on Friday, June 15, 2007, and before Monday, June 18, 2007.

13. To the best of my recollection, I was scheduled to testify on behalf of H.H.S. on Monday, June 18, 2007.

14. At the time of the above referenced conversation with the DOJ, I did not know that Hazlehurst v. HHS or Poling v. HHS were potential test cases in the OAP.

15. It is my understanding the HHS concession in Poling v. H.H.S. has become common knowledge and has been published by international news media. Among other news media coverage, I reviewed the CNN interview in which Dr. Julie Gerberding, the former head of the CDC discussed the concession by H.H.S. in Poling v. H.H.S. and the interview with Dr. Jon Poling, the father of the child whose case was conceded.

16. The summary language, "the vaccinations, significantly aggravated an underlying mitochondrial disorder, which predisposed her to deficits in cellular energy metabolism, and manifested as a regressive encephalopathy with features of autism spectrum disorder" is in essence the chain of causation that I explained to the DOJ attorneys including Vincent Matanoski during the above referenced conversations on June 15, 2007.

17. I have reviewed extensive genetic, metabolic and other medical records of William "Yates" Hazlehurst. In my opinion, and to a reasonable degree of medical certainty, Yates Hazlehurst suffered regressive encephalopathy with features of autism spectrum disorder as a result of a vaccine injury in the same manner as described in the DOJ concession in Poling v. H.H.S., with the additional factors that Yates Hazlehurst was vaccinated while ill, administered antibiotics and after previously suffering from symptoms consistent with a severe adverse vaccine reaction.

18. I have reviewed the attached portion of the transcript, of Vincent Matanoski's closing argument in Hazlehurst v. H.H.S., which is attached as exhibit D. The relevant portion of the transcript states as follows:

I did want to mention one thing about an expert, who did not appear here, but his name has been mentioned several times, and that was Dr. Zimmerman.

Dr. Zimmerman actually has not appeared here, but he has given evidence on this issue, and it appeared in the Cedillo case. I just wanted to read briefly because his name was mentioned several times by Petitioners in this matter. What his views were on these theories, and I'm going to quote from Respondent's Exhibit FF in the Cedillo case, which is part of the record in this case as I understand it.

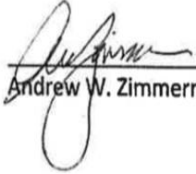
"There is no scientific basis for a connection between measles, mumps and rubella MMR vaccine or mercury intoxication in autism despite well-intentioned and thoughtful hypotheses and widespread beliefs about apparent connection with autism and regression. There's no sound evidence to support a causative relationship with exposure to both or either MMR and/or mercury."

We know his views on this issue.

19. In my opinion, the statement by Mr. Matanoski during his closing argument regarding my expert opinion was highly misleading and not an accurate reflection of my opinion for two reasons. First, Mr. Matanoski took portions of my opinion out of context. My opinion as to Michelle Cedillo was case specific. I was only referring to the medical evidence that I had reviewed regarding her. My opinion regarding Michelle Cedillo was not intended to be a blanket statement as to all children and all medical science. Second, as explained above, I specifically

explained to Mr. Matanoski and the other DOJ attorneys who were present that there were exceptions in which vaccinations could cause autism.

20. In my opinion, it was highly misleading for the Department of Justice to continue to use my original written expert opinion, as to Michelle Cedillo, as evidence against the remaining petitioners in the O.A.P. in light of the above referenced information which I explained to the DOJ attorneys while omitting the caveat regarding exceptions in which vaccinations could cause autism.


Andrew W. Zimmerman M.D.

State of Massachusetts

County of Worcester

Personally appeared before me, the undersigned Notary Public, Andrew Zimmerman M. D. with whom I am personally acquainted and who signed the foregoing Affidavit in my presence and, under oath stated that he had personal knowledge of the facts contained in the foregoing Affidavit and that those facts are true and correct.

Sworn and subscribed before me, the undersigned Notary Public, in and for the aforesaid State and County on this the 21st day of September, 2018.


Notary Public

My Commission expires: April 9, 2021



MAXINE SCHMEIDLER
Notary Public
Commonwealth of Massachusetts
My Commission Expires
April 9, 2021

CURRICULUM VITAE

Date Prepared: December 11, 2017

Name: Andrew W. Zimmerman, M.D.

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Dept. of Pediatrics
55 Lake Ave. North
Worcester, MA 01655

Home Address: 38 Daniels St.
Hopedale, MA 01747

Work Phone: 508-856-3279

Work E-Mail: Andrew.Zimmerman@umassmemorial.org

Work FAX: 508-856-4287

Place of Birth: Harrisburg, PA

Education

1966	AB	Germanic Languages and Literatures	Princeton University
1970	MD	Medicine	Columbia University College of Physicians and Surgeons

Postdoctoral training

07/70-06/72	Intern, Resident	Pediatrics	C.S. Mott Children's Hospital University of Michigan Hospitals Ann Arbor, MI
07/74-06/77	Resident	Neurology	Johns Hopkins Hospital Baltimore, MD

Faculty Academic Appointments

01/77-08/82	Assistant Professor	Neurology Pediatrics	University of Connecticut School of Medicine
08/82-08/83	Associate Professor	Neurology Pediatrics	University of Connecticut School of Medicine
08/83-12/02	Clinical Associate Professor	Pediatrics	University of Tennessee School of Medicine

09/94-2010	Associate Professor	Neurology Psychiatry Pediatrics	Johns Hopkins University School of Medicine
10/10-present	Adjunct Associate Professor	Neurology	Johns Hopkins University School of Medicine
07/08-2012	Associate Professor	Epidemiology	Johns Hopkins Bloomberg School of Public Health
10/10-12/13	Associate Professor	Neurology Pediatrics	Harvard Medical School
12/13-present	Clinical Professor	Pediatrics & Neurology	University of Massachusetts Medical School

Appointments at Hospitals/Affiliated Institutions

01/77-08/83	Staff Physician	Pediatrics and Neurology	University of Connecticut Hospital Farmington, CT
08/83-12/02	Staff Physician	Pediatrics	University of Tennessee Hospital
08/83-08/94	Staff Physician	Pediatrics	East Tennessee Children's Hospital
08/83-08/94	Staff Physician	Pediatrics and Neurology	St. Mary's Hospital Knoxville, TN
09/94-2010	Staff Physician	Pediatric Neurology	Johns Hopkins Hospital
09/94-present	Staff Physician	Neurology and Developmental Medicine	Kennedy Krieger Institute Baltimore, MD
09/05-2010	Director of Medical Research	Center for Autism and Related Disorders	Kennedy Krieger Institute
2010-present	Courtesy Staff		Kennedy Krieger Institute
10/10-10/13	Director of Clinical Trials	Lurie Family Autism Center MGH LADDERS	MassGeneral Hospital for Children Lexington, MA
10/13 – present	Courtesy Staff	MGH Pediatric Neurology	Mass General Hospital for Children and Spaulding MGH Clinic, Sandwich, MA

Other Professional Positions

07/72-06/74	Clinical Associate in Pediatrics	Developmental and Metabolic Neurology Branch, NINDS, NIH
08/83-09/94	Partner	Knoxville Neurology Clinic Knoxville, TN
09/94-08/06	Chairman of Professional Advisory Board	East Tennessee Chapter Autism Society of America
2005-present	Founding Member and Chairman, Scientific Advisory Board Member, Board of Directors	Fetal Physiology Foundation http://www.fetalphysiologyfoundation.org
1985-2008	Examiner	American Board of Psychiatry and Neurology

Major Administrative Leadership Positions

07/91-08/94	Vice President of Medical Staff	East Tennessee Children's Hospital Knoxville, TN
10/03-06/06	President of Medical Staff	Kennedy Krieger Institute
09/83-08/94	Director, Oliver W. Hill Pediatric Neurology Laboratory (EEG)	East Tennessee Children's Hospital
05/85-06/96	President	Pedifutures, Inc. Oak Ridge, TN
06/06-01/07	Organizer, Autism and Immunology Conference	Autism Speaks
06/06-09/06	Symposium Organizer	Fetal Physiology Foundation
03/08-06/08	CME Conference Organizer	Fetal Physiology Foundation

Committee Service

1987	Panel member	NIH Consensus Development Conference on Neurofibromatosis
1996-1998	Pharmacy and Therapeutics Committee	Kennedy Krieger Institute
1998-2000	Health Information Committee	
2000-2006	Medical Staff Executive Committee	
2006-2010	Credentials Committee	

Professional Societies

1975	American Academy of Neurology	
1977	American Academy of Pediatrics 1998-2001	Member, Executive Committee Section on Neurology
1978	Child Neurology Society 1985-86, 1990-91 1987-88 1992-93 1998 2010 2012-15	Scientific Selection Committee Practice Committee Ethics Committee By-Laws Committee Membership Committee Scientific Selection Committee
1983	American Medical Association	
1996	Society for Neuroscience	
2001	Baltimore City Medical Society 2005-07 2005-10	Board Member Health, Education and Legislation Committee
2007	American Neurological Association 2010	Scientific Selection Committee
Grant Review Activities		
2005	Grant review	Scottish Rite Charitable Foundation Ad hoc member
2005-2009	Grant reviewer	Autism Speaks Ad hoc member
2007- 2009	Grant reviewer	Governor's Council for Medical Research and Treatment of Autism
2009	Grand Opportunities Grant Reviews	NIMH, NIH Ad hoc member
2009	Grant reviews	Autistica (Autism Speaks U.K.) Ad hoc reviewer
2009-2010	Grant reviewer	Fetal Physiology Foundation
2009-2010	Grant reviewer	Autism Treatment Network

2010 Ad hoc reviewer ZonMw (Dutch National Research Incentives Scheme)

Editorial Activities

Ad hoc Reviewer:
New England Journal of Medicine
Pediatrics
Archives of Pediatrics
Journal of Pediatrics
Annals of Neurology
American Journal of Obstetrics and Gynecology
Journal of Autism and Developmental Disorders
Autism Research
Journal of Neuroimmunology
Journal of Neurovirology
Journal of Child Neurology
Biological Psychiatry
Brain Imaging and Behavior
Neurobiology of Disease
MIT Press (book proposal)
Neurotherapeutics
FASEB Journal

Honors and Prizes

1966-70	E.J. Noble Foundation International Fellow	Columbia University	International Fellows Program
1970	Medical Student Research Award	Columbia University	
1977	Certificate of Excellence in Teaching	Johns Hopkins University School of Medicine	
2007	Distinguished Service Award	Baltimore Medical Society	

Report of Funded and Unfunded Projects

1977-1979	Zinc incorporation during morphogenesis Charles H. Hood Foundation PI (\$25,000/year) The goal was to localize zinc by autoradiography in developing embryos, with emphasis on neural tube and CNS development.
1979-1982	Zinc transport in pregnancy United Cerebral Palsy Foundation

- PI (\$50,000/year)
This was a study of plasma zinc and zinc transport proteins during pregnancy.
- 1979-1980 Histamine release in migraine
University of Connecticut Research Foundation
PI (\$20,000/year)
This was *in vitro* study of histamine release from lymphocytes of patients with migraine.
- 1986-1988 Cellular zinc uptake in neural tube defects
Physicians' Medical and Educational Research Foundation
University of Tennessee-Knoxville
PI (\$10,000/year)
The objective was to develop methods to determine zinc uptake by fibroblasts from patients with neural tube defects and controls.
- 1989 Ketamine anesthesia and PET in childhood autism
Physicians' Medical and Educational Research Foundation
University of Tennessee-Knoxville
PI (\$15,000)
This was a pilot study to replicate clinical observations of functional improvements in patients with autism following ketamine anesthesia.
- 1990-1994 Ketamine in autism
State of Tennessee Legislature grant
PI (\$50,000)
The objective was to study changes in behavior following ketamine anesthesia for PET and MRI in children with autism.
- 1996-1997 Lamotrigine in autism
Glaxo Wellcome Co.
PI (\$40,000/year)
The goal was to evaluate functional changes on treatment with lamotrigine, for its glutamate (NMDA) blocking properties.
- 1998 Excitatory and inhibitory neurotransmitter receptor expression and microglial status in autism
Autism Research Foundation
PI (\$10,000)
This was a pilot study to examine microglial activation in autism.
- 1998-1999 NCAM in autism
National Alliance for Autism Research
PI (\$75,000/year)
This was a study of Neural Cell Adhesion Molecule in autism.

- 1999-2000 CEB-1050 (amantadine) in autism
Cerebrus, Ltd.
Site PI in multisite study (\$30,000)
This was a multisite study of amantadine for its glutamate blocking properties, to which our site contributed several subjects.
- 2001-2005 Fever in autism
Cure Autism Now Foundation
PI (\$75,000/year for 3 years)
This was an extended study of behavioral improvements with fever in children with autism.
- 2005-2007 Maternal antibodies in autism
National Alliance for Autism Research
Co-PI (Harvey Singer, PI)
This was a study of serum anti-brain antibodies in mothers of children with autism, based on preliminary data.
- 2007-2010 Maternal antibody binding to lymphocytes of offspring with autism
The Hussman Foundation
PI (\$50,000)
This is a current study to examine techniques for the assessment of maternal antibody binding to lymphocytes from children with autism.
- 2008-2010 Hydroxyurea in the treatment of adolescents with autism: Preliminary safety and action study
Anonymous Donor
PI (\$40,000)
This is a pilot grant for study planning and application for FDA and IRB approval for a trial of hydroxyurea in autism.
- 2011-2013 Clinical trial: Sulforaphane-rich Broccoli Sprout Extract for Autism.
PI (\$250,000)
This is a double blind, placebo-controlled trial to test the efficacy of sulforaphane in males with autism, 13-30 years of age.
- 2014-2016 Cytokine expression of lymphocytes in children with Autism Spectrum Disorder
RapidLabs
PI (\$100,000)
A pilot study of in vitro cytokine expression in response to mitogens and new anti-inflammatory drugs.
- 2015-2018 Clinical trial: Sulforaphane treatment of children with Autism Spectrum Disorder
Congressional Mandated Research Program; Department of Defense
PI (\$1,300,000)

A double blind, placebo-controlled clinical trial of sulforaphane in children with ASD, 3-12 years of age.

Current Unfunded Projects

- 2008-present Maternal antibodies in autism; continuing longitudinal study of maternal antibodies to fetal brain in a cohort of mothers of children with autism.
- 2008-present Sickle cell disease and autism spectrum disorders
This is an ongoing evaluation of CDC data from the multisite surveillance study of autism to determine if there is a decreased frequency of autism in persons with sickle cell disease.

Teaching of Students in Courses

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|-----------|--|--|
| 1977-1983 | Neuroscience course
2 nd year medical students | University of Connecticut School of Medicine
1-hr lecture yearly on brain development and pediatric neurology |
| 1995-2008 | Autism: science, clinical evaluation and treatment | Kennedy Krieger Institute; Core course for trainees in neuropsychology, speech therapy, OT and PT; 1.5-hr annual lecture |

Formal Teaching of Residents, Clinical Fellows and Research Fellows

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|-----------|---|--|
| 1983-1994 | Migraine in children
Treatment of epilepsy
Autism
Communication with patients
Neural tube and other CNS birth defects | University of Tennessee-Knoxville
Pediatric and family practice residents
1-hr lectures |
| 2004-2008 | Medical evaluation and treatment of autism spectrum disorders | Center for Autism and Related Disorders
Kennedy Krieger Institute
Recurring lectures to fellows, OT and SLP therapy trainees |
| 1995-2005 | Autism and related disorders | Johns Hopkins Hospital
Pediatric neurology, neurology and developmental medicine and pediatric residents
Biannual 1-hr lecture |
| 1997 | Evaluation of autism | Pediatric residents' rounds |
| 2002 | Neurology and autism | Neurology residents' rounds |
| 2005 | Asperger syndrome | Invited lecture to neurology and developmental medicine fellows |
| 2009 | Clinical observations and autism research | Invited lecture to neurology and developmental medicine fellows |
| 2015 | Clinical and lab research in autism: history and future | Seminary on ASD for MDPHD students at UMass |
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Clinical Supervisory and Training Responsibilities

1977-1983	Inpatient and ambulatory pediatric neurology attending University of Connecticut	Daily clinic sessions and consulting service, teaching pediatric residents
1983-1994	Ambulatory pediatric neurology teaching of pediatric and family practice residents East Tennessee Children's Hospital and University of Tennessee	One session per week/1-2 monthly rotations of residents per year in office practice and hospital consultations
1994-2001	Inpatient attending Pediatric neurology service Johns Hopkins Hospital	Daily for 1 month/year
1994-2010	Ambulatory pediatric neurology Attending/Residents' clinic	One session per month
2004-2010	Ambulatory Developmental Medicine and Child Neurology Attending/Residents' clinic	One session every 6 weeks
2011-	Inpatient attending Pediatric neurology service Massachusetts General Hospital	Daily for 2 weeks/year
2010-	Ambulatory pediatric neurology	Weekly clinic sessions at MGH and 3 days/week at Lurie Center for Autism 3 sessions per week at UMass
2013-present	Resident and Student teaching in Autism (CANDO) and Pediatric Neurology Clinics	3 sessions per week + on service 1 week:4
2011-16	Supervision of Research Fellow Kanwaljit Singh, M.D.	Daily

Formally Supervised Trainees and Faculty

1980-1983	Jeffrey Rosenfeld, MD, PhD/Dept. of Neurology, Univ. of CA Fresno Thesis Committee member, Dept. of Neuroscience, University of CT, Storrs and Farmington, CT; published studies of copper in quaking mice.
1987-1990	Christopher A. Mann, PhD/Sleep medicine Thesis Committee member, Dept. of Psychology, Univ. of Tennessee, Knoxville; published study of topographic brain mapping as a diagnostic for ADHD

- 2005 Autism and Asperger Syndrome / Invited presentation
Psychiatry Update; Sponsored by Johns Hopkins University
New Brunswick, NJ
- 2006 Is autism an autoimmune disorder? / Invited presentation
Autism Network lecture series, Kennedy Krieger Institute/Johns Hopkins
- 2006 Is there a role for the immune system in autism? / Invited presentation
Spectrum of Developmental Disabilities (CME course)
Kennedy Krieger Institute / Johns Hopkins University School of Medicine
Baltimore, MD
- 2008 Maternal antibodies and autism / Invited presentation
Autoimmunity Day / Johns Hopkins Bloomberg School of Public Health
- 2008 Selective mutism and Aicardi syndrome / Invited presentation
Symposium on selective mutism
American Academy of Child and Adolescent Psychiatry
Chicago, IL
- 2012 Future directions in autism research / Invited presentation
Special interest group in neurodevelopmental disorders
Child Neurology Society

Local Invited Presentations (from 2004)

- (No presentations below were sponsored by outside entities)
- 2004 Neuropathology of autism spectrum disorders / Workshop presentation
Epidemiology of Autism Spectrum Disorders
Johns Hopkins Bloomberg School of Public Health
- 2006 Simulation of the beta-2 adrenergic receptor and its polymorphisms in autism
Inaugural symposium of the Fetal Physiology Foundation
Baltimore, MD
- 2007 Immunological aspects of autism / Invited presentation
Workshop on autism research
Kennedy Krieger Institute
- 2007 Autism and the environment / Invited presentation
Workshop on autism research
Kennedy Krieger Institute
- 2008 Fetal mechanisms in neurodevelopmental disorders / Conference organizer
Fetal Physiology Foundation, sponsored by Kennedy Krieger Institute and
NICHD; Johns Hopkins CME program
- 2008 Autism -- 2008 / Grand Rounds
Department of Neurology, Johns Hopkins Hospital
- 2008 Cellular abnormalities: New approaches in autism research
Research seminar organized for staff at Kennedy Krieger Institute
and Johns Hopkins University
Baltimore, MD
- 2008 Autism – 2008 / Neurology Grand Rounds
Johns Hopkins Hospital
Baltimore, MD
- 2009 From hypotheses to theories in autism research / Pediatrics Grand Rounds

Johns Hopkins Hospital
Baltimore, MD
2009 Autism and maternal immunogenetic factors
Baltimore Genetics Society
Greater Baltimore Medical Center
Baltimore, MD

Regional, National and International Invited Teaching and Presentations (from 2002)

(The presentations below sponsored by outside entities are so noted and the sponsors are identified)

2002 Medical and immune factors in clinical trials in autism / Invited presentation
Symposium on clinical trials in autism; Cure Autism Now Foundation
Santa Monica, CA

2002 Autism: An overview / Presentation to pharmaceutical company
(Sponsored by *Psychiatric Genomics, Inc.*)
Germantown, MD

2002 Neurobiology of autism / Invited presentation
Autism symposium, Geisinger Medical Center
Wilkes-Barre, PA

2003 Basic and clinical science of autism and related neurodevelopmental disorders
Medical evaluation and treatment of autism spectrum disorders
Care of the Sick Child Conference (CME)
Arnold Palmer Children's Hospital
Orlando, FL

2004 Autism's early signs / Invited presentation
East Tennessee Children's Hospital
Knoxville, TN

2004 Microglial activation in the brain in autism / Invited presentation
The Autism Research Foundation
Boston, MA

2004 Autism: What it is / Invited presentation
Current Clinical Issues in Primary Care
Hopkins/Harvard CME Program
(Sponsored by *PRI-MED*)
Washington, DC

2004 Autism: Current science and management / Invited Presentation
Society for Pediatric Special Care Dentistry
Banff, Canada

2005 Neuroinflammation and development of white matter / Invited presentation
White Matter "Think Tank"
Cure Autism Now Foundation
Malibu, CA

2005 Immunology and autism / Invited presentation at annual conference
Interdisciplinary Council for Development and Learning
Washington, DC

2005 Immunology and autism / Invited presentation

- The Autism Research Foundation
Boston, MA
- 2006 Serum antibrain antibodies in children with autism / Invited presentation
The Autism Research Foundation
Boston, MA
- 2006 Autism and Asperger syndrome / Grand Rounds
Potomac Hospital
Potomac, VA
- 2007 Clinical overview of autism / Autism Immunology Workshop (organizer)
Autism Speaks / Cure Autism Now Foundation
California Institute of Technology
Pasadena, CA
- 2007 Maternal antibodies and placental-fetal IgG transfer in autism/Invited presentation
The Autism Research Foundation
Boston, MA
- 2008 Evidence for immune involvement in autism / Invited presentation
Neuroimmunology, Brain Development and Mental Disorders
NIMH Conference
Washington, D.C.
- 2008 Placental-fetal transfer of maternal antibodies in autism / Invited presentation
Autism Research Consortium
Massachusetts General Hospital
Boston, MA
- 2009 Effects of fever in autism / Invited presentation
LADDERS Clinic, Massachusetts General Hospital
Lexington, MA
- 2009 Fever, immune factors and synaptic function in autism / Invited presentation
Autism symposium, Lucille Packard Children's Hospital, Stanford University
Palo Alto, CA
- 2009 Immunological aspects of autism: Important questions
Immunological aspects of autism: Curious findings / Invited presentations
Weinberg Child Development Center, Safra Children's Hospital
Sheba Tel Hashomer, Tel Aviv, Israel
- 2009 The fever effect and search for the holy grail in autism
Effects of fever in autism: clues to pathogenesis and treatment
Distinguished lecturers series, MIND Institute
University of CA, Davis
- 2009 Autism: Challenge for our time / Medical staff presentation
Anne Arundel Medical Center
Annapolis, MD
- 2010 Fever and autism / Invited Presentation
Workshop on effects of fever in autism
Simons Foundation
New York, NY
- 2010 Neurology of cognitive flexibility / Invited Presentation
American Academy of Child and Adolescent Psychiatry

- New York, NY
- 2012 Current diagnosis, treatment and research / Invited Presentation
Mary L. Hayleck, MD Memorial Lecture
MedStar Union Memorial Hospital
Baltimore, MD
- 2013 Current Autism Research; Autism Research Institute/Invited Presentation
Annual meeting, Baltimore, MD
- 2014 Neuroinflammation in Autism/Invited Presentation
International Child Neurology Congress, Foz do Iguassu, Brazil

Current Licensure and Certification

- 1994-present Maryland Medical License
- 2002-present Massachusetts Medical License
- 1976 American Board of Pediatrics
- 1979 American Board of Psychiatry and Neurology, with special competence in
Child Neurology
- 1992 Continuing Education Recognition Certificate, American Academy of Neurology

Practice Activities

Discipline: Neurology, Pediatric neurology

1977-1983	Inpatient and outpatient	Adult neurology	On-call coverage
1977-1983	Inpatient and outpatient Consultations and follow up ambulatory care	Pediatric neurology University of CT	4 sessions per week Inpatient consultation service
1983-1994	Inpatient consultations and follow up	Adult neurology Knoxville (TN) Neurology Clinic (private practice)	1 day per week + on call
1983-1994	Inpatient and outpatient Consultations and follow up	Pediatric neurology Knoxville (TN) Neurology Clinic and Univ. of TN	5 days per week + on call
1983-1994	EEG dept. supervision	Pediatric Neurology East TN Children's Hospital, Knoxville	5 days per week + on call
1994-1997	Medical Director	Neurobehavior Unit	5 days per week

	Supervise medical care on inpatient unit	Kennedy Krieger Inst. Baltimore, MD
1994-2010	Inpatient and outpatient Ambulatory care	Pediatric neurology 4 sessions per week Kennedy Krieger Inst.
2010-2013	Outpatient care	Lurie Family Autism Center/LADDERS 4 sessions per week
2012-2013	Outpatient care	Pediatric neurology clinic/MGH 1 session/week
2013-present	Inpatient and outpatient	UMass Memorial Medical Center 4 days per week
2013-present	Volunteer Faculty	MGH Dept. of (Pediatric) Neurology Attending in Residents' Clinic 6/yr Outpatient care at Cape Cod clinic ½ day/month

Clinical Innovations

Zinc nutrition in premature infants	Improvements in intravenous and oral zinc nutriture in prematurity developed nationally as the result of my study of acrodermatitis and zinc deficiency in premature infants; demonstrated anomalous zinc excretion in breast milk.
Immune dysfunction in autism	Fostered recognition of importance of immune system in autism through studies of autoimmune dysfunction in families, microglial activation in brain, maternal antibodies to fetal brain and behavioral improvements during fever.
Fever effects in autism and cell stress responses; treatment trials	Based on clinical observations of the beneficial effects of fever in some children with ASD, treatments, as well as lab studies have followed in collaboration with others, in clinical trials of sulforaphane in ASD.

Technological and Other Scientific Innovations

Novel drug therapy for autism	U.S. Patent No. 4,994,467 Treating autism and other developmental disorders with NMDA receptor antagonists.
Novel use of primidone for treatment of apnea of prematurity	U.S. Patent No. 5,166,158 Method for the treatment of apnea and/or bradycardia (primidone).
Development of wireless EEG for rapid application and measurement	U.S. Patent No. 5,279,305

Education of Patients and Service to the Community (from 2002)

- (No presentations below were sponsored by outside entities)
- 2002 Update on biology of autism
East Tennessee Chapter, Autism Society of America
Knoxville, TN
- 2002 Update on biology and drug therapy of autism spectrum disorders
Cincinnati Children's Hospital
Cincinnati, OH
- 2003 Immunology and autism / Invited presentation
Current Trends in Autism
Ontario, CA
- 2003 Immunology and autism: More than meets the eye / Invited presentation
Symposium for families and professionals
Queens University
Kingston, Ontario
- 2004 Medical science and autism
Parents' Day, Center for Autism and Related Disorders
Kennedy Krieger Institute, Baltimore, MD
- 2005 Autism Research: Challenge of our time
Maryland Chapter, Cure Autism Now Foundation
Columbia, MD
- 2006 Effective use of medications for autism spectrum disorders
Howard County Chapter, Autism Society of America
Columbia, MD
- 2006 Autism research: Challenge of our time
East Tennessee Chapter, Autism Society of America
Knoxville, TN
- 2006 Recent trends in autism research / Invited presentation
Baltimore City and County Chapter, Autism Society of America
Baltimore, MD
- 2007 Immunology and autism / Invited presentation
Association for Research in Autistic People
Rhein-Neckar-Kraichgau; Heidelberg, Germany
- 2009 Genetic and immune abnormalities in autism / Invited presentation
East Tennessee Chapter, Autism Society of America
Knoxville, TN
- 2010 Autism -- 2010
Ezra and Friends Foundation
Vienna, VA

Recognition

- 1995 Distinguished service award
East Tennessee Chapter, Autism Society of America

Peer-reviewed Publications

1. Zimmerman, A.W. and Schmickel, R. Fluorescent bodies in maternal circulation. *Lancet (Letter)*, i:1305, 1971.
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4. Reier, P.J., Matthieu, J-M., and Zimmerman, A.W. Myelin deficiency in hereditary pituitary dwarfism: A biochemical and morphological study. *J. Neuropath Exp Neurol*, 34:465-477, 1975.
5. Zimmerman, A.W., Quarles, R.H., Webster H deF, Matthieu, J-M., and Brady, R.O. Characterization and protein analysis of myelin subfractions in rat brain. Developmental and regional comparisons. *J. Neurochem*, 25:749-757, 1975.
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14. Holmes, G., Rowe, J., Hafford, J., Schmidt, R., Testa, M. and Zimmerman, A.W. Prognostic value of the electroencephalogram in neonatal asphyxia. *Electroencephalogr Clin Neurophysiol* 53:60-72, 1982.
15. Simon, R.H., Zimmerman, A.W., Tasman, A., and Hale, M.S. Spectral analysis of photic stimulation in migraine. *Electroencephalogr Clin Neurophysiol*, 53:270-276, 1982.
16. Holmes, G.L., Blair, S., Eisenberg, E., Schneebaum, R., Margraf, J. and Zimmerman, A.W. Tooth brushing-induced epilepsy. *Epilepsia* 23:657-661, 1982.
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25. Holmes GL, Weber DA, Koczko N, Zimmerman AW: Relationships of endocrine function to inhibition of kindling. *Developmental Brain Research* 16:55-59, 1984.
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33. Zimmerman, A.W. and Lozzio, C.B. Interaction between selenium and zinc in the pathogenesis of anencephaly and spina bifida. *Z Kinderchir* 44 (Suppl I): 48-50, 1989.
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78. Singh K, Connors SL, Macklin EA, Smith KD, Fahey JW, Talalay P, Zimmerman AW. Sulforaphane treatment of autism spectrum disorder (ASD). *Proc Natl Acad Sci USA*. 111(43):15550-5, 2014
79. Singh K, Zimmerman AW. Sleep in Autism Spectrum Disorder and Attention Deficit Hyperactivity Disorder. *Semin Pediatr Neurol*. 2015 Jun;22(2):113-25. doi: 10.1016/j.spn.2015.03.006. Epub 2015 Mar 26. Review. PubMed PMID: 26072341.
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Non-peer reviewed publications

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2. Zimmerman, A.W. Hormones and Epilepsy. *Neurologic Clinics* 4(4), 853-61, 1986.
3. Joshi, J.G., Zimmerman, A.W. Ferritin: An expanded role in metabolic regulation. *Toxicology* 48:21-29, 1988.
4. Zimmerman, A.W., Frye, V.H., Potter, N.T. Immunological aspects

of autism. *International Pediatrics*, 8:199-204, 1993.

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8. Zimmerman AW. The immune system in autism. *J Developmental and Learning Disorders* 3:3-15, 1999.
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10. Zimmerman AW, Gordon B. Neural mechanisms in autism. In: *Autism: Clinical and Research Issues*. Ed. Pasquale Accardo et al, York Press, 2000.
11. Zimmerman AW, Bonfardin B, Myers SM. Neuropharmacological therapy in autism. In *Autism: Clinical and Research Issues*. Ed. Pasquale Accardo et al, York Press, 2000.
12. Zimmerman AW. Commentary: Immunological treatments for autism: In search of reasons for promising approaches. *J Autism Devel. Disorders* 30:479-482, 2000.
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15. Zimmerman AW. Autism spectrum disorders. In: *Treatment of Pediatric Neurologic Disorders*. Eds: H. S. Singer, E.H. Kossoff, A.L. Hartman and T. O. Crawford. Boca Raton, Florida: Taylor and Francis, 2005, pp. 489-494.
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18. Zimmerman AW. Autism. In: Johnson R.T., Griffin J.W., McArthur J.C., *Current Therapy in Neurological Disease*, 7th ed., Philadelphia: Mosby Elsevier, 2006, pp 111-114.
19. Zimmerman AW, Connors SL and Pardo CA. Neuroimmunology and Neurotransmitters in Autism. Chapter for Autism. (R. Tuchman and I. Rapin, eds.), International Child Neurology Association, 2006.
20. Bonfardin B, Zimmerman AW, Gaus V. Pervasive Developmental Disorders. In: Fletcher, R., Loschen, E., Stavrakaki, C., & First, M. (Eds.). *Diagnostic Manual -- Intellectual Disability (DM-ID): A Textbook of Diagnosis of Mental Disorders in Persons with Intellectual Disability*. Kingston, NY: NADD Press, 2007, pp 107-125.
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24. Zimmerman AW (Ed.). *Autism: Current Theories and Evidence*. Humana Press, 2008.
25. Witter FR, Zimmerman AW, Reichmann JP, Connors SL. In utero beta 2 adrenergic agonist exposure and adverse neurophysiologic and behavioral outcomes. *Am J Obstet Gynecol* 201:553-9, 2009.
26. Zimmerman AW, Connors SL (Eds.). *Maternal Influences on Fetal Neurodevelopment*. Springer, 2010.
27. Zimmerman, A. W., Connors, S.L. Neuroscience. Could autism be treated prenatally? *Science* 343:620-1, 2014.
28. Singh, K., Zimmerman, A.W. Sleep in Autism Spectrum Disorder and Attention Deficit Hyperactivity Disorder. *Semin Pediatr Neurol* 22:113-125, 2015.

Abstracts and Poster Presentations (3 years)

1. Ebens, C.L., Morris, C.M., Gause, C.D., Gillin, P, Lee, L-C, Singer, H.S., and Zimmerman, A.W. Parental age and maternal antibodies to fetal brain in autism. International Meeting for Autism Research (IMFAR) 2007.
2. Singer, H.S., Morris, C.M., Gause, C.D., Gillin, P., Lee, L-C, Zimmerman, A.W. Serum antibrain antibody differences in mothers of children with autistic disorder: A study with fetal human and rodent tissue. IMFAR 2007.

3. Priestley, B.J., Lee, L-C, Zimmerman, A.W. Effects of maternal and paternal age in singleton births with autism spectrum disorders (ASD). IMFAR 2007
4. Zimmerman, A.W., Zachary, A.A., Leffell, M.S., Matteson, K.J., Tyler, J.D., Lee, L-C. The frequencies of HLA-A and B antigens in families with autism. IMFAR, May 4, 2007
5. Zimmerman, A.W., Connors, S.L., Curran, L.K. Fever in Autism spectrum Disorders (ASD): Spontaneous reports. IMFAR, May 17, 2008.
6. Zimmerman, A.W., Lee, L.C., Baio, J., Keefer, J.R., Kirby, R.S., Newschaffer, C., Nicholas, J.S., Durkin, M., Zahorodny, W., Smith, K.D. Sickle cell disease and autism spectrum disorders. IMFAR, May 8, 2009.
7. Croen, L., Connors, S.L., Matevia, M., Newschaffer, C., Zimmerman, A.W. Prenatal exposure to beta 2-adrenergic receptor agonists and risk of autism spectrum disorders. IMFAR, May 8, 2009.
8. Harrington, R.A., Lee, L-C., Crum, R.M., Zimmerman, A.W., Hertz-Picciotto, I. Association between SSRI exposure during pregnancy with behavior and conditions among children with ASD. IMFAR, May 3, 2013.
9. Zimmerman, A.W., Singh, K., Connors, S.L. Citalopram treatment of young children with autism spectrum disorder (ASD): Correlation with maternal history of depression. International Congress of Child Neurology, Foz do Iguassu, Brazil, May 5, 2014.

Narrative Report

My first passion was for the clinical care of children, then for investigation based on clinical observations in order to pursue underlying mechanisms of disease. In neurology I found a broad array of clinical and intellectual challenges. An early interest in aberrant brain development and trace metal metabolism at the University of Connecticut was followed by recognition of the importance of autism during 11 years of private practice in Knoxville, Tennessee, during which I continued to do research. First and foremost, I value direct clinical care as the foundation for investigation that leads to improved clinical care. This approach led to my appreciation of the importance of immune factors in autism, an area of research that continues to unfold. In the past several years I have been focusing on underlying cellular mechanisms that may contribute to autism and novel treatments. Over 16 years at Kennedy Krieger Institute and Johns Hopkins, I devoted 50% time to the clinical care of patients with autism and other neurodevelopmental disorders and epilepsy, 40% to research. Teaching (10%) of trainees has been a pleasure in academic environments, and I was honored to serve as president of the medical staff for 3 years. I have also co-founded the Fetal Physiology Foundation and served on the board. At MGH and the Lurie Center, I conducted a clinical trial of sulforaphane (broccoli sprouts extract) for the treatment of autism, in collaboration with Drs Kirby Smith and Paul Talalay at Johns Hopkins. This approach is based on the clinical observation of behavioral improvements in autism during

fever, and the stimulation of cellular stress responses (e.g., heat shock proteins) by sulforaphane. I moved to UMass (Worcester) in late 2013 and have been seeing patients and teaching both in the autism clinic as well as general pediatric neurology. I am currently running a clinical trial of sulforaphane in children with autism, funded by the DOD.

Clinical expertise in pediatric and behavioral neurology and innovative approaches to disease mechanisms and treatment best describe my area of excellence. I have several current collaborations with colleagues, including studies of maternal antibodies in autism, *in vitro* assays of cytotoxicity between mothers and their children with autism, epidemiological study of autism in sickle cell disease (a negative correlation) and cell signaling with genetic variants of the beta-2 adrenergic receptor. In our current clinical trial of sulforaphane in children, several collaborators are helping to study metabolic aspects of ASD as well as the effects of sulforaphane at the cellular level.

My role in teaching has included mentorship of several individuals who have entered the fields of pediatric neurology and autism. A few colleagues in neurology have become involved as leaders in autism in their areas of expertise at my urging, and have made important contributions to the field.

- 1991-1994 Michie O. Swartwood, PhD/Dept. of Psychology, SUNY
Thesis Committee member, Dept. of Psychology, Univ. of TN; published study of effects of methylphenidate in ADHD
- 1991-1994 Jeffrey N. Swartwood, PhD/ Dept. of Psychology, SUNY
Thesis Committee member, Dept. of Psychology, Univ. of TN; published study of neurophysiological differences between ADHD and Non-ADHD children
- 2002-2005 Amy E. Purcell, PhD/Attorney
Thesis committee member, Dept. of Neuroscience, Johns Hopkins University School of Medicine
- 1997-2005 Laura K. Curran, PhD/Research Assistant, Kennedy Krieger Institute
Thesis committee member and mentor, Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health; published study of Behavioral Changes with Fever in Children with Autism
- 2007 Stephanie Darbre, MD, PhD/Elective during medical training at University of Geneva in study of cellular stress responses in autism (with AWZ and Kirby Smith, PhD); preparation for application to FDA for clinical trial of hydroxyurea in autism. Kennedy Krieger Institute and Johns Hopkins University
- 2006-2009 Katherine A. Bowers, PhD/Postdoctoral Fellow, NICHD, Epidemiology Branch
Thesis committee member (alternate reviewer), Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health; publications being submitted on gene-environment interactions in autism.
- 2008-2012 Rebecca A. Harrington, PhD/doctoral thesis committee member
SSRI use in pregnancy and autism in offspring
Johns Hopkins Bloomberg School of Public Health
- 2016- Anita Panjwani /doctoral thesis committee member
Johns Hopkins Bloomberg School of Public Health
Sulforaphane clinical trial in ASD, in Bangladesh

Formal Teaching of Peers (from 2002)

- (No presentations below were sponsored by outside entities)
- 2002 Differential diagnosis of abnormal behavior (from a neurological perspective)
Spectrum of Developmental Disabilities (CME course)
Kennedy Krieger Institute / Johns Hopkins University School of Medicine
Baltimore, MD
- 2003 Autism: Trends in patient management / Invited presentation
Maryland Academy of Physician Assistants
Baltimore, MD
- 2004 Immunology and autism / Invited presentation
Autism Network lecture series, Kennedy Krieger Institute/Johns Hopkins