

BIOGRAPHICAL SKETCH

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NAME: May, Philip Alan

POSITION TITLE: Research Professor

eRA COMMONS USER NAME (credential, e.g., agency login): philmay

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Catawba College, Salisbury, NC	A.B.	05/1969	Sociology
Wake Forest University, NC	M.A.	05/1971	Sociology
University of Montana, Missoula, MT	Ph.D.	08/1976	Sociology (Demography, Epidemiology, and Population Studies)

A. Personal Statement

Over the past 38 years, I have been the principal investigator overseeing the design, methodology, field clinics, data collection, and analysis for over a dozen major, representative, population-based epidemiological studies of children in entire communities on the prevalence, characteristics, etiology, and prevention of fetal alcohol syndrome (FAS) and specific diagnoses of fetal alcohol spectrum disorders (FASD). These studies have been carried out in the United States, Italy, and South Africa. Currently, I continue to work on studies of both average, and variability in individual, outcomes related to prenatal alcohol exposure, especially diagnostic variability and trait variability across and within specific FASD diagnoses. I continue this work with my highly experienced and expert colleagues at UNC, the University of New Mexico, Stellenbosch University, the University of South Dakota, University of Arizona, Stanford, and several other institutions because of our long-standing and successful collaboration. One reason that I moved to UNC is to pursue a more complete understanding of the etiology of FASD while we completed cross sectional and longitudinal studies of the prevalence and characteristics of FASD. One unique area of special exploration is maternal risk factors for FASD relationship to variation in multiple child outcomes. Our experience over the years has raised questions about the interaction between specific patterns of maternal alcohol intake, multiple distal risk factors, and variation in child outcomes. Distal variables such as body mass, maternal age, dietary intake, metabolic variation, childbearing history, breastfeeding when consuming alcohol, sex of the child, and paternal contribution to the severity of FASD will all lead to new knowledge of etiological mechanisms. Exploring such questions and seeking partial answers from associations studies and large sample epidemiological data has already led to new insights and new lines of investigation for our team and others to pursue in genetics, epigenetics, and metabolomics that may fit, or more completely explain, the substantially variable child outcomes that we see in our studies. We have also recently employed biomarkers of alcohol use (EtG and PEth) to assess the validity of self-report data in the South African population. Furthermore, translating research results to prevention, intervention, and prevention medicine is our goal.

- 1) **Philip A. May**, Christina D. Chambers, Wendy O. Kalberg, Jennifer Zellner, Haruna Feldman, David Buckley, David Kopald, Julie M. Hasken, Rongui Xu, Cordon Honerkamp-Smith, Howard Tara, Melanie A. Manning, Luther K. Robinson, Margaret P. Adam, Omar Abdul-Rahman, Keith Vaux, Tamison Jewett, Amy J. Elliott, Julie A. Kable, Natacha Akshoomoff, Daniel Falk, Judith A. Arroyo, Dale Hereld, Kenneth Lyons Jones, H. Eugene Hoyme. Prevalence of Fetal Alcohol Spectrum Disorders in 4 US Communities. *Journal of American Medical Association*, 319(5):474-482, 2018. doi:10.1001/jama.2017.21896
- 2) H. Eugene Hoyme, Wendy O. Kalberg, Amy J. Elliott, Jason Blankenship, David Buckley, Anna-Susan Marais, Melanie A. Manning, Luther K. Robinson, Margaret P. Adam, Omar Abdul-Rahman, Tamison Jewett, Claire D. Coles, Christina Chambers, Kenneth L. Jones, Colleen M. Adnams, Prachi E. Shah, Edward P. Riley, Michael E. Charness, Kenneth R. Warren, **Philip A. May**. Updated Clinical Guidelines for Diagnosing Fetal Alcohol Spectrum Disorders. *Pediatrics*, 138(2): pii:20154256, 2016. PMID:PMC4960726.
- 3) **Philip A. May**, Barbara Tabachnick, Julie M. Hasken, Anna-Susan Marais, Marlene M. de Vries, Ronel Barnard, Belinda Joubert, Marise Cloete, Isobel Botha, Wendy O. Kalberg, David Buckley, Zachary R. Burroughs, Heidre Bezuidenhout, Luther K. Robinson, Melanie A. Manning, Colleen M. Adnams, Soraya Seedat, Charles D.H.

Parry, H. Eugene Hoyme. Who is Most Affected by Prenatal Alcohol Exposure: Boys or Girls?, Drug and Alcohol Dependence, 177:258-267, 2017. doi:10.1016/j.drugalcdep.2017.04.010

- 4) **Philip A. May**, Julie M. Hasken, Jason Blankenship, Anna-Susan Marais, Belinda Joubert, Marise Cloete, Marlene M. de Vries, Ronel Barnard, Isobel Botha, Sumien Roux, Cate Doms, J. Phillip Gossage, Wendy O. Kalberg, David Buckley, Luther K. Robinson, Colleen M. Adnams, Melanie A. Manning, Charles D.H. Parry, H. Eugene Hoyme, Barbara Tabachnick, Soraya Seedat. Breastfeeding and Maternal Alcohol Use: Prevalence and Effects on Child Outcomes and Fetal Alcohol Spectrum Disorders. Reproductive Toxicology, 163: 13-21, 2016. PMID: PMC4987236.

B. Positions and Honors

Position and Employment

1970-1973	Commissioned Officer, U.S. Public Health Service, Community Mental Health Program, P.H.S. Indian Hospital, Pine Ridge, SD.
1970-1973	Instructor of Sociology, Oglala Sioux Community College, Pine Ridge, SD.
1973-1976	NIMH Research (NRSA) Pre-doctoral Traineeship, University of Montana, Missoula, MT.
1976-1978	Director of Health Statistics and Research, Navajo Health Authority, Window Rock, AZ.
1978-1982	Assistant Professor of Sociology, The University of New Mexico.
1979-1986	Director, NIMH (NRSA) Pre-doctoral Research (T32) Training Program in Department of Sociology
1979-1985	Program Director, National Indian FAS Prevention Program and Epidemiology, I.H.S. Project on FAS.
1982-1989	Associate Professor of Sociology, The University of New Mexico.
1989-2011	Professor of Sociology, The University of New Mexico.
1989-2011	Director, NM Access to Research Careers (NIMH-COR) Training Program (T34).
1990-1996	Professor of Psychiatry, The University of New Mexico, School of Medicine.
1990-1999	Director, Center on Alcoholism, Substance Abuse and Addictions, UNM.
1996	Resident Fellow, Virginia Foundation for the Humanities, University of Virginia.
1999-Present	Senior Research Scientist, Ctr on Alcoholism, Substance Abuse and Addictions, UNM.
2004-2011	Professor of Family and Community Medicine, UNM.
2007-Present	Extraordinary Professor of Obstetrics and Gynecology, Stellenbosch University, Faculty of Health Sciences, Tygerberg (Cape Town), South Africa.
2010-Present	Adjunct Professor of Pediatrics, Sanford School of Medicine, University of South Dakota, Sioux Falls, SD.
2011-Present	Professor Emeritus, University of New Mexico.
2011-Present	Research Professor, University of North Carolina, Gillings School of Global Public Health, Department of Nutrition.

Honors (selected): 1969-70, Wake Forest Univ. Fellowship; 1982, Certificate of Appreciation, National Indian Health Board; Faculty Member of the Year, UNM Sociology Graduate Student Association Award; 1988, Member, U.S. Surgeon General's Workshop on Drunk Driving; 1992, 1993, US Indian Health Service, Special Awards of Recognition and Appreciation for Prevention of FAS among American Indians; 1994-96, Member, Institute of Medicine, Committee on FAS; 1994, United Nations Human Rights Award; 1996, Special Recognition Award, U.S. Indian Health Service, Division of Mental Health; 1998, Excellence in Education Award, Laguna Pueblo; 2000-02, Institute of Medicine, Committee on Pathophysiology and Prevention of Adolescent and Adult Suicide; 2002, Student Service Award, Faculty Category; 2007, Wayne S. Fenton Undergraduate Research Educator Award for significant achievement, NIMH, Certificate of Appreciation. (In recognition for ten years as a board member and eight years of service as President, Board of Education, Laguna Pueblo Department of Education); 2009, Geoffrey Robinson Memorial Keynote Presentation, 4th International Conference on Fetal Alcohol Spectrum Disorders, Vancouver, BC, Canada; 2011, 56th Annual UNM Research Lecture Award (the highest research award for a faculty member at UNM); 2011, Excellence Award, National Organization on Fetal Alcohol Syndrome (NOFAS); 2013, Starfish Award, Univ. of British Columbia, 5th International Conference on FASD; 2013, Henry Rosett Award, FASD Study Group, Research Society on Alcoholism; 2014, University of New Mexico, CASAA Founder's Recognition Award at the 25th Anniversary Celebration; 2017, Geoffrey Robinson Memorial Keynote Presentation (2nd time), 7th International Conference on FASD.

Professional Memberships

1991-present	Member, Research Society on Alcoholism
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1985-2014	Member, American Public Health Association (Section on Alcohol and Drugs)
1990-present	Member, College on Problems of Drug Dependence
1990-2011	Member, American Sociological Association (Section on Alcohol and Drugs)
1991-2014	Member, American Association of Suicidology
1990-present	Member, Population Reference Bureau
1986-present	Research Associate, American Indian and Alaska Native Mental Health Research Center, University of Colorado Health Sciences Center

C. Contribution to Science

1. *Determining the Prevalence of the Full Continuum of FASD in General Populations and Devising Innovative Methods for Prevalence Studies.*

The prevalence of fetal alcohol syndrome (FAS) and all four fetal alcohol spectrum disorder (FASD) diagnoses is unknown in most populations. I was the PI on the first ever population-based study of FAS prevalence (1980-1983) and on multiple other population-based studies on the prevalence of FAS and/or FASD among American Indians, South Africans, Italians, and recently, the general population of the United States. My colleagues and I published the first ever population-based prevalence rates and characteristics studies for each of the above populations, the two successful methodologies for FASD epidemiology using active case ascertainment methods.

- a. **P.A. May**, A. Baete, J. Russo, A.J. Elliott, J. Blankenship, W.O. Kalberg, D. Buckley, M. Brooks, J. Hasken, O. Abdul-Rahman, M.P. Adam, L.K. Robinson, M. Manning, H.E. Hoyme. Prevalence and Characteristics of Fetal Alcohol Spectrum Disorders. *Pediatrics*, 134(5):855-866, 2014. PMID:PMC4210790.
- b. **P.A. May**, C. Keaster, R. Bozeman, J. Goodover, J. Blankenship, W.O. Kalberg, D. Buckley, M. Brooks, J. Hasken, J.P. Gossage, L.K. Robinson, M. Manning, H.E. Hoyme. Prevalence and Characteristics of Fetal Alcohol Syndrome and Partial Fetal Alcohol Syndrome in Rocky Mountain Region City. *Drug Alcohol Depend*, 155, 118-127, 2015. PMID: PMC4581993
- c. **P.A. May**, M. de Vries, A-S Marais, W.O. Kalberg, D. Buckley, C.M. Adnams, J.M. Hasken, B. Tabachnick, L.K. Robinson, M.A. Manning, H. Bezuidenhout, M.P. Adam, S. Seedat, C.D.H. Parry, H.E. Hoyme. Replication of High Fetal Alcohol Spectrum Disorder Prevalence Rates, Child Characteristics, and maternal Risk Factors in a Second Sample of Rural Communities in South Africa. *Int J Environ Public Health*. 14:522, 2017. doi:10.3390/ijerph14050522. PMID: PMC5451973.
- d. **P.A. May**, AS. Marais, M.M. de Vries, W.O. Kalberg, D. Buckley, C.M. Adnams, J.M. Hasken, R. Barnard, B. Joubert, M. Cloete, B. Tabachnick, L.K. Robinson, M.A. Manning, K.L. Jones, H. Bezuidenhout, S. Seedat, C.D.H. Parry, H.E. Hoyme. The Continuum of Fetal Alcohol Spectrum Disorders in a Community in South Africa: Prevalence and Characteristics in a Fifth Sample. *Drug Alcohol Depend*, 168:274-286, 2016. PMID: PMC5086258.

2. *Defining and Refining the Diagnosis of FAS, Partial Fetal Alcohol Syndrome (PFAS), Alcohol-Related Neurodevelopmental Disorder (ARND), and Alcohol-Related Birth Defects (ARBD).*

Diagnostic criteria for the four specific diagnoses within the continuum of FASD continue to evolve. Our clinical team has continuously worked to advance the specificity of the diagnoses. I served on the influential Institute of Medicine (IOM) study committee on FAS (1994-1996), and our team has since targeted our research on further defining and further operationalized the growth, physical, neurobehavioral components of the IOM diagnostic guidelines.

- a. M. Valentine, D. Bihm, L. Wolf, H.E. Hoyme, **P.A. May**, D. Buckley, W.O. Kalberg, O. Abdul-Rahman. Computer-aided Recognition of Facial Attributes for Fetal Alcohol Spectrum Disorders. *Pediatrics*, 140(6): e20162028, 2017.
- b. H.E. Hoyme, **P.A. May**, W.O. Kalberg, P. Kodituwakku, J.P. Gossage, P.M. Trujillo, D.G. Buckley, J. Miller, N. Khaole, D.L. Viljoen, K.L. Jones, L.K. Robinson. A Practical Clinical Approach to Diagnosis of Fetal Alcohol Spectrum Disorders: Clarification of the 1996 Institute of Medicine Criteria. *Pediatrics*, 115(1): 39-47, 2005. PMID: PMC1380311.
- c. **P.A. May**, M.M. de Vries, AS Marais, W.O. Kalberg, C.M. Adnams, J.M. Hasken, B. Tabachnick, L.K. Robinson, M.A. Manning, K.L. Jones, D. Hoyme, S. Seedat, C.D.H. Parry, H.E. Hoyme. The Continuum of Fetal Alcohol Spectrum Disorders in Four Rural Communities in South Africa: Prevalence and Characteristics. *Drug Alcohol Depend*, 159: 207-218, 2016. PMID:PMC4724497.

- d. **P.A. May**, J.P. Gossage, M. Smith, B.G. Tabachnick, L.K. Robinson, M. Manning, M. Cecanti, K.L. Jones, D.L. Viljoen, N. Khaole, D.G. Buckley, W.O. Kalberg, and H.E. Hoyme. Population Differences in Dymorphic Features among Children with Fetal Alcohol Spectrum Disorders. J Dev Behav Pediatr, 31(4): 304-316, 2010. PMID:PMC4113014.

3. *Determining Proximal and Distal Maternal Risk Factors for FASD.*

Neither the proximal (prenatal alcohol use by quantity, frequency, duration, or gestational timing) nor the distal maternal risk factors (maternal health, age, nutrition, gravidity, parity, socioeconomic status, genetics or epigenetics) for FASD have been well documented and defined over the years. Since 1997 our research team has led the way in documenting, describing, and analyzing multiple variables that affect maternal risk for FASD and has attempted to link them to multiple specific fetal outcomes.

- a. **P.A. May**, J.P. Gossage, A-S Marais, L. Hendricks, C. Snell, B.G. Tabachnick, C. Stellavato, D. Buckley, L. Brooke, and D.L. Viljoen. Maternal Risk Factors for Fetal Alcohol Syndrome and Partial Fetal Alcohol Syndrome in South Africa: A Third Study. Alcohol Clin Exp Res, 32(5): 738-753, 2008.
- b. M. Cecanti, D. Fiorentino, G. Coriale, W. O. Kalberg, D. Buckley, H. E. Hoyme, J.P. Gossage, L.K. Robinson, M.A. Manning, M. Romeo, J. Hasken, B. Tabachnick, J. Blankenship, **P.A. May**. Maternal Risk Factors for Fetal Alcohol Spectrum Disorders in a Province in Italy. Drug Alcohol Depend. 145:201-208, 2014. PMID: PMC4736727.
- c. **P.A. May**, J. Blankenship, A-S Marais, J.P. Gossage, W.O. Kalberg, B. Joubert, M. Cloete, R. Barnard, M. De Vries, L.K. Robinson, C.M. Adnams, D. Buckley, M. Manning, C. Parry, H.E. Hoyme, B. Tabachnick, and S. Seedat. Maternal Alcohol Consumption Producing Fetal Alcohol Spectrum Disorders (FASD): Quantity, Frequency, and Timing of Drinking. Drug Alcohol Depend., 133(2):502-512, 2013. PMID: PMC3829200.
- d. **P.A. May**, B.G. Tabachnick, L.K. Robinson, H.E. Hoyme, and J.P. Gossage. Maternal Risk Factors Predicting Child Physical Characteristics and Dymorphology in Fetal Alcohol Syndrome and Partial Fetal Alcohol Syndrome. Drug Alcohol Depend. 119:18-27, 2011. PMID:PMC3189325.

4. *Describing Cognitive, Behavioral, and Performance Traits of Children with FASD and Comparing Them to Normal Controls in the Same Population.*

For many years there has been a search for one or more neurobehavioral phenotypes or characteristic cognitive and behavioral traits for children with FAS or other FASD. We have tested and evaluated over 1,000 of children with FASD and thousands more normal controls and collected companion child physical, dymorphology, and maternal risk factor data.

- a. **P.A. May**, B.G. Tabachnick, J.P. Gossage, W.O. Kalberg, A-S Marais, L.K. Robinson, M. Manning, J. Blankenship, D. Buckley, H.E. Hoyme, C.M. Adnams. Maternal Factors Predicting Cognitive and Behavioral Characteristics of Children with Fetal Alcohol Spectrum Disorders. J Dev Behav Pediatr, 34(5):314-325, 2013. PMID: PMC3731773.
- b. W.O. Kalberg, **P.A. May**, J. Blankenship, D. Buckley, J.P. Gossage, C.M. Adnams, A Practical Testing Battery to Measure Neurobehavioral Ability among Children with FASD. Int. J Alcohol Drug Res, 2(3):51-60, 2013. PMID:PMC4170949.
- c. P.K. Goh, L.R. Doyle, L. Glass, K.L. Jones, E.P. Riley, C.D. Coles, H.E. Hoyme, J.A. Kable, **P.A. May**, W.O. Kalberg, E.R. Sowell, J.R. Wozniak, S.N. Mattson. A Decision Tree to Identify Children Affected by Prenatal Alcohol Exposure. Journal of Pediatrics, 177:121-127.e1, 2016. doi:10.1016/j.peds.2016.06.047
- d. S.N. Mattson, S.C. Roesch, L. Glass, B.N. Deweese, C.D. Coles, J.A. Kable, **P.A. May**, W.O. Kalberg, E.R. Sowell, C.M. Adnams, K.L. Jones, E.P. Riley, and the CIFASD. Further development of a neurobehavioral profile of fetal alcohol spectrum disorders. Alcohol Clin Exp Res, 37(3): 517-528, 2013. PMID:PMC3524344.

5. *Prevention, Intervention, and Management of Children with a FASD.*

Knowledge for preventing and implementing prevention programs for FASD has been a major component of our work over the years. We have helped define and evaluate interventions (educational, cognitive, and nutritional) to enhance children development of children diagnosed with FASD, and aid in the management of daily life are contributions we have made.

- a. C.M. Adnams, P. Sorour, W.O. Kalberg, P. Kodituwakku, M.D. Perold, A. Kotze, S. September, B. Castle, J.P. Gossage, **P.A. May**. Language and literacy outcomes from a pilot intervention study for children with fetal alcohol spectrum disorders in South Africa. Alcohol, 41(6):403-414, 2007. PMID:PMC2098695.

- b. W.O. Kalberg, B. Provost, S.J. Tollison, B.G. Tabachnick, L.K. Robinson, H.E. Hoyme, P.M. Trujillo, D. Buckley, A.S. Aragon, **P.A. May**. A Comparison of Motor Delays in Young Children with Fetal Alcohol Syndrome to those with Prenatal Alcohol Exposure, and with No Prenatal Alcohol Exposure. Alcohol Clin Exp Res, 30(12):2037-2045, 2006.
- c. M.M de Vries, B. Joubert, M. Cloete, S. Roux, B.A. Baca, J.M. Hasken, R. Barnard, D. Buckley, W.O. Kalberg, C.L. Snell, A-S. Marais, S. Seedat, C.D.H. Parry, **P.A. May**. Indicated Prevention of Fetal Alcohol Spectrum Disorders in South Africa: Effectiveness of Case Management. Int J Environ Res Public Health, 2015 13(1): ijerph13010076, 2015. PMID: PMC4730467
- d. **P.A. May**, J.H. Miller, K.A. Goodhart, O.R. Maestas; D. Buckley, P.M. Trujillo, J.P. Gossage. Enhanced Case Management to Prevent Fetal Alcohol Spectrum Disorders in Northern Plains Communities. Matern Child Health J, 12(6):747-759, 2008.

Complete List of Published Work (over 150 publications) in MyBibliography:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/philip.may.1/bibliography/45110770/public/?sort=date&direction=ascending>

D. Research Support

Ongoing Research Support

U01 AA019894 May (PI) 09/30/10 – 08/31/18

The prevalence and characteristics of fetal alcohol spectrum disorders (FASD) in the mainstream U.S. population were not known. Innovative, active case ascertainment research on FASD in 1st grade children and maternal interviews in 3 representative U.S. communities will produce accurate measures of the prevalence, characteristics, and specific contextual etiology of FASD in mainstream populations.

Role: PI

2R01/UO1 AA15134 May (PI) 02/05/13 – 02/04/19

“Trajectory of FASD across the Lifespan: New Understandings in Intervention.” Included are nested studies of: early diagnosis of FASD in infants and toddlers; early intervention for children with FASD via cognitive/behavioral intervention and nutritional supplementation; biomarkers of alcohol use (PEth and EtG) in the prenatal period; and the nutritional status of pregnant women and genetic correlates with nutrient blood analyses and dietary intake to understand individual variation in child outcomes.

Role: PI

Completed Research Support (selected)

R01/UO1 AA15134 May (PI) 09/30/06 – 02/04/13

The comprehensive model of community-based FASD prevention recommended by the Institute of Medicine was implemented in a community in the South Africa and its efficacy measured via multiple measures of epidemiology, program evaluation, several nested studies of indicated and selective prevention, and changes in the prevention community vs. four comparison communities.

R01 AA15134-03S1 May (PI), L. K. Robinson (Co-I) 09/12/08 - 09/29/12

This was a study of the physical, cognitive, developmental, and behavioral characteristics and changes in three cohorts of South African children, diagnosed with FAS or PFAS when 6 to 7 years old in 1997, 1999 and 2002 and matched controls. Also their mothers are re-contacted and interviewed to determine the trajectory of their health, substance use, and other aspects of their lives.

U01 AA14834 Mattson (PI), May (Co-I) 09/30/07 – 09/29/12

As part of the Collaborative Initiative on Fetal Alcohol Spectrum Disorders (CIFASD), we worked in search for a behavioral phenotype for children with FASD. Professor May and his staff were co-investigators carrying out this neuropsychological research among South Africans, American Indians in the Plains, and in New Mexico.