Rebecca J. Schmidt, PhD
Assistant Professor of Public Health Sciences,

Cheryl K. Walker, MD
Associate Professor of Obstetrics and Gynecology

UC Davis School of Medicine and
The MIND Institute
Outline

• ELEAT History & Purpose
• ELEAT Development
• ELEAT Focus Groups
• ELEAT Pilot Testing
• ELEAT Reliability and Validity Analyses
• ELEAT Current Version
• ELEAT Online System & Next Steps
• Relevance of ELEAT to ASC
EEARN
Environmental Epidemiology of Autism Research Network

Project Rationale

- Environmental factors alter ASD susceptibility & course
- Many ASD studies lack exposure component
  - Genetics
  - Early Signs
  - Interventions
- Pooled Data would benefit studies of:
  - Gene X Environment
  - Rare Exposures
Objective

• Create an exposure assessment tool to be used in autism studies
• Short, useful for a variety of study populations
• Allow pooling of environmental exposure data
UC Davis Experience

Center for Children’s Environmental Health

CHARGE

SUPERB

STUDY

MARBLES
Markers of Autism Risk in Babies - Learning Early Signs

United States Environmental Protection Agency

Autism Speaks
It’s time to listen.

National Institute of Environmental Health Sciences

Early Life Exposures Assessment Tool
ELEAT Implementation Team

Rebecca J. Schmidt  UCD, Molec/Reprod Epidemiology

Cheryl Walker  UCD, Obstetrics & Gynecology

Deborah Bennett  UCD, Exposure Assessment

Daniel Tancredi  UCD, Biostatistics

Keith Jose  UCD, Online Systems Development
## Critical Periods of Susceptibility Indicated from ASD Studies

<table>
<thead>
<tr>
<th>Trimester</th>
<th>Gestational Weeks</th>
<th>Brain Pathology</th>
<th>Exposure</th>
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<tbody>
<tr>
<td>First</td>
<td>1-20</td>
<td>Neurogenesis</td>
<td>Freeway Proximity</td>
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<td>Weeks 1-20</td>
<td>Days 26-81</td>
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<td>Second</td>
<td>1-16</td>
<td>Neuronal Migration</td>
<td>Pesticides</td>
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<td>Weeks 1-16</td>
<td>Days 26-81</td>
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<td>Third</td>
<td>1-24</td>
<td>Neuronal Maturation</td>
<td>Folic Acid</td>
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<td>Weeks 1-24</td>
<td>1st Month</td>
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<td></td>
<td>1-30</td>
<td>Cortical Layer Formation, Organization, and Neuronal Differentiation</td>
<td>Rubella Infection</td>
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<td>Weeks 1-30</td>
<td>1st Month</td>
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<td>Fever</td>
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<td>1st and 2nd Trimester</td>
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<td>Thalidomide</td>
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<td>Days 20-24</td>
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<td>Valproic Acid</td>
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<td>Days 26-28</td>
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<td>SSRs</td>
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<td>1st Trimester</td>
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<td></td>
<td>Prenatal Stresses</td>
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<td>Weeks 25-28</td>
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</tbody>
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Critical Susceptibility Windows Covered in ELEAT

3 Months Pre-Conception

Pregnancy

Breastfeeding

Autism 1st Year
Focus Groups

• Conducted 3 two-hour focus groups with mothers of children with ASD and/or typical development from diverse settings

• Discussion focused on question clarity/content, module length, formatting, & administration mode

• 17 Participants included MARBLES participants and staff and patients at WellSpace Health, Sacramento, CA
**Focus Group Findings**

Helped us:

- Shorten the Instrument
- Make better use of Gateway Questions
- Increase Health Literacy
- Improve Cultural Sensitivity
- Prepare for On-line Self-Administration
Pilot Tested ELEAT in MARBLES Participants

- MARBLES (Markers of Autism Risk in Babies: Learning Early Signs)
  - Prospective Pregnancy Cohort Study of Children who have older siblings with ASD
  - Collect information & specimens from before pregnancy until clinical diagnosis at 3 years
- 127 MARBLES Mothers completed ELEAT
- Child had to be 2 years old or older
Validation + Reliability Testing

SUPERB
Biological / Dust Samples
- Pesticides / PBDEs / PFOS / PFOA

MARBLES
Environmental Exposure Questionnaires
- Lifestyle Factors
- Home & Environmental Exposures

Food Frequency Questionnaires
- Diet, Supplements, & Nutrition

Medical Records
- Maternal Conditions / Med Interventions

Biological Specimens
- Nutrients
- Pesticides / Phthalates / PBDEs
Reliability Testing

• Compared with MARBLES information

• Completed:
  – Medical Conditions & Events  *(Module M)*
  – Diet, Supplements, & Nutrients  *(Modules D & S)*
  – Lifestyle  *(Module L)*
  – Environmental Exposures  *(Module E)*
  – Home Exposures  *(Module H)*

• Overall, agreement fair – good, not for timing

• Examining by age and dx/concerns of child at time mother completed the ELEAT (2-7 years old)
Current ELEAT Instrument

- 10 Modules (including 1 Instrument Rating)
- ~260 items (many skipped with gateway Q’s)
- Average Completion Time ~ 41 (35-47) min
- Paper and On-line Versions
- U.S. and U.K Versions, Portuguese coming
ELEAT Modules

- Module X: Diagnosis / Demographics
- Module B: Breastfeeding & Child Diet
- Module M: Maternal Conditions / Medical Interventions
- Module D: Maternal Diet
- Module S: Supplements
- Module L: Lifestyle
- Module H: Home Environment
- Module E: Environment
- Module O: Occupation & Exposures
- Module I: Instrument Rating
Documentation

- **Codebooks** provide information on content, structure, layout, skip patterns to facilitate creation of on-line system.

- **Itemized Rationale Summaries** provide information for each question:
  - Source of question
  - Exposure(s) of interest
  - Evidence for exposure(s) & measurement by questionnaire (including reliability/validity)
  - References
  - Ranking based on above
Online System

• Website
  – For researchers and participants
  – ELEAT Information/Documentation
  – Gateway to Survey
• Secure Hosting Environment
  – Data & Pooled data
• Pilot Testing
  – Participants from NJLAGS & iBASIS ready
A study of **LIFE** exposures.
Module E: Environment

This section asks about furnishings, renovations, and consumer product use. For questions 1-20, consider where you were living in the 3 months prior to becoming pregnant through your child’s first year after birth. Please try and give your best answer to each question. If you would prefer not to answer or if you do not want to answer, you can check “Declined”. If there is a question you do not know the answer to, you may check “Don’t Know”. The following questions are relevant for the time period between three months prior to becoming pregnant to the end of the first year after birth. If the response is ‘Yes’, please tell us time period the event occurred – Mark all that apply.

Questions about furnishings, renovations and consumer product use

1. How many pieces of furniture with cushions, such as sofas or chairs with cushions, were in your home while you were pregnant?

CLEAR

# of pieces of furniture with cushions:

3 0 (none) Declined

na
Dissemination

• Goal: Expand use across populations, increase generalizability, & initiate pooled data studies

• Potential Partners:
  – IAN (Interactive Autism Network Project)
  – SPARK (Simons Foundation Powering Autism Research for Knowledge)
  – EU-AIMS
  – NCAP (National Collaborative Autism Project)
  – PhenX
Relevance to Autism Genetics Studies

- Examine Gene x Environment Interaction effects for autism susceptibility
- Identify potential environmental contributions to genetic phenotypes
- Control for these factors in analyses of genetic contributions
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ELEAT@ucdavis.edu