



Break the Cycle: Exploring the Relationship Between Disadvantage and Disability


A Project of:



 institute for the
study of
disadvantage and disability



Pediatric Environmental Health as a Discipline


- Addresses the child's environment as a sum of
 - physical
 - biological
 - social
- The child's environment can impact the child's growth, development, and well-being for better or worse






Presentation Outline

- Children's Environmental Health
- Children with Cerebral Palsy
- Cycle of Disadvantage and Disability
- Formation of the ISDD
- Break the Cycle Project
- Where are we now and where do we go from here?




Why *Pediatric* Environmental Health

- Children are in a state of growth and development
- Children are uniquely vulnerable:
 - growth
 - higher surface area : volume
 - higher minute ventilation
 - lack of experience or comprehension may reduce ability to avoid hazards



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Differences in the physical environment

- "Breathing zone" -- distance from floor of air intake -- is lower, may lead to inhalation of air of different quality from the adult
- The attractive hazard – kids like to put things in their mouths

Biological Differences

- Higher metabolic rate = more food intake per kg of body weight
- Immature metabolic processes may alter metabolic pathways of substances, quantitatively and qualitatively
- Growing organs may be at increased risk at same level of toxicant
- The Brain is Growing!

Pediatric Environmental Health....

- Air Pollution and Asthma
- Chemicals and the Brain
 - Lead, Mercury, Pesticides, PCB's
- The "Broader Environment"
 - Physical, Social & Economic
- Diet
 - Food & Eating Habits

Social Differences

- The child is ... a child
 - Developing
 - Requires adult care, supervision & stimulation
 - Has more to learn

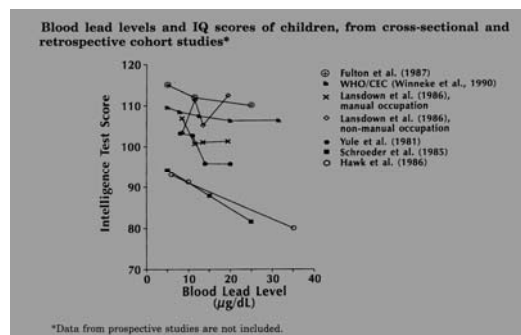
Chemicals & Brain Function: Lead

- Lead initially recognized as a multi-system poison at levels exceeding 40 $\mu\text{g}/\text{dL}$ (anemia, abd cramps, seizures, encephalopathy, renal colic)
- Only later recognized as a developmental toxin
- Lead sources: lead-based paint, gasoline, crafts, lead industries (smelters, automotive, others)
- Initial concern raised in 1920's about lead addition to gasoline, but lead only removed in late 1970's

Goals of Pediatric Environmental Health

- Reduce or eliminate environmental hazards to children
- Diagnose environmentally related conditions early and accurately
- Reduce the impact of environmental hazards on children
- Improve our our awareness and understanding of 'environmental health

Lead blood levels vs. IQ





Lead and Behavior

- High lead children recognized to be more aggressive, more hyperactive than low lead children
- Behavior does NOT regress toward the expected over time, even in a socially advantaged setting



Exposure history

- 1872: Anniston founded as a company town for the Woodstock Iron Company
- By 1929: 117 foundries, mostly in west Anniston
- Late 1920s: Biphenyl manufacturing began



Pediatric Environmental Health Specialty Units (PEHSU)

- Established by the EPA & ATSDR around the Country
- To provide further assistance to the public and to clinicians around the issues of the Environment and Children's Health
- PEHSU role
 - telephone information service
 - medical referral service
- SE PEHSU = Emory, started 1/2000
 - (877) 33-PEHSU



Exposure history

- 1935: Monsanto purchased the facility, began manufacturing PCBs, parathion, phosphorous pentasulfide, para-nitrophenol, and polyphenols — one of two U.S. PCB manufacturing sites



Anniston, Alabama population data

- Anniston city: 26,000
 - (54% white: 46% Black)
- Children born each year:
 - Anniston city: approx. 375



Exposure history

- Two large landfills were used throughout the plant's operation, one (west) until 1961, the other (south) until 1988
- Some product was given to local people for termite control, fencepost treatment, etc.



Evidence of Contamination

- 1970s-80s: Intermittent PCB detection in downstream fish and sediment
- Early 1990s: Recognition of downstream fish contamination; ADPH fish advisory.



Community Response to Contamination

- Mid-1990s
 - First citizens group started, litigation began
- 1998-2000
 - Broader contamination recognized, new citizens groups started, EPA involvement sought, further litigation launched.
- Currently
 - Superfund designation being considered.



Anniston, Alabama PCB levels in blood

- 1995 ATSDR sampling of 103 people:
 - 46 (45%) with serum PCBs >10 ppb
 - 28 (27%) with serum PCBs >20 ppb
 - 5 (5%) with serum PCBs > 100 ppb
- 1999 Plaintiff sampling of ≈ 2,970 people:
 - 1,037 (35%) with serum PCBs > 10 ppb
 - 521 (17.5%) with serum PCBs >20 ppb
 - 41 (1.4%) with serum PCBs >100 ppb



Summary of the Situation

- History of Pollution in Anniston
- An Affronted Citizenry
- Litigation
- Fractious situation
- EPA & ATSDR involvement
- Need for information and education



Anniston, Alabama Additional exposure concerns

- Lead contamination found incidentally in soil samples in 2000, but ATSDR blood testing in 2001 revealed low levels
- Mercury discharges publicized 2001.



Brief History of the Project

January 2001 Emory PEHSU presents Grand Rounds on Pediatric Environmental Health to Pediatricians in Anniston

December 2001 First Community Forum on what to do to promote optimal growth and development for children

January 2002 Formation of Steering Committee to develop a program for the children of Anniston

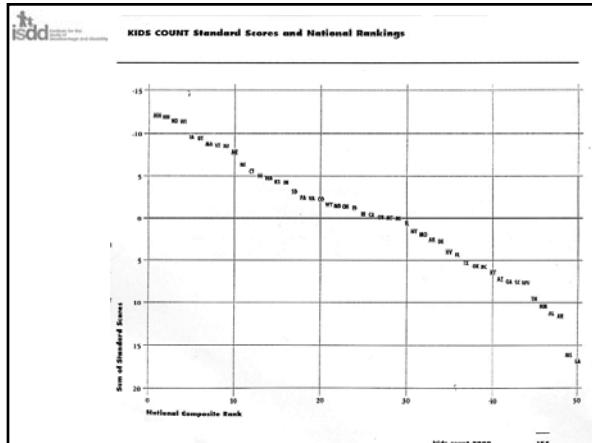
Profile of Alabama

- Alabama trails most states on several birth measures.
 - Alabama ranked among the bottom ten states in four of the eight measures of a healthy start to life, including teen births, repeat teen births, low-birthweight births, and preterm births.

Needs Assessment 2001: Calhoun County, Alabama

Figure 3-12: General Health Status

Entity	Percent
Calhoun County	35
Alabama	20
U.S.	15



Needs Assessment 2001: Calhoun County, Alabama

Days with Mental Health "Not Good"

Entity	8 to 29 Days	30 Days
Calhoun County	10	8
Alabama	9	5
U.S.	7	4

Key Indicators of Infant Health: 1999

Ranking for Alabama

Percent of total births to teens	#46
Percent of total births to mothers with less than 12 years of education	#41
Percent low-birthweight births (less than 5.5 lbs.)	#47

Initial Goals of Steering Committee

- Gather information on status of children
- Gather information on existing resources
- Develop ways of improving availability and access to services for the children and their families
- Explore potential funding sources for a improving services and developing a research project
- Reaching out to the Community at large



Vision 2020: for the Children of Anniston

- A Community-based Collaborative Partnership between the service providers and researchers
- Promote “Early Detection Early Intervention”
- Develop Research Agenda
- Seek funds to improve services and conduct research



Interdisciplinary Team

- Developmental Pediatrics
- Orthopedics
- Orthotics & Wheelchair
- Therapies
- Nutritionist
- CMS Coordinators
- School Advocates



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Survey of Clinic

- Funded by Wil Ward Foundation
- Chart Review during Summer of 2001
- Thanks to
 - Mandy Rubin MPH
 - Stacy Westerman
 - Karen Carter MD



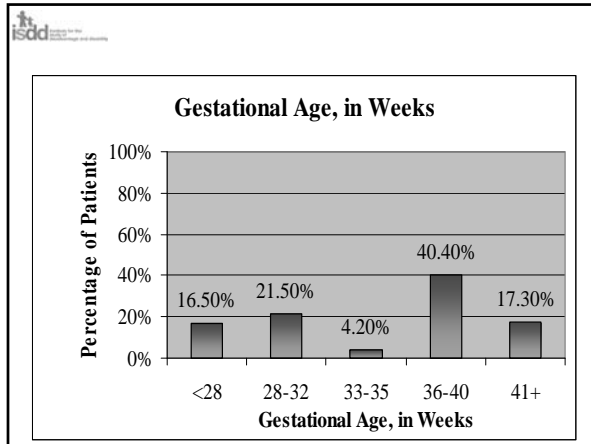
Hughes Spalding Cerebral Palsy Clinic

- Children with CP who live in Inner City Atlanta represent a population that is medically underserved.
- Started in 1998
- Meets twice a month
- Average of 16 patients per clinic
- Interdisciplinary
- Expanding to include family supports



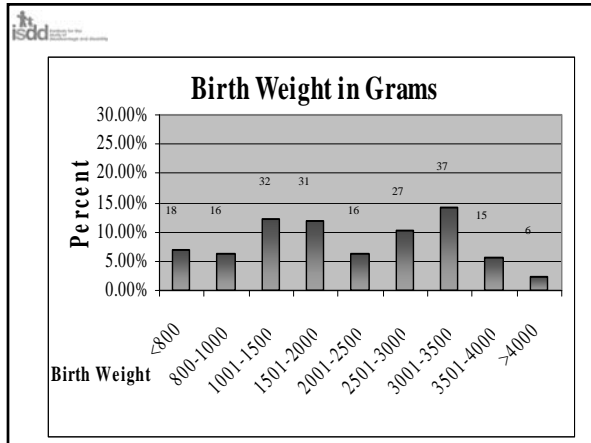
Methods

- Data was collected through reviewing the medical records of 261 patients seen at the cerebral palsy clinic, and placed into a Microsoft Excel spreadsheet under the following categories:
 - **Basic Information, Birth History, Past Medical History, Physical Therapy, Occupational Therapy, Orthopedics, Social Work, Developmental Pediatrics, Examination and Nutrition.**
- Analysis was performed using the statistical program Epi Info.



Orthopedic Complications

Orthopedic Conditions	Number Recorded	Percent n = 261
Lower Contractures	98	37.50%
Upper Contractures	51	19.50%
Scoliosis	65	24.90%
Hip Problems	52	19.92%
Kyphosis	7	2.70%



Associated Medical Conditions

Other Medical Conditions	Number Recorded	Percent n = 261
Eye/Vision Problem	133	50.96%
Seizure(s)	118	45.21%
Constipation	104	39.85%
Drooling	73	27.97%
Tube-fed	52	19.92%
Reactive Airway Disease (RAD)	51	19.54%
Sleeping Problems	49	18.77%

Perinatal and Neonatal Period

Perinatal/Neonatal Complication(s)	Number Recorded	Percent N = 261
Substance Use during Pregnancy	39	14.94%
Admitted to Neonatal Intensive Care Unit (NICU)	68	26.05%
Required neonatal ventilation	51	19.60%
Intraventricular Hemorrhage (IVH)	22	8.40%

Medications

Type of Medication	Number Recorded	Percent N = 261
Any Type	153	58.62 %
Seizure	82	31.42 %
Pulmonary	44	16.86 %
Spasticity	37	14.18 %
Gastrointestinal	26	9.96%
ADHD	6	2.30%
Other	52	19.92%

isdd

Surgeries

Type of Surgery	Number Recorded	Percent N = 261
Orthopedic	90	34.48%
Gastrointestinal	50	19.16%
Eye	29	11.11%
ENT	26	9.96%
Shunt	20	7.66%
Botox Injections	14	5.36%
Hernia	13	4.98%
Other	30	11.49%

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Number of Hospitalizations

Number of Hospitalizations per Patient	Number Recorded	Percent
0	65	24.9%
1	144	55.2%
2	39	14.9%
3	9	3.4%
4	4	1.5%

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Number of Surgeries

Number of Surgeries per Patient	Number Recorded	Percent N=261
0	157	60.2%
1	69	26.4%
2	21	8.0%
3	14	5.4%
TOTAL	261	100%

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- ### Medical Complications
- Significant orthopedic problems with functional implications
 - Multiple associated medical problems
 - Frequently tube fed
 - On multiple medications
 - High rate of hospital admissions
 - High rate of surgeries

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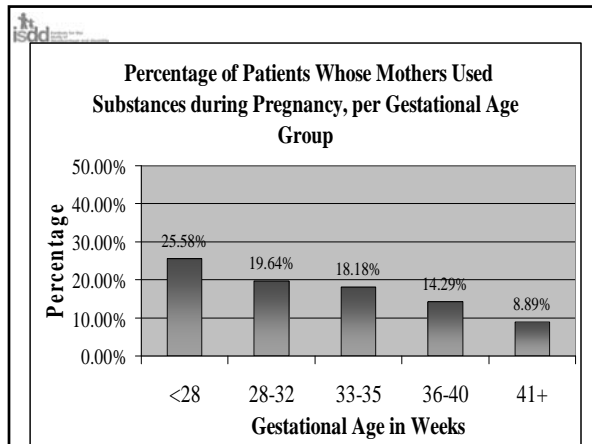
Hospitalizations

Hospitalizations	Number Recorded	Percent N = 261
Ever been hospitalized	169	64.8%
Pulmonary	36	13.8%
Neurological	26	9.96%
Infection/Viral	18	6.7%
Other	130	49.8%

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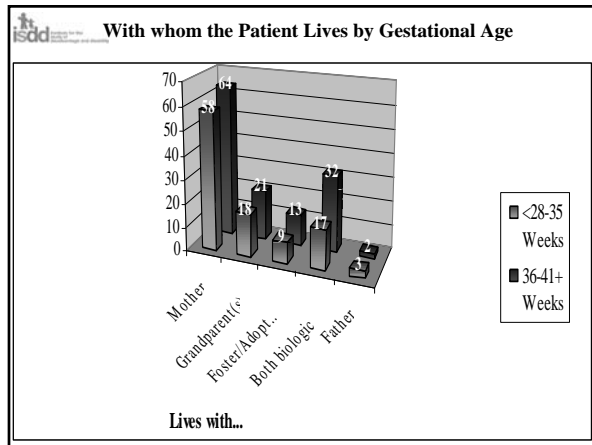
Other Diagnoses

Other Diagnoses	Number Recorded	Percent n = 261
Autism	17	6.51%
Mental Retardation	15	5.75%
Hearing Problems	15	5.75%
ADHD/Learning Disabilities	9	3.45%
Sickle Cell Disease	3	1.15%



Conclusion I

- This is a clinic survey of a specific population
- There are social demographic factors that predispose to prematurity, low birthweight and cerebral palsy
- The population are severely involved with complex medical problems



Conclusion II

- Adverse social circumstances and complex medical problems require an infrastructure of social and medical services that are interdisciplinary and coordinated
- Programs of prevention that address the predisposing social factors are a critical public health need

Demographic and Etiological Findings

- Bimodal Distribution of birth weight and gestational age
- There is a high rate of mothers using substances during pregnancy particularly in the lower birth weights and gestational age
- Most children live in single parent families with Mother

A CDC Study (Mervis 1995)- on pregnancy related risk variables

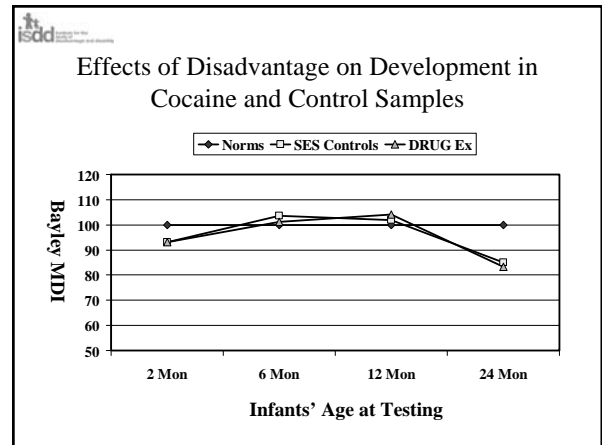
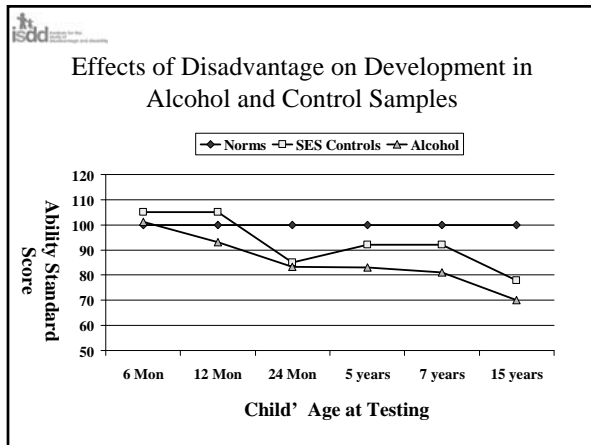
- The risk for retardation increased as **birth weight** decreased, with risk for severe retardation two and a half times higher than for mild mental MR.
- In utero exposure to **tobacco** was associated with 50% increase in the likelihood that a child will have mental retardation.
- Drews et al., 1996-revealed that prenatal **alcohol consumption** of 2 or more drinks per day has been associated with an average decline of 7 IQ points in children age 7 yrs.

Effects of Disadvantage on Development in Alcohol and Control Samples

- From a series of studies of Alcohol Exposure during Gestation carried out at Emory University School of Medicine, Department of Psychiatry and Behavioral Sciences and Georgia State University
- Claire D. Coles, Ph.D., Principal Investigator
- Investigators: Arthur Falek, Ph.D, Paul Fernhoff, MD, Mary Ellen Lynch, Ph.D, Iris Smith, Ph.D, MPH
- Both Alcohol and Disadvantage contribute to IQ decline.

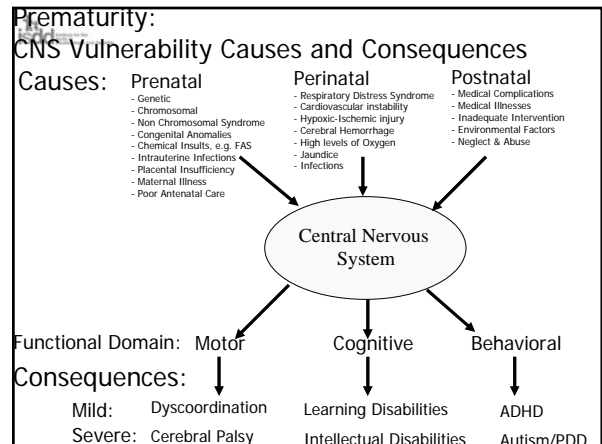
Effects of Disadvantage on Development in Cocaine and Control Samples

- Results of study of Cocaine in Pregnancy and Control over first 24 months of life.
- Groups matched for SES and Ethnicity
- Both from low SES, African-American Population
- Over 1st 2 years of life, environmental factors affect Mental Development more than drug exposure.



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- Investigators: Mary Ellen Lynch, Ph.D, Josephine V. Brown, Ph.D., Kathleen Platzman, Ph.D, Roger Bakeman, Ph.D., William Sexson, MD
- Information: ccoles@emory.edu

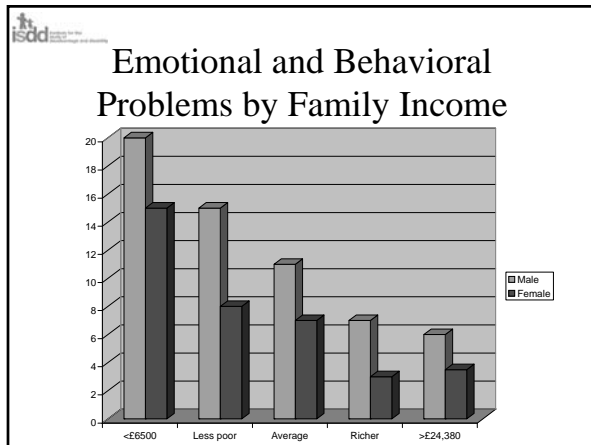


Children: Poverty & Vulnerability

Child Outcomes	Risk for poor relative to non-poor children
Child abuse and neglect	6.8
Lead Poisoning	3.5
Birth to unmarried teenager	3.1
depression	2.3
Experiencing violent crimes	2.2
Short-stay hospital episode	2.0
Grade repetition and high school dropout	2.0
Substance abuse	1.9
Low birth weight	1.7
Mortality	1.7
Learning disability	1.4
Parent report of emotional or behavior problem that lasted 3 months or more	1.3

“From Neurons to Neighborhoods” - NRCIOM

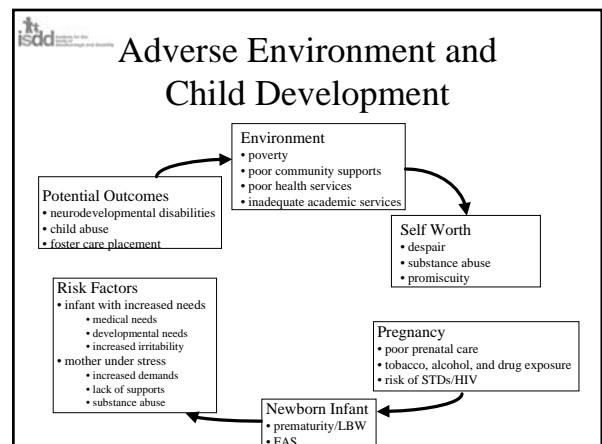
One of the most consistent associations in developmental science is between economic hardship and compromised child development.



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Poverty Effects on Cognitive and Educational Function

Indicator	Children Who Are Poor	Children Who Are Not Poor
Developmental delay	5.00%	3.80%
Learning disability	8.30%	6.10%
Grade retention	28.80%	14.10%
Ever expelled or suspended	12.10%	6.10%
High school dropout rate in 1994	21.00%	9.60%
Not employed or in school at age 24	15.90%	8.30%





“From Neurons to Neighborhoods” - NRCIOM

The most widely cited and well documented finding in the early childhood intervention literature is the strong correlation between family socio-economic status and childhood development.



The Institute for the Study of Disadvantage and Disability

- Improve understanding of relationship between social and economic disadvantage and developmental disabilities
- Develop programs to improve the outlook of children and families
- Support and coordinate research
- Raise awareness among professionals who are committed to the health and well being of children
- Influence public policy



Can we make a Difference?

- **Absolutely!!!!**
- **Positively!!!!**



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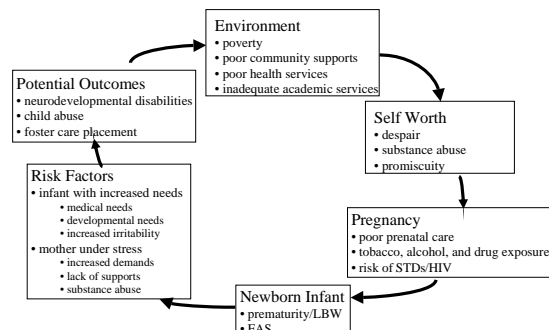


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Cycle of Disadvantage & Disability





Break the Cycle

- Funded by the Governor's Council on Developmental Disabilities
- Involving 3 Universities and 6 departments
 - Emory
 - Maternal Health, Law School & Theology
 - GSU
 - Psychology & Education
 - Morehouse
 - Community Health
- Student Directed Projects to Explore Ways to “Break the Cycle”



Presentation Overview

- **Introduction**
- **Past Research**
- **Present Research**
- **Future Research**



Student Projects

- Maternal Factors in Child Health
- Pregnancy Risk Assessment
- Child Protection – Family Issues
- Children with Mental Illness in Juvenile Justice System
- Improving Skills of Urban Students



Introduction

- Graduation with Honors in Community Service Program at MSM
- “Break The Cycle”: collaboration with MSM through Department of Pediatrics and Department of Community Health
- Personal interest in pediatrics and community health



MATERNAL FACTORS IN CHILD HEALTH AND DEVELOPMENT

Keisha R. Callins
3rd year medical student
Morehouse School of Medicine
Mentor: Dr. Leslie Rubin
March 22, 2005



Past Research

- 1999 Recipient of the National Minority Internship Research Training (MIRT) Fellowship
- Topic: “Risk Factors for diarrhea in children under five: a case-control study in Westmoreland, Jamaica”
- To identify several risk factors:
 - Demographic
 - Environmental
 - Maternal
 - Etiologic

Past Research, cont.

- **Study Design:** Case – Control
- **Site:** 3 clinics and main hospital in Westmoreland, Jamaica
- **Time period:** June-August 1999
- **Data Collection instrument:** Interviewer administered questionnaire
- **Participants:**
 - 26 mothers of children with diarrhea
 - 21 mothers of children with no diarrhea

Future Research

- **To identify maternal factors** that significantly affect the health and development of children
- **To develop data collection instrument** targeted to mothers of children with developmental disabilities
- **To conduct pilot study** at the Cerebral Palsy Clinic at Hugh Spalding Children's Hospital (starting August 2005)
- **To design an intervention program** targeted to mothers of children with disabilities

Past Research, cont'd

- **Analysis:**
 - descriptive statistics
 - chi-square tests
 - t-tests
- **Results:**
 - Gender of the child
 - Maternal age
 - Number of other children in household under age five
 - significant association found between the mother's belief about the cleanliness of her drinking water and her decision to boil water for drinking
- **Conclusion:**
 - Culturally sensitive interventions based on health belief model targeted to mothers of young children should include:
 - Education about the cause, prevention, treatment of diarrhea
 - Skill-building to improve hygienic practices

Conclusion

**Why do we care about
maternal factors in
child health and development?**

Present Research

- **Literature Search:** Impact of maternal factors on growth and development outcomes of premature and high-risk infants
- **Maternal factors may include:**
 - Breastfeeding
 - Socio-economic status
 - Education
 - Demographics
 - Access to healthcare
 - Post-natal care
 - Substance abuse
 - Social support
 - Nutrition
 - Knowledge, beliefs, barriers relevant to childcare and development

**Children live what they learn,
Children learn what they live,
Teach them the way to love in their hearts,
and they will find love in the world.**

(song excerpt)



Student Project Forum: April 20, 2005



So, we must move on...

- Together...
- We can do more...
- And make a bigger difference.....



Student Project Forum: April 20, 2005

- Mentor Sponsored Student Presentations
- State Programs
- Discussion
- Open to the Public



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