MENTAL ILLNESS AND VIOLENCE: A NEURODEVELOPMENTAL PERSPECTIVE
COMMOM GOALS IN MEDICINE

- Prevention
- Early identification
- Early intervention
Brain and its disorders are complex

Big science - team work is needed

Integrative multifaceted approach to identification and care: family, school, community, health professionals
Key Structures Underlying Emotional Regulation

Orbital (green) ventromedial (red) prefrontal cortex

Dorsolateral prefrontal cortex

Amygdala

Anterior cingulate cortex

SEX DIFFERENCES

ORBITAL GRAY/AMYGDALA


From Gur et al., Cerebral Cortex 2002
Brain Maturation

Spinal cord at lumbar level

25 Wks gestation

Corpus callosum

Developmental trajectories

Yakovlev PL, Lecours AR (1967)
EARLY COURSE OF PSYCHOSIS

- Period of transition
- Brain maturation
- Vulnerability
WHAT DO WE KNOW ABOUT PSYCHOSIS?

- A process
- Associated with brain changes that relate to behavior
- Interventions can work
HOW DO WE KNOW IT?

- Study of youth at risk and first presentation
- Longitudinal studies
- Early intervention programs
Neuroimaging: MRI

T1-weighted structural (3:28)

Diffusion Tensor imaging (10:56)

ASL Perfusion (5:32)

fMRI: Emotion Identification (10:36)

fMRI: Fractal n-Back (11:39)

fMRI: Resting State (6:18)

Total scan time: 50 minutes
RELATIVE GROWTH OF BRAIN REGIONS WITH AGE (8-21 yrs, 731 subjects)

Gray Matter (GM) density with age: correcting for sex

White Matter (WM) density with age: correcting for sex

Ventricles (CSF) density with age: correcting for sex

The proportion of GM relative to the total brain volume decreases with age and that of WM increases with age. This reflects both the effects of volume change and maturation of WM, which increases myelin that appears bright (FDR corrected q<0.05, p<0.01) Radiological convention
DTI Tractography

MALES

FEMALES

Left - Right

Left - Right
WHAT DO WE NEED TO DO?

- Investigate precursors that will allow early detection
- Focused research on informative populations with advanced neuroscience methodology
- Education – families, schools, communities
- Integrated science-based interventions