The Impact of Medical Conditions on Learning & Behavior

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Agenda for Today

- Introduction
- World Health Model for Chronic Illness
- Diabetes
- Epilepsy
- Asthma
- CI assessment and intervention issues
- Practice parameters
- Resources

Global & Domestic Models of CI

World Health Model of CI

Aligned with World Health Organization International Classification of Functioning (ICF)
- ICF assesses different aspects of the disability as it interacts with the environment
- Intended to be a measure that grows with the child
- Future assessments in non-educational settings in USA will have ICD and ICF codes
- APA practice manual to be published soon
- Provides a holistic picture of child but also
  - needs, outcomes, costs, quality, satisfaction,
  - service provision, social policy
- Intended for use in special education settings
- Designed to be cross-culturally relevant

World Health Organization: ICF Development

WHO Conceptual Framework

- 7 years 1994-2001
- 61 countries
- ICF drafts translated into/texted in 27 languages
- 18 National Consensus Conferences
- 7 International Consensus Conf.
- 2000 Live Case evaluations
- 3500 Case Summary evaluations
- Children’s version approved 2006
- Includes special education as a target setting

Health Condition (disorder/disease)

Body function/structure (Impairment)

Activities (Limitation)

Participation (Restriction)

Environmental Factors

Personal Factors
Cultural Competency

Cultural Competence: Operational Definition

“Cultural competence is the integration and transformation of knowledge about individuals and groups of people into specific standards, policies, practices, and attitudes used in appropriate cultural settings to increase the quality of services; thereby producing better outcomes.”

(NASP, 2005)

Promoting Cultural Diversity and Cultural Competency

Self-Assessment Checklist

for Personnel Providing Services and Supports to Children and their Families
Available at NASP website

Defining SES: Elements

- No standard definition of SES in psychological and neuropsychological research
- Parental education
- Occupation
- Financial/income level
- Parents living in home
- Family size
- Limited urban acculturation
- Free/reduced meals

Cultural Variable: Socioeconomic Status
Reasons for Elevated Risk for CI in Low SES Children

- Poor prenatal care
- Birth injuries
- Malnutrition
- Sleep deprivation issues re: cognitive processes
- Reduced access to long-term, ongoing, preventative health care
- Increased dependency on ERs (Asthma example)
- Less treatment adherence with low SES groups (medication example: could include encounters with goats... to breach development)
- Toxic exposure: lead, pesticides
- Parasitic infections: neurocysticercosis, toxocariasis
- Health issues such as otitis media (linked to reading)
- Low SES school district’s quality of education
- Double-jeopardy—comorbidity

Diabetes

- Total: 18.2 million people – 6.3% of the population – have diabetes.
- Diagnosed: 13 million, Undiagnosed: 5.2 million
- About 206,000 people under 20 years of age have diabetes. This represents 0.25% of all people in this age group.
- Approximately one in every 400 to 500 children and adolescents has type 1 diabetes.
- Clinic-based reports and regional studies indicate that type 2 diabetes is becoming more common among ethnic minority children and adolescents.

Diabetes - TYPE 1

- Type 1 diabetes or juvenile-onset diabetes.
- Type 1 diabetes develops when the body’s immune system destroys pancreatic beta cells, the only cells in the body that make the hormone insulin that regulates blood glucose.
- This form of diabetes usually strikes children and young adults, although disease onset can occur at any age.
- Type 1 diabetes may account for 5% to 10% of all diagnosed cases of diabetes.
- Risk factors for type 1 diabetes include autoimmune, genetic, and environmental factors.

Diabetes - TYPE II

- Type 2 diabetes may account for about 90% to 95% of all diagnosed cases of diabetes. It usually begins as insulin resistance and the pancreas gradually loses its ability to produce insulin.
- Type 2 diabetes is associated with older age, obesity, family history of diabetes, prior history of gestational diabetes, impaired glucose tolerance, physical inactivity, and race/ethnicity.
- Type 2 diabetes is increasingly being diagnosed in children and adolescents. One in 4 obese children and adolescents have prediabetes.
Testing Blood Glucose

- Normal blood glucose levels range between 70 and 120 (for non diabetics)
- 70 to 130 for diabetics
- Test at regular intervals
- Or more if symptomatic of hypo or hyper

Low Blood Glucose Hypoglycemia

<table>
<thead>
<tr>
<th>Mild/Moderate Symptoms that vary by individual and episode.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shaky</td>
</tr>
<tr>
<td>Sweaty</td>
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<tr>
<td>Hungry</td>
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<tr>
<td>Pale</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Severe Symptoms</th>
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</thead>
<tbody>
<tr>
<td>Inability to swallow</td>
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</table>

High Blood Glucose Hyperglycemia

<table>
<thead>
<tr>
<th>Mild/Moderate Symptoms that vary by individual and episode.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased thirst</td>
</tr>
<tr>
<td>Nausea</td>
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<tr>
<td>Hungry</td>
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</tbody>
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<table>
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<tr>
<th>Severe Symptoms</th>
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</thead>
<tbody>
<tr>
<td>Ketones</td>
</tr>
<tr>
<td>Sleepiness</td>
</tr>
</tbody>
</table>

Age-appropriate goals

- Knowledge of diabetes
- ‘Rules of the game’:
  - food, insulin and exercise.
- Blood glucose:
  - testing
  - hypo- and hyperglycemia
- Special precautions:
  - sickness
  - eating/sleeping away from home
  - hyperglycemia/weight loss
  - alcohol
- Complications of diabetes

Age-appropriate goals: General 1

| 6–7 years: |
| parents are responsible for the daily diabetes care |
| the child could be encouraged to help |

| 8–9 years: |
| child takes over a larger part of the practical responsibility for diabetes care |
| the parents, however, still have the main responsibility |

| 10–11 years: |
| child needs only limited theoretical background, but should be able to take practical responsibility for diabetes care |
| the parents should assist in dosing insulin |

Age-appropriate goals: General 2

| 12–13 years: |
| the child takes practical care of the diabetes and begins to acquire the theoretical background |

| 14–15 years: |
| the young person takes care of the diabetes and has now acquired the requisite theoretical background |

| 16–17 years: |
| preparations are made for adult life, as the diabetes becomes a matter between the young person and the diabetes team |
| he/she is motivated to obtain further knowledge and experience |
Glycated hemoglobin
International Society for Pediatric and Adolescent Diabetes

- Glucose attaches itself to the molecule of hemoglobin (Hb) during the life-cycle of the circulating red cell, forming glycated hemoglobin (HbA1 or HbA1C).
- HbA1C level reflects levels of glycemia over the preceding 6-12 weeks.
- HbA1C monitoring has been shown to be the most useful measure in evaluating metabolic control and is the only measure for which good data are available in terms of its relationship with later microvascular complications.
- Frequency of measurement will depend on local facilities and availability, but good clinical practice would suggest that there should be 4 to 6 measurements per year in younger children, 3 to 4 measurements per year in older children, and a minimum of 1 measurement per year in all children.

HbA1c and Blood Glucose Levels
HbA1c Mean Blood Glucose

<table>
<thead>
<tr>
<th>HbA1c</th>
<th>Mean Blood Glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0%</td>
<td>120 mg/dl</td>
</tr>
<tr>
<td>7.0%</td>
<td>150 mg/dl</td>
</tr>
<tr>
<td>8.0%</td>
<td>180 mg/dl</td>
</tr>
<tr>
<td>9.0%</td>
<td>210 mg/dl</td>
</tr>
<tr>
<td>10.0%</td>
<td>240 mg/dl</td>
</tr>
<tr>
<td>11.0%</td>
<td>270 mg/dl</td>
</tr>
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Neuropsychological Effects

- Research shows difference in neuropsychological effects in children between early onset, (birth to 5) and later onset (5 and up) (Ryan & Morrow, 1987; Brands et al, 2005)
- Early onset more sensitive to insulin or metabolic insult = more reactive hypoglycemic seizures = and resultant...
- Diabetic encephalopathy—which effects wide selection of cognitive domains
  - Attention, learning, memory, problem-solving, visuospatial, and visuomotor efficiency

Neuropsychological Effects

- Control for young children little more relaxed to avoid severe hypoglycemic episodes
- Retrospective study showed more impairments in spatial and pattern recognition in those young children on intensive therapy compared to conventional (Driesen, Cox, Gonder-Fredrick & Clarke, 1995)

Neuropsychological Effects

- Critical periods of sensitivity cerebral structures myelinate at different times and rates (Rovet, Ehrlich & Czuchta, 1990)
- Spatial abilities vulnerable to early onset
- Verbal abilities vulnerable later onset
- Chronic hyperglycemia disrupts myelinization

Neuropsychological Effects

- Age of onset seems to predict results of tests measuring “fluid abilities” (Brand et al, 2005)
- Duration of illness seems to predict performance on “crystallized abilities” (Ryan, Vega, & Drash, 1985)
- School attendance factor—students with Diabetes miss more school than controls (Ryan, Longstreet, & Morrow, 1985)
**Diabetes & Eating Disorders**

- Problems with family’s ability to balance teen’s complementary needs for independence & supportive guidance
- Eating Disorders Inventory
- Diagnostic Survey for Eating Disorders—Modified
- Remember—Self Report instruments

**School Psychological Treatment Goals**

1) Provide baseline data of cognitive functioning
2) Provide baseline data of memory, attention, and executive functions
   - Digit Span, Letter/Naming, Trails A & B, BVRT, Coding, TOMAL
   - Don’t forget BG level at time of testing
3) Provide baseline data of behavioral/psychological functioning
4) Provide portfolio of BG levels for am and pm of school day

5) Request HA1c information
6) Create management plan with nurse and parents
7) Assess level of diabetes management knowledge
8) Communicate with Diabetes Educator
9) Create special observation system for teacher(s)
10) Create working relationship with parents

11) Provide group services for students with chronic illness (homogeneous vs heterogeneous)
12) Provide information about community groups/activities
13) Create plan for transition to middle/high school
14) Communicate plan to middle/high school personnel
15) Prepare parents for common issues with teenage self-management

**Diabetes Knowledge Tests**

- Brief Diabetes Knowledge Test
  (Michigan Diabetes Research and Training Center)
  - 23 items, multiple choice
  - Age range—6th grade and up
  - Free
  - www.med.umich.edu/mdrtc/survey/
  - Inverse correlation between HbA1c and # of items answered correctly (Colleran, Starr, & Burge, 2003)

**Michigan Diabetes Research and Training Center’s Brief Diabetes Knowledge Test**

- Which of the following is a “free food”?
  - A. Any unsweetened food
  - B. Any dietetic food
  - C. Any food that says “sugar free” on the label
  - D. Any food that has less than 20 calories per serving
Michigan Diabetes Research and Training Center’s Brief Diabetes Knowledge Test

- If you are beginning to have an insulin reaction, you should:
  - A. Exercise
  - B. Lie down and rest
  - C. Drink some juice
  - D. Take regular insulin

Diabetes Knowledge Tests

- Diabetes Quiz—500 questions taken online with access to Diabetes Encyclopedia—scores online for immediate feedback
  - Fun and informal
  - www.yourdiabetesworld.com/health/dwk/info/quiz/quiz_init.asp
  - By Novo Nordisk

Diabetes School Guide

Helping the Student with Diabetes Succeed
A Guide for School Personnel
A Joint Program of the National Institutes of Health and the Centers for Disease Control and Prevention
U.S. Department of Health and Human Services

Diabetes—Web Resources

- American Association of Diabetes Educators
  - http://www.aadenet.org
- American Diabetes Association
- Centers for Disease Control and Prevention
  - http://www.cdc.gov/diabetes
  - http://www.cdc.gov/nchs
- http://www.va.gov/health/diabetes/
- http://www.hrsa.gov
- Indian Health Service
  - http://www.ihs.gov

Summary

- School Psychological services for Diabetes focus on:
  - Documenting current and progressive levels of cognitive, academic, social, psychological, and self management skills.
  - Drawing school personnel into the care plan
  - Drawing parents into the care plan
  - Communicating effectively with medical personnel
  - Preventing primary and secondary complications and promoting quality of life (QOL)
Epilepsy

What is Epilepsy?

Epilepsy is a medical condition that produces seizures affecting a variety of mental and physical functions. It is also called a seizure disorder. When a person is said to have epilepsy, they are considered to have epilepsy.

A seizure happens when a brief, strong surge of electrical activity strikes a region of one or both sides of the brain. One in 10 adults will have a seizure sometime during their life.

Seizures can last from a few seconds to a few minutes. They can have many symptoms, from convulsions and loss of consciousness to some that are not so obvious, like staring, lip smacking, or jerking movements of arms and legs.

Incidence of Seizure Type

Potential Causes of Epilepsy in Newborns

• Brain malformations
• Lack of oxygen during birth
• Low levels of blood sugar, blood calcium, blood magnesium or other electrolyte disturbances
• Inborn errors of metabolism
• Intracranial hemorrhage
• Maternal drug use
• Infection

Epilepsy—General Description

• Central nervous system disorder that is characterized by unprovoked, recurrent seizures that disrupt communication among brain cells.
• Epilepsy is often amenable to clinical treatment through medications, surgery, and diet.
• Unpredictability of the seizures, which can curtail daily activities such as driving, school attendance, and employment.
• Persons with epilepsy contend with discrimination and misunderstanding of those around them.
• Relatively difficult to detect, and it tends to contribute to morbidity rather than mortality.

Biomagnetism and Biosignalanalysis: Localization of Seizures

Wolters, Institute for Biomagnetism and Biosignalanalysis, University of Muenster, Germany. Scientific Computing and Imaging (SCI) Institute and the Center for Integrative Biomedical Computing (CIBC).
Potential Causes of Epilepsy in Infants & Children

- Fever (febrile seizure)
- Brain tumor (rarely)
- Infections

Potential Causes of Epilepsy in Children & Adults

- Congenital conditions (Down Syndrome; tuberous sclerosis & neurofibromatosis)
- Genetic factors
- Autism spectrum (approx. 30%)
- Progressive brain disease (rare)
- Traumatic Brain Injury
- No known cause 70% all ages

Epilepsy–Epidemiology

- Onset of seizures is highest in the first year of life.
- Decreases in adolescence.
- Incidence remains relatively constant until about age 60, after which it rises dramatically.
- About 3% of the population will be diagnosed with epilepsy after having more than one seizure.
- In the United States, more than 2 million people are being treated for epilepsy. Many more cases are likely, but undetected.

Diagnosis of Epilepsy

- Careful medical history with as much information as possible about what the seizures looked like and what happened just before they began.
- (EEG). Electrical signals from brain cells are recorded. Brain waves during or between seizures may show special patterns.
- Imaging methods such as CT or MRI scans may be used to search for any growths, scars, or other physical conditions in the brain.
- In a few research centers, positron emission tomography (PET) imaging is used to identify areas of the brain that are producing seizures.

Epilepsy Treatment Goal

- No Seizures +
- No Side Effects

= Control

Epilepsy–Treatment Success

- 1 in 5 patients receiving antiepileptic medications experience recurring (intractable) seizures
- Optional referral to specialized epilepsy centers for:
  - additional medication management
  - use of nonpharmacologic treatment devices
  - surgery
  - or some combination of the above
- Gender differences now known
Neuropsychological Effects

- Wide variety—determined by type of seizure, duration, age of onset, medication side effects, level of control, etiology, setting where study done (Hartlage, Bennett, Ho, Dodrill)
- Highly individualized results dependent on age of child, localization of seizures, treatment integrity, tests used (constructs and psychometrics)

Neuropsychological Effects

- Sensory input—distortions in size, depth, hallucinations, olfactory, gustatory sensations.
- Attention & Concentration—ictal and interictal phases, focal seizures tend to have problems with selective attention, generalized seizures tend to have problems with sustained attention (Bennett & Ho, 1997)

Neuropsychological Effects

- Learning & Memory—localized
- Language—circumstantiality, spoken and written (story about Daddy’s boots)
- Perceptual-motor skills—Bender Gestalt, Frostig differentiate groups
- Executive Functions—poor performance on Trails, Wisconsin Card Sorting, Category.

Anti-Epileptic Drugs

- Phenobarbital
- Primidone
- Phenytoin
- Ethosuximide
- Valproic Acid
- Carbamazepine
- Felbamate
- Gabapentin
- Lamotrigine
- Levetiracetam

AED Effects

+ Increased seizure threshold
+ Seizure cessation
+ Attention/”alertness”
- Memory
- Sustained attention
- Psychomotor
- Problem solving
- Hyperactivity
- Aggression
- Psychosis

AED Evaluation

- How well AEDs stops seizures
- How well AED works with other AEDs (polytherapy)
- How tolerable are side effect of AEDs
School Psychological Goals

1) Assist with measurement of control and treatment adherence
   - Develop relationship with physician
   - Volunteer to collect data
   - Develop relationship with parents
   - Collect information about med(s), support system, access to healthcare, sped/504, history, old records

2) Prevent progression and promote seamless assessment—especially in young children—
   - Sell prevention to the parents—may mean encounters with goats.
   - Sell the prevention idea to school personnel
     - Let them know how they can help:
       - Observations
       - Contacts community services
       - Ask for support from school administrator etc.
       understanding for absences and home-school communication

3) Develop baseline assessment of
   - Cognitive/attention/executive functions
   - Motor
   - Psychological
   - Social
   - Emotional
   - Academic functioning
   - Watch out for problems with practice gains, CBA issues (psychometrics being compared)

4) Assess quality of life (QOL)
   - Adolescent Psychosocial Seizure Inventory (APSI)
   - Washington Psychosocial Seizure Inventory
     (Dodrill & Bazzel, 1994)

5) Support
   - Community resources—EFA etc.
   - Chronic illness group at school
   - Individual counseling—play with net together
   - Play with whole family
   - Students with seizures
     - Emancipation issues—self management
     - Education in hormonal changes/gender
     - Education about alcohol & drug abuse
     - Education about pregnancy, birth control
Summary

- School Psychology services for Epilepsy focus on:
  - Documenting current and progressive levels of cognitive, academic, social, psychological, and self management skills.
  - Drawing school personnel into the care plan
  - Drawing parents into the care plan
  - Communicating effectively with medical personnel
  - Preventing primary and secondary complications and promoting quality of life (QOL)

Robert’s Story

- 8 year old Anglo male
- Second grade
- Abandoned by parents raised as child of grandparents
- Grandfather stroke
- Behavior problems
- Psychiatrist diagnosed as ADHD
- On multiple meds
- Reading at 97% on 1st grade materials last year now not on K level

EFA

- Epilepsy Foundation of America
  - www.epilepsyfoundation.org/aboutus/
  - EFA-AED site + Drug alerts
  - www.aesnet.org/AED/index.cfm#

ASTHMA

Management of children with asthma:
Clinical Setting
Asthma

- Chronic respiratory disease caused by reversible airflow obstruction due to:
  - Bronchospasm
  - Swelling of the airway
  - Increased mucus secretion
  - Lymphocytic invasion of airway walls

Asthma Characteristic Symptoms

- Wheezing
- Coughing
- Shortness of breath
- Can be associated with:
  - Hypoxemia
  - Acidosis
  - Seizures
  - Death

Asthma Triggers

- Exercise
- Tobacco smoke
- Allergens
- Cold air
- Sudden changes in barometric pressure
- Chemicals
- Foods

Asthma

- Most common chronic disease of childhood
- Leading cause for pediatric hospitalizations
- Leading cause of school absenteeism
- 4.8 million children—highest rate with African American children
- Morbidity & mortality rates climbing
- Mortality associated with lack of proper diagnosis of asthma severity and lack of adequate treatment due to limited funds for access (Sanders, 1998)
  - Each day 14 Americans die from asthma.

Asthma Prevalence

Three children in every classroom in America
Asthma Attack

- Airways come into contact with an asthma trigger.
- Tissue inside the bronchi and bronchioles becomes inflamed (inflammation).
- At the same time, the muscles on the outside of the airways tighten up (constriction), causing them to narrow.
- A thick fluid (mucus) enters the airways, which become swollen.
- The breathing passages are narrowed still more, and breathing is hampered.

Neuropsychological Effects

- Halstead—subtests sig. diff. between groups—primary abilities affected:
  - Visualizing and remembering spatial configuration
  - Incidental memory
  - Planning
  - Visual and tactile motor tasks

- Loss of consciousness and cyanosis related to very mild to mild brain damage (Dunleavy & Baade, 1980)

Differential Diagnosis

- Competing factors during an assessment of Asthma:
  - Hypoxia—transient
  - Trauma (Panic disorder, PTSD)
  - Medication side effects
  - Lack of exposure to curriculum

Peak Flow Meter

- Tool for objectively measuring the severity of asthma. The number obtained is called a peak expiratory flow rate (PEFR). The PEFR is the amount of air that can be forcefully exhaled and indicates the degree of obstruction or narrowing of the airways.

- Helps to determine when medicine or a change in treatment is necessary.

Nebulizer

This is an electrical device that sends medicine directly into the mouth by tube or, in children, by clear mask. It requires no hand-breath coordination. Put in the prescribed amount of medicine, take the tube in the mouth (or place the mask over the child’s nose and mouth) and breathe normally until the medicine is gone.

Metered Dose Inhaler

- When properly used, the MDI gets up to 12 percent to 14 percent of a bronchodilator or other medication deep into the lungs with each puff. The medication acts more quickly than medication taken by mouth. And it causes few side effects, because the medication goes right to the lungs and not to other parts of the body.
**Medication side effects**

- Growth delay
- Cognitive deficits
- Nervousness
- Nausea
- Jitteriness
- Hyperactivity
- Drowsiness

**Treatment Goals**

1) Baseline assessment of cognitive functioning
2) Baseline assessment of memory, executive functioning, attention
3) Documentation of hospitalizations, episodes of cyanosis, emergency room visits, medications, frequency of use of inhaler
4) Documentation of triggers in school/cats!
5) Documentation of limits of PE etc.

**Treatment Goals**

6) Assessment of PTSD/Anxiety
   - BASC, RCMAS, Trauma Symptom Checklist for Children, self-efficacy, identity formation, resiliency.
7) Seamless assessment for times when symptoms increase, med. changes
8) Chronic Illness group activities, diaphragmatic breathing, relaxation exercises, imagery, biofeedback!

**Mark’s Story**

- 11 year old Anglo male
- 4th grade (repeat)
- Father died 3 years ago
- Asthma since birth--takes breathing treatments 2x day
- Class clown
- Severe stutter
- Poor self-concept
Websites

- American Lung Association
  1-800-LUNG-USA or 1-800-586-4872 http://www.lungusa.org

- Asthma and Allergy Foundation of America
  1-800-7-ASTHMA or 1-800-727-8462 http://www.aafa.org

- Asthma Resource Bank
  1-734-647-9047 http://www.asthameresourcebank.org

- National Allergy Bureau
  1-800-9-POLLEN or 1-800-976-5536 http://www.aaaai.org/nab/

- National Asthma Education and Prevention Program

Summary

- School Psychological services for Asthma focus on:
  - Documenting current and progressive levels of cognitive, academic, social, psychological, and self management skills.
  - Communicate effectively with medical personnel
  - Drawing school personnel into the care plan
  - Drawing parents into the care plan
  - Preventing primary and secondary complications and promoting quality of life (QOL)

Typical Test Battery for CI

- Draw-a-Person
- Bender Gestalt
- Kinetic Family Drawing
- KABC-II
- KTEA-II

Measures of Attention
- Informal monitoring of attention throughout test administration
- Test Observation Form (McConaughy & Achenbach, 2004)---
- Continuous Performance Tests
- BASC-II
- Children’s Color Category Test
- Cecil’s Trailmaking test

Test Battery cont’d.

- Measures of Executive Functions:
  - Tower of London
  - Category and Trailmaking tests
  - BRIEF
  - Planning and Learning scales of KABC-2
  - D–KEFS
  - BASC-2 EF content scale correlation with BRIEF
  - NEPSY
### Test Battery cont’d

- **Memory:**
  - Delayed memory KABC-II
  - TOMAL, CMS
  - Short-term memory
  - Working memory
  - Long-term memory and retrieval

- **Psychological/Behavioral**
  - BASC-II (resiliency, functional communication etc.)
  - Trauma Symptom Checklist

### Chronic Illness Workshop Summary

- World Health Model for CI
- Cultural Competence
- Nature of different CI conditions relating to demands of everyday living at school
- Typical assessment battery
- Practice parameters for CI
- Resources

### Test Battery cont’d.

- **Extras**
  - Chronic illness knowledge tests
  - Motor free visual/spatial tests
  - Verbal subtests off WISC-IV
  - Rorschach (Exner scoring)

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