MCPAP Clinical Conversations: Screening for Developmental and Behavioral Problems in Young Children

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What is “screening”? 

- Brief assessment for a specific condition
  - Performed on every child, independent of symptoms or cause for concern
  - Identifies risk (not diagnosis)

- Differs from surveillance
  - Standardized
  - Involves a threshold that defines concern

- Recommended at regular intervals
- Must be brief and efficient
Why do routine screening?

- Resources are limited
  - Time
  - Money
  - Programs
  - People

- The purpose of screening is to suggest…
  - How to allocate resources
  - Which resources are most useful for which children/families
Poll #1

What behavioral screening tool do you use routinely for preschool aged children?

- PEDS
- ASQ
- SWYC
- Something else – what?
Poll #2

How satisfied are you with the usefulness of this tool?

- Very useful
- Useful enough
- So-so
- Not useful
Poll #3

Do you also use a screening test to evaluate children’s cognitive, language and/or motor skills? If so what test and at what age(s)

- No
- ASQ-3
- PEDS
- SWYC
- Some other screening test
Choosing what conditions to screen for:

The condition has to:

- Be important (cause morbidity)
- Be common
- Develop slowly
- Be treatable
- Give better results if treated earlier
- Be identifiable with a reliable/valid screening test
Are developmental delays and behavioral conditions **important**?

- Most common concerns of parents

- >20% of children have a developmental and/or mental health disorder

- Special education services for children with developmental delays – 13% of children; increasing costs (19% of total public education in USA)

- Social and financial costs of developmental and mental health disorders (health care, medications, education, employment, public safety, criminal justice)
How *common* are developmental and mental health problems?

Considerable regional and socioeconomic variations

- Social-emotional/behavioral disorders: 20%
- Speech and language impairment: 7-15%
- ADHD: 7-10%
- Learning disability: 7%
- Developmental coordination disorder: 6-8%
- Intellectual disability/mental retardation: 1-3%
- Autism Spectrum d/o: ~ 1%
Disabilities due to chronic conditions, leading to limitations of usual activities for age (NHIS)

Prevalence per 1,000

% change in prevalence: +15.6%

Disabilities leading to limitation of usual activities for age (NHIS)

% change: +20.9%
- Any physical disability

% change: -11.8%
- Any neurodevelopmental or mental health condition

Are developmental and behavioral problems identifiable before they fully manifest themselves?

- Early language skills predict later language complexity, as well as reading.

- Growing evidence that early signs of autism can be identified in some children before their first birthday.

- Early temperament/irritability predict later disruptive behavior disorders.

- >50% of adults with mental health disorders had symptoms in childhood.
Are developmental delays and behavioral conditions *preventable/treatable*?

- **Primary prevention**: intervention is applied to an entire population

- **Secondary prevention**: intervention is applied to a sub-population of individuals identified to be at risk

- **Treatment**: intervention is applied to individuals with identified needs
Primary Prevention D-B problems

- Rubella vaccine
- Folic Acid
- Limit alcohol consumption
- Reduce premature births
- Reduce environmental lead
- Parenting education
  - Incredible Years
  - Triple P
- Early literacy programs
  - Reach Out and Read
Secondary prevention

Children at risk:

- Children born prematurely
- Children in poverty
- Immigrant children
- Children who have experienced abuse or neglect
- Children whose parents have experienced trauma
  - Adverse Childhood Experiences ("ACES" study)
- Children with a chronic health condition
- Family history of a mental health disorder
Secondary prevention of developmental problems

- **High Scope Perry Preschool Project:**
  - Children born in poverty, at high risk of failing in school (Michigan)
  - Age 3 and 4
  - High quality preschool, 2 ½ hrs/day
  - Parenting education
  - Comparison group
  - Follow-up at age 40
Perry Preschool Trial – follow-up

- Ready for school at 5: 28% (No preschool), 67% (Preschool)
- High school graduate: 60% (No preschool), 77% (Preschool)
- Earned 20K+ at 40: 40% (No preschool), 60% (Preschool)
- Public assistance as an adult: 15% (No preschool), 32% (Preschool)
- Home ownership: 13% (No preschool), 36% (Preschool)
Abecedarian Project
North Carolina, 1972

- Preschool for high risk children
- Emphasis on social, emotional, language and cognitive development

Results:
- Higher IQ test scores
- Higher math and reading test scores
- More graduate from high school; more attend college
- Older when first child born
- Higher income; less likely to need public assistance
- 5 X less crime
Secondary Prevention opportunities: Emotional/behavioral problems

- Parenting guidance in groups
  - Parental discord/divorce
  - Adoption
  - Children with ADHD, Autism
  - Tobacco, alcohol, drug abuse
    - Parents, teens

- Individual counseling
  - Parents
  - Children
Treatments for developmental delays/disorders

- Early Intervention Programs (0-3 yrs)
- Occupational Therapy
- Physical Therapy
- Speech and Language therapy
- Dyslexia programs
- Reading programs
- Applied Behavioral Analysis (ABA) for autism
Treatment for childhood mental health disorders

- Cognitive behavioral therapies
  - Depression
  - Anxiety Disorders

- Psychopharmacological therapies
  - Depression
  - Anxiety disorders
  - Bipolar disorder
  - ADHD

- Family therapy
  - Eating disorders
  - ODD/CD
Parent-completed tests for young children

- Cognitive, Language & Motor development
  - Ages and Stages (ASQ-3)
  - Parent’s Evaluation of Developmental Status (PEDS)
  - The Survey of Wellbeing of Young Children (SWYC) – “Milestones” component
Parent-completed tests for young children

- **Cognitive, Language & Motor development**
- **Behavioral/Emotional Adjustment**
  - Ages & Stages–Social Emotional (ASQ-SE)
  - Early Childhood Screening Assessment (ECSA)
  - Strengths & Difficulties Questionnaire (SDQ)
  - Brief Infant & Toddler Social Emotional Assessment (BITSEA)
  - The Survey of Wellbeing of Young Children (SWYC) –
    - Baby Pediatric Symptom Checklist
    - Preschool Pediatric Symptom Checklist
Parent-completed tests for young children

- Cognitive, Language & Motor development
- Behavioral/Emotional Adjustment

**Autism:**
- Modified Checklist for Autism in Toddlers (MCHAT)
- Parent’s Observations of Social Interaction (POSI)
Poll #4

Approximately what proportion of preschool children who screen positive on a behavioral screening test do you refer for further evaluation or treatment?

- 100%...
- 80%...
- 60%...
- 40%...
- 20%?
Screening for psychosocial risk

- Food insecurity
- Substance use (tobacco, alcohol, other drugs)
- Family violence (child and adult, physical/sexual abuse)
- Housing instability
- Parental depression
- ACEs (Adverse Childhood Experiences) – 10 questions
  - Physical/sexual/emotional abuse
  - Parental discord/separation
  - Parental mental illness
- Safe Environment for Every Kid (SEEK)
- SWYC Family Questions
SWYC Principles

- Development & Behavior inseparable
- Family context is critical
- Feasibility is key
  - Brief
  - Easy to administer and score
  - Amenable to electronic administration
  - Compatible with EMR (soon to be in EPIC)
- Freely available
- Maximize information available to pediatrician prior to encounter
Development
- Delays
- Autism

SWYC Milestones

Parent’s Observations of Social Interaction (POSI)

Academic Pediatrics, 2013
J of Infant Mental Health, 2012
Baby Pediatric Symptom Checklist (BPSC)

Preschool Pediatric Symptom Checklist (PPSC)

Behavior

Emotion

Academic Pediatrics, 2012
Academic Pediatrics, 2013
Development

- Delays
- Autism

Behavior

- Internalizing
- Externalizing

Family

Parent Depression, Concerns, and Family Stressors
<table>
<thead>
<tr>
<th>Age in months</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>9</th>
<th>12</th>
<th>15</th>
<th>18</th>
<th>24</th>
<th>30</th>
<th>36</th>
<th>48</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional-behavioral symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BPSC</td>
<td></td>
<td>PPSC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developmental milestones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Milestones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASD symptoms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>POSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Family Questions and Parent Concerns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Example: 18 Month Form

**SWYC™**: 18 months

- Child's Name: 
- Birth Date: 
- Today's Date: 

#### Developmental Milestones

These questions are about your child's development. Please tell us how much your child is doing each of these things. If your child doesn't do something anymore, choose the answer that describes how much he or she used to do it. Please be sure to answer ALL the questions.

<table>
<thead>
<tr>
<th>Not Yet</th>
<th>Somewhat</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walks up stairs with help</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kicks a ball</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Names at least 5 familiar objects - like ball or milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Names at least 5 body parts - like nose, hand, or tummy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climbs up a ladder at a playground</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses words like &quot;me&quot; or &quot;mine&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jumps off the ground with two feet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puts 2 or more words together - like &quot;more water&quot; or &quot;go outside&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses words to ask for help</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Preschool Pediatric Symptom Checklist (PPSC)

These questions are about your child's behavior. Think about what you would expect of other children the same age, and tell us how much each statement applies to your child.

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Somewhat</th>
<th>Very Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does your child...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seem nervous or afraid?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seem sad or unhappy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Get upset if things are not done in a certain way?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have a hard time with change?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have trouble playing with other children?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Break things on purpose?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fight with other children?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have trouble paying attention?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have a hard time calming down?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have trouble staying with one activity?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Is your child... | | |
| Aggressive? | | |
| Fidgety or unable to sit still? | | |
| Angry? | | |
| Take your child out in public? | | |
| Comfort your child? | | |
| Know what your child needs? | | |
| Keep your child on a schedule or routine? | | |
| Get your child to obey you? | | |

### Parent's Concerns

Do you have any concerns about your child's learning or development? 

1. Do you have any concerns about your child's behavior?
   - Not at all
   - Somewhat
   - Very Much

### Family Questions

Because family members can have a big impact on your child's development, please answer a few questions about your family below.

1. Does anyone smoke tobacco at home?
   - Yes
   - No

2. In the last year, have you ever drunk alcohol or used drugs more than you meant to?
   - Not at all
   - Several days
   - More than half the days
   - Nearly every day

3. Have you felt you wanted or needed to cut down on your drinking or drug use in the last year?
   - Not at all
   - Several days
   - More than half the days
   - Nearly every day

4. Has a family member's drinking or drug use ever had a bad effect on your child?
   - Not at all
   - Several days
   - More than half the days
   - Nearly every day

5. In the past month was there any day when you or anyone in your family went hungry because you didn't have enough money for food?
   - Not at all
   - Several days
   - More than half the days
   - Nearly every day

6. Over the past two weeks, how often have you been bothered by any of the following problems?
   - Not at all
   - Several days
   - More than half the days
   - Nearly every day

7. Having little interest or pleasure in doing things?
   - No difficulty
   - Some difficulty
   - A lot of difficulty
   - Not applicable

8. Feeling down, depressed, or hopeless?
   - No difficulty
   - Some difficulty
   - A lot of difficulty
   - Not applicable

9. In general, how would you describe your relationship with your spouse/partner?
   - No tension
   - Some tension
   - A lot of tension
   - Not applicable

### Parent's Observations of Social Interactions (POS)

Does your child bring things to you to show them to you?

<table>
<thead>
<tr>
<th>Many times a day</th>
<th>A few times a day</th>
<th>A few times a week</th>
<th>Less than once a week</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>Usually</td>
<td>Sometimes</td>
<td>Rarely</td>
<td>Never</td>
</tr>
</tbody>
</table>

Is your child interested in playing with other children?

<table>
<thead>
<tr>
<th>Says a word for what he wants</th>
<th>Points to it with one finger</th>
<th>Reaches for it</th>
<th>Pulls me over or puts hand on it</th>
<th>Grunts, cries or screams</th>
</tr>
</thead>
<tbody>
<tr>
<td>(please check all that apply)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What are your child's favorite play activities?

<table>
<thead>
<tr>
<th>Playing with dolls or stuffed animals</th>
<th>Reading books with you</th>
<th>Climbing, running, being active</th>
<th>Lining up toys or other things</th>
<th>Watching things go round like fans or wheels</th>
</tr>
</thead>
<tbody>
<tr>
<td>(please check all that apply)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Please continue on the back
Covers fine and gross motor, language, and cognition.

10 items

Questions are different at each age, but there is a Milestone section on every SWYC form.
Developmental Milestones

- Scoring:
  - “Not yet”=0
  - “Somewhat”=1
  - “Very Much”=2

- Add up a total score.

- Cut score is different at each age.

- Excel calculator can be downloaded from www.theswyc.org - makes scoring easy!

- Baby Pediatric Symptom Checklist (BPSC)
- On 2 to 15 month forms
- 12 items
- Scoring:
  - “Not at all”=0
  - “Somewhat”=1
  - “Very Much”=2
- 3 subscales (4 items each)
- Subscale score ≥3 is positive
Preschool Pediatric Symptom Checklist

On the 18-60 month SWYC forms

18 items

Scoring:
“Not at all”=0
“Somewhat”=1
“Very Much”=2

1 total score

≥9 is positive
Parent’s Concerns

- 2 items on the back of every age-specific SWYC form
- Asks whether parents are concerned about the child’s learning, development, and/or behavior
Parent’s Observations of Social Interactions (POSI)

- ASD risk
- On the 18, 24, and 30 month SWYC forms
- 7 items
- Scoring:
  3 responses in the three right-most columns indicates a positive score
Family Questions

- On the back of every age-specific form
- 9 items
- Asks about:
  - Parents’ tobacco use
  - Parents’ drug/alcohol abuse
  - Food security
  - Parents’ depression
  - Domestic violence risk
- Taken from other validated measures
- Most items are positive if “yes.” 2-item depression screen positive if total score is 3 or more
The Survey of Wellbeing of Young Children

- Children 1 month to 5 years
- Short parent-report checklist
- Easy to administer and score
- Free; downloadable from internet
- Integrated:
  - Cognitive, motor & language
  - Emotional-behavioral symptoms
  - Autism
  - Family risks
  - Parental depression
- Easy to build in electronic format
- Soon to be available in EPIC

www.TheSWYC.org
Screening for postpartum depression

Edinburgh Postnatal Depression Scale

Included on the 2, 4, and 6 month SWYC forms (replaces PHQ-2)

Satisfies MA state requirement for postpartum depression screening – code S3005

Resource in MA: MCPAP for Moms
https://www.mcpapformoms.org/
Coding

- SWYC is approved by MassHealth as a behavioral screening tool for children from birth to 5. Use 96110

- EPDS is approved by Mass Health for parental depression screening. Use modifier to 96110
Systematic follow-up

- First level screening test
- Conversation with parents
- Observations of child
- Discussion with other parent, teachers, others
- Second level screening instrument
  - Parent-completed
  - Administered
- Referral for further testing/evaluation
Improving diagnosis in healthcare
Poll # 5

If a child scores outside of the normal range on a parent-reported screening test that has a sensitivity and a specificity of 70%, approximately what do you think the chances are that the child truly has a behavioral or developmental problem?

- 90%,
- 70%,
- 50%,
- 30%
Threshold Simulation

Screener Scores

Greater Risk
Normally distributed bell curve

Mean = 4

Healthy Population

Screener Scores

Frequency

Mean = 4

Healthy Population

Screener Scores

Frequency
20% in the affected population

Mean = 4

Mean = 5.5

Healthy Population

Affected Population

Screener Scores

Frequency
Here’s that same image, with the affected population flipped.
Four Possible Results

Screening Threshold (Set at 4.8)
Sensitivity = \frac{TP}{TP + FN}
Specificity

Specificity = \frac{TN}{TN + FP}
PPV = \frac{TP}{TP + FP}
Same risk?
Threshold Probability

PPV averages risks across all who score positive

No disorder

disorder
QUIZ: What is the threshold probability?

- Prevalence = 20%
- Sensitivity = 77%
- Specificity = 77%
- PPV = 46%

Threshold Probability = ?

Diagram showing screen negative frequency distribution with screener scores ranging from 0 to 7.
So what should you do?
Set a higher threshold?

Previous Screening Threshold (Set at 4.8)

New Screening Threshold (Set at 5.7)
Higher threshold means higher PPV

\[
PPV = \frac{TP}{TP + FP}
\]
Higher threshold means lower sensitivity

\[
\text{Sensitivity} = \frac{TP}{TP + FN}
\]
QUIZ: Effect of higher threshold

Prevalence = 20%
Sensitivity = ?
Specificity = 95%
PPV = 70%
Threshold Probability = 50%
CONCLUSION: There are tradeoffs in choosing a threshold for any screening instrument:

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.1</td>
<td>-0.05</td>
<td>0</td>
</tr>
<tr>
<td>-0.05</td>
<td>0</td>
<td>0.05</td>
</tr>
<tr>
<td>0</td>
<td>0.05</td>
<td>0.1</td>
</tr>
<tr>
<td>0.05</td>
<td>0.1</td>
<td>0.15</td>
</tr>
<tr>
<td>0.1</td>
<td>0.15</td>
<td>0.2</td>
</tr>
<tr>
<td>0.15</td>
<td>0.2</td>
<td>0.25</td>
</tr>
<tr>
<td>0.2</td>
<td>0.25</td>
<td>0.3</td>
</tr>
<tr>
<td>0.25</td>
<td>0.3</td>
<td>0.35</td>
</tr>
</tbody>
</table>

↑ PPV, Specificity  ↓ Sensitivity
↓ PPV, Specificity  ↑ Sensitivity
Abstract  To help the physician decide whether or not to treat a patient who may or may not have a disease, a method has been developed for calculating a therapeutic threshold. If the probability of disease in a given patient exceeds the threshold, the preferable course of action is to treat; if the probability is below the threshold, the preferable course of action is to withhold treatment. This method is applicable in many medical and surgical settings in which some diagnostic uncertainty exists after all appropriate studies have been carried out. The technic not only exposes some of the basic principles of therapeutic decision making in the face of diagnostic uncertainty but also forms a convenient framework for analyzing the impact of “soft” clinical data on the decision-making process. (N Engl J Med 293:229-234, 1975)

The dilemma of whether or not to administer a certain drug or carry out a certain operation in a patient without an established diagnosis is familiar to physicians. In many clinical situations considerable uncertainty exists about the presence or absence of a given disease because no further confirmatory diagnostic studies are available. Given this uncertainty, administering a treatment known to be effective for the disease under consideration will be beneficial if the disease is actually present, but may be quantitative estimate of the probability and utility (value) of each outcome; and combining the estimates by a method that provides a measure of the “expected value,” or worth, of each course of action. Starting from these principles, a simple and clinically useful mathematical relation has been derived in this study between the benefits and costs of a treatment in a given disease and the threshold level of clinical suspicion of the disease. When the probability of a patient’s illness exceeds this
Questions; more information

www.TheSWYC.org
theswyc@gmail.com
QUESTIONS?