ADDRESSING DIABETES RISK FACTORS THROUGH COMMUNITY PARTNERSHIPS

SESSION 1: IDENTIFYING YOUR TARGET POPULATION
School-Based Health Alliance

The national voice for school-based health care

- Supports school-based health centers (SBHCs) through technical assistance and training

- Advocates for SBHCs on the federal, state, and local levels

- Demonstrates the value of SBHCs with common standards, measures, data, and research
The **National Nurse-Led Care Consortium (NNCC)** is a membership organization that supports nurse-led care and nurses at the front lines of care.

NNCC provides expertise to support comprehensive, community-based primary care.

- Policy research and advocacy
- Technical assistance and support
- Direct, nurse-led healthcare services
In this collaborative

- Etna, WY
- Greenville, MS
- Chicago, IL
- Clay City, KY
- Canton, OH
- Abington, PA
- Staten Island, NY
- Huntington Park, CA
- Pittsburg, KS
- Augusta, AR
- Bessemer, AL
- Miami, FL
- Lihue, HI
- Hialeah, FL
- Titusville, FL

NATIONAL NURSE-LED CARE CONSORTIUM
a PHMC affiliate

SCHOOL-BASED HEALTH ALLIANCE
Redefining Health for Kids and Teens
Qualifications

- BS
- BSN
- FNP-BC
- FNP-C
- MD
- MPH
- MSN
- NCSN
- CRNP
Reasons for participating

• “Giving children the tools and resources needed to develop good habits is a wonderful way to change the culture of overeating, little or no exercise, and eating the wrong foods.”

• “We want to have a stronger presence in the community, build relationships, and treat the family as a whole. We think collaborating with a school on diabetes prevention encompasses all of these goals, while directly serving our patients and bettering the health of the community.”

• “The opportunity to collaborate with other health centers who face similar challenges. The possibility of being more involved in the community through partnership with a local elementary school.”
Goals

• “…guidance in how to do specific programs to educate parents of kids at risk for diabetes”

• This collaborative will also give opportunities for learning for our providers, nurses, and clinical team members.”

• “Learn and identify risk factors and how to address them within our school population.”

• “We have several community based interventions for adults on island, but nothing for students. Hoping this collaboration will have suggestions on ways to address that.”
Getting to know you

- Your name
- Your role
- Your organization
- Why you joined this learning collaborative
Today’s presenters

James Huang, MD, FAAFP
• Unity Health Care

Heather Batson, MA
• PHMC
WHY IS SCREENING ELEMENTARY SCHOOL STUDENTS IMPORTANT?

- Identify children who may have T2DM but no/low symptoms
- Identify children with pre-diabetic conditions
- Identify children and schools at increased risk
  - Provide interventions at individual, family, and school or community level
CHILDREN AND YOUNG ADULTS WITH T2DM ARE MORE LIKELY TO EXPERIENCE DIABETES COMPLICATIONS THAN PEERS WITH T1DM

Source: "Association of type 1 diabetes vs. type 2 diabetes diagnosed during childhood and adolescence with complications during teenage years and young adulthood," Journal of the American Medical Association, Feb. 28, 2017

Credit: NIH/NIDDK
POLL

What % of an individual’s health status is determined by their health care?

A. 10%
B. 20%
C. 50%
D. 70%
Today’s presentation

1. Epidemiology of T2 DM and prediabetes among youths
2. Clinical signs and symptoms; co-occurring conditions
3. Population health/Social Determinants perspectives:
   – Obesity
   – Adverse Childhood Experiences (ACEs) and chronic stress
   – Race/ethnicity
   – Socio-economic status and neighborhood factors
4. Data resources
T2DM AND PREDIABETES AMONG CHILDREN AND TEENS:
increasingly prevalent in the US

Before 1990, T2DM among children and teens was almost unknown. Today, it is still uncommon, but a growing problem.

Prediabetes in children and teens is also rising. However, surveillance is not available for youths <20, so reliable information is lacking.

Community focused approaches in high-risk areas address environmental risks for everyone.
The SEARCH for Diabetes in Youth study

- 2002- present (ongoing)
- Track all diabetes cases in local youth < 20
  - both type 1 and type 2
- Multi-state
  - South Carolina, Ohio, Colorado, California, and Washington
- Additional tracking and biometrics of participants
T2DM INCIDENCE IN YOUTHS AGE 10-19

T2DM INCIDENCE IN YOUTHS AGE 10-19

T2DM incidence in youths 10-19 is higher for girls, but increasing for both boys and girls


T2DM cases among young people <20 are projected to increase 50% by 2050, even if incidence stays the same.
However, incidence is expected to **increase**, due to projected increases in risk factors for children. **Projections show that T2DM among people <20 could more than triple!**

Dynamic modeling of incidence, mortality, and population growth.
BUT SEARCH estimates may be low

Why? depend on diagnosed diabetes

• Access to care is an issue in the children most at risk

National Health and Nutrition Examination Survey (NHANES) 2005-2014

• Interviews and physical examinations from a representative sample of US residents
• Estimate prevalence of diabetes (T1 and T2) and prediabetes by using a glucose tolerance test, HbA1C and fasting blood sugar
• Cases of 2,606 youth age 12-19 were examined

https://jamanetwork.com/journals/jama/fullarticle/2533492
Many diabetes cases detected in NHANES were new diagnoses (includes T1DM and T2DM, *weighted prevalence: 0.8% overall*)

Previously undiagnosed cases:

A higher % of cases in Hispanic Black and Hispanic/Latino youth age 12-19 were previously undiagnosed--most of these cases are likely T2DM


[https://jamanetwork.com/journals/jama/fullarticle/2533492](https://jamanetwork.com/journals/jama/fullarticle/2533492)
POLL

What % of NHANES youth age 12-19 met ADA criteria for prediabetes?

A. 3%
B. 8%
C. 18%
D. 37%
NHANES participants age 12-19 with prediabetes: Up to one in 5 teens are prediabetic

https://jamanetwork.com/journals/jama/fullarticle/2533492
TAKE HOME POINTS FROM EPI:

• Although T2DM is still rare in children, it is projected to increase drastically
  – T2 DM may be underdiagnosed in children, especially in Black/African-American and Latino/Hispanic children

• Prediabetes may be common in teens
  – Our best guess is that about one in five teens experiences blood sugar control abnormalities
CLINICAL RISK FOR T2 DM and PREDIABETES IN CHILDREN/TEENS
CHILDREN WITH PREDIABETES:

- Have altered glucose metabolism, specifically impaired first phase insulin secretion
- This often comes before insulin resistance, while in adults it is the opposite
HOW IS OBESITY MEASURED FOR CHILDREN?

Overweight:
85th-94th percentile

Obese:
> 95th percentile
Prediabetes in overweight and obese teens

201/1156 (17%) adolescents had prediabetes

- 181 adolescents diagnosed with prediabetes by FPG
- 20 adolescents diagnosed with prediabetes by OGTT

**GLUCOSE TOLERANCE**

- **FPG**: Impaired fasting glucose: 100-125 mg/dL
- **OGTT**: Impaired glucose tolerance: 140-200 mg/dL at 2 h post challenge

**A1C (≥5.7%)**

- Correlates with abnormal FPG <100 mg/dL or OGTT ≥140 mg/dL
### Table 2.5
Risk-based screening for type 2 diabetes or prediabetes in asymptomatic children and adolescents in a clinical setting*

<table>
<thead>
<tr>
<th>Criteria</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight (BMI &gt;85th percentile for age and sex, weight for height &gt;85th percentile, or weight &gt;120% of Ideal for height)</td>
<td><strong>A</strong></td>
</tr>
</tbody>
</table>

Plus one or more additional risk factors based on the strength of their association with diabetes as indicated by evidence grades:

- Maternal history of diabetes or GDM during the child’s gestation **A**
- Family history of type 2 diabetes in first- or second-degree relative **A**
- Race/ethnicity (Native American, African American, Latino, Asian American, Pacific Islander) **A**
- Signs of insulin resistance or conditions associated with insulin resistance (acanthosis nigricans, hypertension, dyslipidemia, polycystic ovary syndrome, or small-for-gestational-age birth weight) **B**
Fetal environment

Maternal obesity and GDM result in excess nutrient delivery to fetus which may cause
– beta-cell hyperplasia and increased fetal insulin
– increased fetal fat deposition

Maternal malnutrition, prematurity, and low birth weight result in reduced nutrient delivery to fetus which may cause
– beta-call hypoplasia and reduced insulin production
– elevated glucocorticoids and catch-up fat disposition
Family history of type 2 diabetes in first- or second-degree relatives reported in 74%-100% of children with type 2 diabetes.
Hypertension is associated with T2DM in children

Hypertension (systolic or diastolic blood pressure values ≥ 95 percentile)
- 32% of youth with type 2 diabetes

### TABLE 3 Updated Definitions of BP Categories and Stages

<table>
<thead>
<tr>
<th>For Children Aged 1–&lt;13 y</th>
<th>For Children Aged ≥13 y</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Normal BP</strong>: &lt;90th percentile</td>
<td><strong>Normal BP</strong>: &lt;120/&lt;80 mm Hg</td>
</tr>
<tr>
<td><strong>Elevated BP</strong>: ≥90th percentile to &lt;95th percentile or 120/80</td>
<td><strong>Elevated BP</strong>: 120/&lt;80 to 129/&lt;80 mm Hg</td>
</tr>
<tr>
<td>mm Hg to &lt;95th percentile (whichever is lower)</td>
<td></td>
</tr>
<tr>
<td><strong>Stage 1 HTN</strong>: ≥95th percentile to &lt;95th percentile + 12 mmHg,</td>
<td><strong>Stage 1 HTN</strong>: 130/80 to 139/89 mm Hg</td>
</tr>
<tr>
<td>or 130/80 to 139/89 mm Hg (whichever is lower)</td>
<td></td>
</tr>
<tr>
<td><strong>Stage 2 HTN</strong>: ≥95th percentile + 12 mm Hg, or ≥140/90 mm Hg (whichever is lower)</td>
<td><strong>Stage 2 HTN</strong>: ≥140/90 mm Hg</td>
</tr>
</tbody>
</table>
Triglyceride and LDL abnormalities are linked to T2DM in children

- Hypertriglyceridemia in 65% and low HDL cholesterol in 60%
- high LDL in 24%

### Table 1

Acceptable, Borderline-high, and High Plasma Lipid and Lipoprotein Ranges for Children and Adolescents

<table>
<thead>
<tr>
<th>Category</th>
<th>Acceptable (mg/dL)</th>
<th>Borderline (mg/dL)</th>
<th>High (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC</td>
<td>&lt; 170</td>
<td>170-199</td>
<td>≥ 200</td>
</tr>
<tr>
<td>LDL-C</td>
<td>&lt; 110</td>
<td>110-129</td>
<td>≥ 130</td>
</tr>
<tr>
<td>Non-HDL-C</td>
<td>&lt; 120</td>
<td>120-144</td>
<td>≥ 145</td>
</tr>
<tr>
<td>TG (y)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-9</td>
<td>&lt; 75</td>
<td>75-99</td>
<td>≥ 100</td>
</tr>
<tr>
<td>10-19</td>
<td>&lt; 90</td>
<td>90-129</td>
<td>≥ 130</td>
</tr>
<tr>
<td>HDL-C</td>
<td>&gt; 45</td>
<td>40-45</td>
<td>&lt; 40</td>
</tr>
</tbody>
</table>

PCOS and T2DM

PCOS: ~40% reduction in insulin-stimulated glucose disposal
Additional risk factors for T2DM in children

- Use of atypical antipsychotics (such as olanzapine, ziprasidone, risperidone, aripiprazole)

<table>
<thead>
<tr>
<th>Atypical Antipsychotic</th>
<th>Weight Gain</th>
<th>Risk of Diabetes</th>
<th>Risk of Dystlipidemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clozapine (Clozaril)</td>
<td>High</td>
<td>Very low</td>
<td>Very low</td>
</tr>
<tr>
<td>Olanzapine (Zyprodex)</td>
<td>Moderate</td>
<td>Very low</td>
<td>Very low</td>
</tr>
<tr>
<td>Risperidone (Risperdal)</td>
<td>Low</td>
<td>Discrepant information</td>
<td>Discrepant information</td>
</tr>
<tr>
<td>Quetiapine (Seroquel)</td>
<td>Low</td>
<td>Discrepant information</td>
<td>Discrepant information</td>
</tr>
<tr>
<td>Aripiprazole (Abilify)</td>
<td>Very low</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Ziprasidone (Geodon)</td>
<td>Very low</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
POPULATION HEALTH PERSPECTIVES

Social determinants of health are intertwined with diabetes and prediabetes risks
Source: Institute for Clinical Systems Improvement, Going Beyond Clinical Walls: Solving Complex Problems (October 2014)
RISKS FOR DIABETES- POPULATION LEVEL

1. Obesity

Early onset T2DM is even more linked to obesity than in older adults

Areas with high rates of childhood obesity are also likely to be environments that increase risks for prediabetes
>80% of children and young adults with T2DM are also obese

- Compared to 56% of older adults with T2DM
VARIATIONS IN OBESE PHENOTYPES AND RISK FOR T2DM AMONG YOUTHS

• Different phenotypes occur among higher-weight children and youths
  – Some will never develop metabolic syndrome associated with diabetes, even if they stay obese

• Obese children who have early signs of abnormalities such as:
  – High triglycerides
  – Fatty liver
  – Fat deposits in muscle
  – Elevated inflammatory markers

Are more likely to develop glucose tolerance issues and ultimately, diabetes.
OBESITY PREVALENCE HAS INCREASED FOR ADULTS (20+) AND YOUTHS (2-19) SINCE 1999 (NHANES)

National and State by State Obesity Rates, Youth Ages 10-17, 2016-17:
RISK FOR OBESITY IN CHILDREN AND YOUTHS IS LINKED TO SES

- Neighborhood
- Education
  - The more education the head of household has, the less likely their children will be obese
- Income:
  - Lower in high income groups, except among African-American girls
RISK FACTORS FOR PEDIATRIC DIABETES

1. Obesity

2. Adverse childhood experiences and stress
The three types of ACEs include:

**ABUSE**
- Physical
- Emotional
- Sexual

**NEGLECT**
- Physical
- Emotional

**HOUSEHOLD DYSFUNCTION**
- Mental Illness
- Incarcerated Relative
- Mother treated violently
- Substance Abuse
- Divorce

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Of 17,000 ACE study participants:

- 36% have experienced 0 ACEs
- 26% have experienced 1 ACE
- 16% have experienced 2 ACEs
- 9.5% have experienced 3 ACEs
- 12.4% have experienced 4+ ACEs

64% have at least 1 ACE
ABUSE

- Physical Abuse: 28.3%
- Sexual Abuse: 20.7%
- Emotional Abuse: 10.6%

NEGLECT

- Emotional Neglect: 14.8%
- Physical Neglect: 9.9%

HOUSEHOLD DYSFUNCTION

- Household Substance Abuse: 26.9%
- Parental Divorce: 23.3%
- Household Mental Illness: 19.4%
- Mother Treated Violently: 12.7%
- Incarcerated Household Member: 4.7%
As the number of ACEs increases, so does the risk for negative health outcomes.
Possible Risk Outcomes:

**BEHAVIOR**
- Lack of physical activity
- Smoking
- Alcoholism
- Drug use
- Missed work

**PHYSICAL & MENTAL HEALTH**
- Severe obesity
- Diabetes
- Depression
- Suicide attempts
- STDs
- Heart disease
- Cancer
- Stroke
- COPD
- Broken bones

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SCHOOL-BASED HEALTH ALLIANCE
Redefining Health for Kids and Teens
Clinical Assessment Tools

The tools below can help provide additional support for the pediatric medical home to identify and more effectively care for children and adolescents who have been exposed to violence. This list does not include all tools but rather ones that relate most. Additional resources can be found on the Practice and Providers Resources page.

ACEs Family Health History and Health Appraisal Questionnaire
The Family Health History and Health Appraisal questionnaires developed by Dr. Vince Felitti and Kaiser Permanente were used to collect information on childhood maltreatment, household dysfunction, and other socio-behavioral factors examined in the ACE Study. The questionnaires are not copyrighted and there are no fees for their use.

ACEs screening tool for children and adolescents
The ACEs screening tool for children and adolescents was developed by Dr. Nadine Burke Harris for use in her clinic. The ACE Questionnaire is free and is intended to be used solely for informational or educational purposes. You must register to use it.

Parental ACEs screening tool
Many children experience stressful life events that can affect their health and wellbeing. The results from this questionnaire will assist your child’s doctor in assessing their health and determining guidance. Please read the statements below. Count the number of statements that apply to your child and write the total number in the box provided.

Please DO NOT mark or indicate which specific statements apply to your child.

1) Of the statements in Section 1, HOW MANY apply to your child? Write the total number in the box.
RISK FACTORS FOR PEDIATRIC DIABETES

1. Obesity
2. Adverse childhood experiences and stress
3. Race/ethnicity

Although children of all backgrounds can and do get T2DM, some children are at increased risk:

- Hispanic/Latino youth
- Native American/Alaska Native youth
- South Asian youth
- Black/African-American youth
Race/ethnicity: American Indian and Non-Hispanic Black children and teens age 10-19 had the highest T2DM rates.
WHY DOES RACE AND ETHNICITY MATTER

- Possibly some genetic factors
  - If so, they interact with environment and culture
- Other social determinants of health are related to race and ethnicity
  - Socio-economic status
  - Minority stress burden
  - Neighborhood factors and segregation
RISK FACTORS FOR PEDIATRIC DIABETES

1. Obesity
2. Adverse childhood experiences and stress
3. Race/ethnicity
4. Socio-economic status, including neighborhood factors

Socio-economic status is important when we’re talking about individuals or families, but also at the community level. The effect of place can be so strong that it masks impact of individual behaviors.
THE IMPORTANCE OF PLACE ON HEALTH

• Example: DC
Median household income in D.C., by Census tract

Source: ACS 2015 estimates; D.C. Policy Center
Food deserts in D.C.

Areas of limited food access in the District (in red) based on grocery or supermarket location, household income, and transportation access.

Source: D.C. Policy Center
Grocery Stores, Corner Stores, Pharmacy/grocery

Source: BBL data for 2015 and 2016
CHILD OBESITY IN DC

2- to 4-year-old WIC participants

- Current obesity rate (2014): 13.0%
- Rank among states (2014): 36/51

10- to 17-year-olds

- Current obesity rate (2016-2017): 16.1%
- Rank among states (2016-2017): 18/51

Source: stateofobesity.org/wic

Source: stateofobesity.org/children1017
DC FRESH MATCH

Bonus Bucks
FOR WIC + SENIOR FARMERS MARKET NUTRITION PROGRAM

KIDS & TEENS EAT FREE
Text FOOD to 877-877 or Call 1-866-3-HUNGRY
For Free Summer Meals Near You
dcsummermeals.dc.gov
Langdon Park
2862 Mills Avenue NE, Washington DC 20018

CONTACT: (202) 576-6595

HOURS: Community center M-F 10-5, Sat 9-3. Park dawn-dusk. Pool seasonal summer June-August

GENERAL INFO:

Overall Size: Larger than a football field


GETTING THERE:

SPORTS:

Sports Facilities/Activities: Open Space, Trails, Outdoor Basketball Court, Tennis Court, Skateboard Park, Horseshoe Pits
You've been prescribed outdoor time!
¡Le recetaron un tiempo al aire libre!

<table>
<thead>
<tr>
<th>PATIENT NAME/NOMBRE:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TAKE/TOMAR:</td>
<td>Walk and/or jog</td>
</tr>
<tr>
<td>FREQUENCY/FRECUENCIA:</td>
<td>5 times a week</td>
</tr>
<tr>
<td>DURATION/DURACIÓN:</td>
<td>For 30 minutes</td>
</tr>
</tbody>
</table>

NOTES/NOTAS:

SIGNATURE: ____________________________  DATE: 02/12/2019

PARK RX CODE: **CA034F**
LEARN MORE AT [WWW.PARKRXAMERICA.ORG](http://www.parkrxamerica.org)

Langdon Park
[http://parkrxamerica.org/3020/langdon-park](http://parkrxamerica.org/3020/langdon-park)
DATA RESOURCES TO BETTER UNDERSTAND YOUR ENVIRONMENT

Some data are available that can help you understand your local risk:

- Obesity
- Social determinants of health
- Food security
- Policies (that’s an aspect of environment too!)
Mapping Tools

Maps and mapping tools can help you demonstrate disparities and need, provide baseline data, document trends, and much more. Here we offer a collection of some of the best mapping tools for community development and health. Many of these are interactive and let you create your own maps.

Featured Resources

**California Healthy Places Index**

This resource helps explore community conditions that predict life expectancy, comparison and ranking of scores across the state, and

**Distressed Communities Index**

The DCI is a new and interactive way to visualize economic distress and prosperity across 25,000 zip codes in the US.

**HealthLandscape**

This tool brings together various sources of health, socio-economic and environmental information in a convenient, central location to help answer questions about

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MeasureUp

- Mapping Tools
- Measurement Tools
- Evidence Base
- Measurement Stories
- Deeper Dive
COMMUNITY COMMONS

https://www.communitycommons.org/map/
COMMUNITY COMMONS

- Maps with indicators
  - basic SDOH, some by tract or block group
  - Free lunch eligibility
  - Grocery store access
  - Access to exercise
- Coming soon: community indicator reports on custom areas
Includes state by state data about:

- Obesity in Kids 10-17
- Obesity in High school students
- Obesity in WIC recipients age 2-4
- Policies (access to food, school and early childhood environments, others)
COUNTY HEALTH PROFILES

Explore Health Rankings

The annual Rankings provide a revealing snapshot of how health is influenced by where we live, learn, work, and play. They provide a starting point for change in communities.

Read Our Reports

Review key findings from our annual County Health Rankings, along with other state and national reports.

Find County Rankings

Enter your state or county

Use the Data

Find and understand the data you need – in this site and beyond – to move to action.
Get a snapshot of a county’s health and SDOH information

Includes information about:

- Demographic characteristics
- Food environment, food insecurity, and limited access to healthy foods
- Children in poverty
- Children in single-parent households
- Eligibility for free/reduced lunch

Most available over time

Compare counties

If we have time:

Washington DC
Data about kids under 18 by county and metro area
- SES, demographic characteristics, low birth weight, more
SOME locations have school district data
Maps by census tract about “opportunity”
Not updated as often as County Health Rankings
BASIC SCHOOL INFO--LOCAL


For very basic data about school districts (charters may count as their own “district” data point) https://nces.ed.gov/ccd/districtsearch/index.asp

For basic info about individual schools: https://nces.ed.gov/ccd/schoolsearch/
MORE SCHOOL INFORMATION

• School health profiles with nutrition, physical activity, and other data are available for some states and large districts:
  – [https://www.cdc.gov/healthyyouth/data/profiles/results.htm](https://www.cdc.gov/healthyyouth/data/profiles/results.htm)
• School policy information on the state level is available from:
  – [https://stateofobesity.org/state-policy/#schools](https://stateofobesity.org/state-policy/#schools)
  – These resources can give you ideas about how to assess your local school policy environment as well as give you info about state policies
• Many schools districts collect BMI data
  – Check with your state DOH or DOE to see how these are reported to the public, if at all.
• CDC also has other helpful tools about healthier school environments:
  [https://www.cdc.gov/healthyschools/nutrition/schoolnutrition.htm](https://www.cdc.gov/healthyschools/nutrition/schoolnutrition.htm)
Homework assignment

- Assess how well your health center screens children age 3-17 for weight concerns
- Choose a geographic area of interest
- Choose 3 social determinants or other indicators to look up for these areas
- Assess: What do your findings suggest about childhood T2DM/prediabetes/obesity in your area?
Mapping Your Medical Neighborhood

Jillian Bird, RN, MSN
Dale Ayton, CRNP

Participants will learn to utilize strategies and tools to engage community partners as part of the larger medical neighborhood. Facilitators will describe how the medical neighborhood reinforces care team infrastructure and practice in the clinical setting.