Diabetes 101: Diagnosis & tools
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Goals
Review biology, treatment & adjusting the plan
• The diagnosis
• The biology
• The magic of insulin
Age related physiology
• Developmental
• Options to assist with management: testing, sensors, pumps
• Moving to independence
• Co-morbidities: stress, anxiety, depression, behavioral, resiliency
• Future

Auto-immune
• Self made antibodies destroy the beta cells:
  • Unable to make insulin
  • Genetic predisposition (HLA type)
  • Environmental triggers: viral, food, toxins, stress

Other screening labs:
• Thyroid antibodies: free T4, TSH, (17-30%);
• Celiac: TTG IgA, IgG (1-16%)
• Look at growth, weight loss, diarrhea, abdominal pain, not diet driven;
  weight loss, thinning tights, disappearing Art, weight gain, lupus, fatigue, low
• Random cholesterol
• Autoimmune types: IC 512 & Gad 65 AB, Highly sensitive
  insulin AB, ZNT8AB Barabara Davies

• Genetics
• Beta cell depletion
• Immune modulation/inflammation
• Insulin resistance
• Environment
Type 1 Incidence

- 5-10% of total population with diabetes
- 85% pediatric diabetes is type 1
  - 30% are overweight at diagnosis
- 1 in 300-400 kids
- common auto-immune condition in children
- T1D 30,000 per year nationally 24/100,000
  - Increased incidence of 2-3% per year
- Can occur at any age
  - Average age of onset is 4-11 years
  - Age of onset is getting younger
- Equal incidence: gender, socioeconomic status

Diabetes is a Continuum of β-cell DYSFUNCTION

Comparing Definitions for T1D, ‘LADA’, T2D

<table>
<thead>
<tr>
<th>Domain</th>
<th>T1D in children</th>
<th>T1D in adults</th>
<th>LADA</th>
<th>T2D</th>
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<tbody>
<tr>
<td>Immunity</td>
<td>Strong (HLA++)</td>
<td>++ (HLA+)</td>
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<td>Variable</td>
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<td>Insulin Therapy</td>
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</table>

SEARCH Study for Diabetes in Youth

Proposal for algorithm for classification of diabetes in youth

Pediatric concerns

- Symptoms:
  - Polyuria, polydipsia, polyphagia
  - Insulin sensitivity
  - Physical growth
  - Sexual maturity
- Developmental stage
  - Ability to provide self care
  - Supervision in schools
  - Risks to cognitive development
  - Family dynamics
- Limited research
  - Need to rely on expert opinion
  - Multidisciplinary team
  - Timely education
- Adult supervision vs self-care
  - Physical ability
  - Emotional development
  - Psychological needs

Case #1: New onset diabetes

- DA: 12:1
- Weight/height matched, normal BMI
- Polyuria, polydipsia for 1-2 days, some weight loss
- No emesis, nausea, or nocturia
- BS 545 mg/dl at MD office, no urine ketones
- A1c 8.4 % (4.5-5.5)
- Given Lantus, (0.2 u/kg/d) report for education the next day
- Also ++ Thyroid AB, (auto immune hypothyroidism)
  - TSH 540, free T4 = 0.06
  - Cholesterol 385 mg/dl
- **Mother with type 1 diabetes since age 9 & acquired hypothyroidism
Flexible Plan: Multiple daily injections (MDI)

- In all age groups = associated with reaching glucose targets (easier to obtain control)
- Less fluctuation in BG → linked to better academic performance
- Children in optimal control → adults in optimal control?
- Complication reduction?
- **If miss 1 meal bolus every other day: ^ Alc by 1%

Case #1:  Weight 50 kg
Beginning puberty dose 0.5 u/kg
50 kg = 25 u/kg
25 x 40% = 10 units basal
25 x 60% = 15 units = 5 u/meal
Target 150; Correction (50-75)
Carbs (60 grams): 75-80 grams (bolus 1:15)
Also started on levothyroxine

Insulin is the key! Types:

- **Basal= 24 hour coverage**
  - Lantus- may burn, lower pH (belly or butt)
  - Basilar- generic?
  - Levenmir- may not last 24 hr
  - Tresiba- newer, different action
- Quick acting:
  - starts 5-10 min, peak 60-90 min, lasts 120-150 min, up to 6 hrs
  - Humalog
  - Novolog
  - Apidra

Emergencies

- **Low blood sugar – medical emergency**
  - [treated with quick acting carbohydrate]
  - Less than 80 mg/dl with symptoms
  - Less than 70
  - What ever mood they are in…
- **Diabetic Keto-acidosis: not enough insulin**
  - [treated with insulin and hydration]
  - The body uses alternate fuel (fatty acids, proteins)
  - The waste product of this is ketones (poisons)
  - Ketones make the body more acid
hypoglycemia

Brain needs glucose
High or low glucose = changes in mentation
Physiologic: body systems ready to assist but... counter regulatory response abnormal in person with type 1
Hypo unaware: 9x more frequent lows

Safety>
What ever the mood...
Treat with quick acting carbs
Rule of 15 grams carb/15 min
*It’s individual

Glucagon for lows & during illness

• Glucagon for lows: emergency
• Dose
• <5 yo use half
• 5 & over use full amount
• Mix in vial, can use insulin syringe to administer
• Position on side/N/V
• Systemic response-
• Soon to be nasal*

Glucagon for lows with illness
Dose sub Q
Over 1 year age/negative ketones
• Unable to maintain BS of 100
• ≤ 2 years: 2 units (20 mcg)
• >2 years: 2 units (20 mcg)
• 3 years & up = 1 unit/yr of age
• Mix per label
• Draw dose with insulin syringe
• Once reconstituted: good 24 hrs in fridge
• May repeat dose every 30-60 min
• Discard mix after 24 hours

Diabetic Keto-Acidosis

• DKA = 25-30% of new present in DKA
• Too little insulin to transport glucose
• Glucose (BS) accumulates (><250 mg/dl)
• Body uses alternate fuel
• DKA can evolve quickly
• (young, poor access, lower income & parent education)
• Most common cause of death in childhood
• 100% mortality without insulin
• ketosis, dehydration, electrolyte imbalance, acidosis
• It occurs more often with type 1 diabetes
• Anything that increases BS & decreases insulin action can contribute to DKA
• You can have ketones with a normal sugar
Casey Johnson’s Cause of Death:
Diabetes Neglect 2010

- Johnson, 30, ... coroner said
In a brief statement.

- She died of diabetic ketoacidosis, a life-threatening
condition caused by lack of insulin and high blood sugar.

- Johnson, 30, may have been dead as long as two days
before found.

- Using insulin and taking
large amounts of Nyquil to
assist her in sleep, the
coroner said.

The couple face up to 25 years in prison $100,000 in
fines if convicted.

Madeline — called Kara — died Easter Sunday at the rural
home...from undiagnosed diabetic ketoacidosis.

Madeline, a straight-A student; home-schooled, in
good health...started getting tired about two weeks
before she died...when the situation got worse, "we
stayed fast in prayer. We believed that she would
recover." By March 22, Madeline couldn't walk or talk, her
grandmother said.

Grandmother urged family to take her to the doctor.
Grandma then contacted a daughter-in-law in California,
who called police on a non-emergency line to report the girl
was in a coma and needed medical help. An ambulance
was dispatched to the home shortly before some friends in
the home called 911 to report the girl had stopped
breathing.

DKA Symptoms

Situations contributing
to inadequate insulin

- New onset
- Lack of planning, testing/knowledge
- Infection
- Insulin resistance
- Suboptimal treatment plans (growth, forgot appointment)
- Inadequate sick day management
- Poor absorption
  - Lipo hypertrophy
  - Lipo atrophy
- Poor insight into impact of missing insulin
- Co morbidities:
  - Hyperthyroidism: increases metabolism, numbers go up, need more aggressive mgmt
  - Hypoglycemia—hypothyroid state

Cumulative: in 2 small studies prior to admission:
- Large volume of high calorie fluids prior to DKA (type 1)
Inadequate insulin, cont.

Psychological reasons
- Focus, distracted by life
- Insulin omitted for weight control
  - in 11-25 year olds, up to 30% report insulin misuse
  - Psychosis complicated by eating disorder
- Depression, fatigue
- Insulin avoided (fear of low)
- Need injecting in public
- Needle issues

Cumulative effect:
- Missed dose
- Miss match insulin/CHO
- Blind bolus (no BS check)
- Site overuse
- Post meal dosing
- The family thinks they are testing/dosing
- Then add stress.....

Insulin issues:
- Out dated
- Improperly stored
  - (cooked in automobile)
- Inaccurately measured
- Incorrectly injected
- No air shot
- Pump issues

Case #2 DKA example

John age 14
- Routine visit 8 months post dx
- Prolonged honeymoon
  - 8.5 kg weight loss
  - A1c was 6.7 now >14
  - Current BS 405
  - Ketones: Large
  - Sent to lab- lytes ok
    - treat @ home

- Tested, dosed q 2 hours
- After 4 hours, improved
- Noted in visit
  - Log book # all normal
  - Meter—few #, 1-2 per day, all over 250
  - Returned to full supervision

DKA prevention reminder card

Diabetic Ketosis/Diabetes Too Little Insulin
- Test for ketones, her accuracy, see the color key on the bottle.
- If urine is over 200 check breath in a lunch box.
- After giving correction doses at each check.
- If sugar is over 200 wait once.
- Follow the link of the glucose chart.
- These things do and go.
- Test until sugar is under 200 and there are no ketones.
- Drink until thirst is quenched.
- Your child needs drink or eat.
- Sugar is over 200 and ketones are still moderate to beag before three hours of eating meals.

Emergency (Syracuse): 411-261-2400.
Emergency (After 3 p.m.): 1-800-292-2400.
And ask for the Diabetes Doctor on page for pump site or advice.
If test results does not improve then:
- Check your pump and tubing for problems.
Case #3-Infant

13 month presented with
- tachypnea, low energy, a little weight loss

- ED: pH 7.19, bicarb 4, BS 576 mg/dl
- A1c 7.9%
- Celiac, thyroid negative

- Split Basal: am 1 unit, pm ½ unit,
  <200 = 0.5 unit,
  >200 = 1 unit,
- Lunch/supper: <150 = 0, 150-350 = 0.5, >350 = 1

- Introduced to ¼ unit dosing

- Problem: does not eat solids,
  relying on breast milk for nutrition

- Breast feeding = 15 gms, (est.)

- Support: dad there for 1 session, not supportive in real time

- After 1 week: new plan

<table>
<thead>
<tr>
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<th>10-20</th>
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<td>0</td>
<td>0.25*</td>
<td>0.5</td>
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<tr>
<td>0-0.25</td>
<td>0.25*</td>
<td>0.5</td>
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Levimir may be a good basal option
less pain, shorter action, split in BID dosing

Glycemic goals for < 6 year old
- Pre 80-200, bedtime 110-200 (150)
- A1c goal 7.5-8.5%
- Insulin use: 0.2-0.5 u/kg/d

Chase, P. & Maahs, D. 2011 pg. 56 & 151

Age related goals: the very young
- Child Dia-bites
  - Gradually alert adult to low BS
  - May offer finger for BS
  - Sometimes pulls on parent leg
  - Dir states ahead
  - Dex com = life saver*

- Adult role
  - Define child's world, provide structure, boundaries
  - Do all cares
  - Diabetes care evolve as ritual of love
  - Parents win battles

Toddler case #4
- CA 2.38 yr,
- Dx at 22mo,
- Growth good:
  - A1c 8.1 % (7.5-9%)
  - Insulin use 3 unit (0.25 u/kg/d)
  - Basal = am 1 unit + pm 0.75 unit

- Frustrations:
  - # variability,
  - Unpredictable child behaviors
  - Dose pre meal is tricky
  - Random lows, (gets crabby),
  - Leading 8-10 iv/day

Tasks for age:
- Developing gross motor skills, speech, trust, love
- Rapid growth & development
  - Learn through imitation
  - Parent acceptance of diabetes cares as part of life

- Dia-bilities:
  - Parents do all
  - Acceptance of DB care as part of life
  - Often give insulin post meal

- Ready for pump & glucose sensor
  - What pumping allows:
    - Decimal doses
    - Variable basal/time of day
    - Button pushing
    - CGM
    - Cons - connected 24/7, child lock
**Sensor technology**

- Dexcom = life, management changer!
- Approved for age 2 years
- PA for younger
- Interstitial glucose, slightly delayed from BS
- Accurate, needs calibration 2/day
- Transmits to phone, watch
- Alarms, arrows, trends
- Info. to pumps: T slim
- New: Dex 6, update software, no calibration,
  - Interface with insulin pumps T slim & Omni pod
- Freestyle Libre:
  - CGM with wired enzyme tech. sensor
  - Enzyme allows calibration once at factory
  - Wired enzyme tech. keeps sensor from straying from the calibration—no need to calibrate
  - Sensor updates BS every 15 min
  - Need to scan for data to be saved (at least every 8 hr)
  - CGM trend graphs can be viewed in scanner
  - Does not alarm to high or low sugars
  - Age 18, we use 7 yrs

**Pump therapy**

- Medtronic:
  - 530 G: auto-off basal with lows
  - 670G artificial pancreas
  - over 14 years, late pubertal
  - pre-meal dose, accurate carb count
  - stable overnights

- Omni pod:
  - No tubing
  - Dosing less refined
  - Future will talk to Dex com
  - Shocks: Pod failure: insulin irretrievable
  - New model = more refined dosing

- Tandem T slim X2
  - Software upgrades, large 480 units
  - Dex com transmits to screen
  - Soon will interface Dex com/T-slim

- Micro manage!
- Only use rapid insulin
- Basal = background insulin
- Bolus = dose for food, correction → Same doses as MDI
- Basal: may need to decrease basal by 10-20%
- Dawn effect → numbers higher at wake up, bkfst
  - Increase basal from 0400-0900
- Lows with activity → suspend, detach, temporary basal
- Basal rate for week day, school, extreme sport, sedentary

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For our toddler:

- 

TDD: 3 units per day. Same ratios, sensitivity

Basal:

- 1.75 per 24 hours = 0.729 u/hr
- 1.75 x 0.85 = 1.475 u/hr

Increase basal from 0400-0900.

Basal rate for week day, school, extreme sport, sedentary

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9
### Case #5

- 6.5 year old
- A1c 7.2% (<=8.1%)
- Minimal lows
- TDD = 17 units or 0.7 u/k/d
- 1700 = 100, 400 = 24
  - use as guide

#### Glycemic goals:
- 6-12 y.o. A1c < 8.0%
- Pre meal 70-180; 90-180 (130)
- Bed time 100-180

#### 5-7 yr. old
- Eager to please and follow directions
- Participates in thinking out loud for parent
- May be able to test sugar with prompting
- Adjust for activity

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### School age: early 7-10 years

#### Disability:
- Testing,
- Age 10-12 gives injection with supervision
- Make own food choices, learning carb counting
- Recognize and treat lows

#### Developmental tasks
- Concrete thinker ➔ more logical and understanding
- More curious, social & responsible
- Increased independence with supervision
- Check injection sites in order...
- Show insulin pump site....

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### 8 yo Male-Case #6

[Graph showing growth chart]

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8 yo Male

- BMI: A1c jumped to >14
- DKA episode
- Summer break: age 8 yrs
- Followed DKA care
- Worked with primary care
- Supervision: mom working
- Sibling was to supervise?
- Really on his own
- School is a blessing

School age: middle school Case #7

- CA: 12 yr, Dx @ age 4 yr
- Pre-menarchal
- A1c: 8.2% (historically 7-8%)
- CSII: age 8.5 yrs
- Basal 8.9 (27%)
- Very active in sports
- Goals for age:
  - 70-130 pre meal,
  - 90-150 @ HS

Diabetes related:
- Age 11-12 resp. for snacks & dosing if needed, often need reminders
- Does own pump bolus,
- May need reminders
- Testing pretty independent
- Reminders
- Part of problem solving:
  - Number variability explained
  - Adjusting for activity
  - Not interested in sensor
  - (another "thing" to wear)
- On a trip for soft ball
- Dilution—for glucagon

13 year old – Case #8 example

- CA: 13.13 yr male: dx age 9 yr.
- BMI: 10% 10th
- TDD: 46 or 1.21 u/kg/d
- A1c: 10.6% (was 7-8% when parent in charge)
- Issues: site overuse, not dosing for snacks, high numbers at supper
- Did not stop video game for dose or "I would die"

This patient:
- History of # falsification, site overuse, miss match CHO/bolus
- Parental supervision increased, mom at work after school
- Used phone: set alarm for after school snack, reviewed sites
- When asked for urine at clinic visit stated "That's how it all began"
Diabetes break case #9
Another 12 yo female
- A1c was 8%, now @9.5%
- On 0.74 u/kg/d
- Same doses, more supervision
3 month FU
- A1c 6.9%
- 0.75 u/kg/d
- Wt +1 #
- BMI 79th centile
- Father commented the extra supervision was hard

Older adolescent 15-19 case #10
17 yo Male
- Wt @ visit down 3 kg
- Lips dry, BS 446, Ketones large
- Forgets lantus 2 days/7
- Forgets Humalog rarely but...
- Rarely tests—1-2/d
- 1.09 u/kg/d
- A1c = 14%
- Social issues, Anger issues
- In alternative school
- Upset now... how long will this take?

Sent to lab
- CO2 = 22, sugar 408
- Gave corrections
- Followed DKA card

Other options:
- Libre??
- 75/25 insulin???
- Tresiba for basal

The next visit: shows his new tattoo, made by self with kit bought online

17 yo Female- diagnosis current: concerns?
Type 2??

- 17 yo with poly's
- Weak, palpitations, HA, abd pain, dry lips, HTN
- EKG, Echo normal
- BS 159/6, pH 7.29, c peptide 0.2 (1.1-4.4)
- Thyroid AB, function normal
- GAD IC-AB normal
- *proteinuria
- HTN, vitamin D low

***Timing of food/ snack
70/30 Basal: Am = 47 units; pre supper = 32 units; total 79 units per day

Insurance issues: paying cash

Mixed insulin: NPH start 30 min, peak 6-8 hours, gone 12 hrs
71/25- Nove/Novolin: starts 5-10 min, peak 60-90 min, lasts 2 hrs
72/28- Regular insulin: starts in 30 min, peaks in 2-4 hrs, lasts 6-8 hrs
70/30 - Walmart $165.24/vel 1000 units Rx + 3 visits/me = $550.00
Diabetes Family concerns

- Feel sadness/loss
- Frustration/isolation
- Db fatigue
- Control- safety
- Family conflict
- Negotiate life transitions
- Support from HC provider
  * Be on same page
- Assess diabetes distress
- Depression screening
- Db distress scale
- DDS parents 1- 2012
- BG # over target: use poker face
- Ask what now, not why
- Use I like, I wish...
- Any thoughts?
- If discord, establish agreement with parent/teen
- Set goals

Psychosocial

**Parental impact**

- Warmth and caring:
  * for each 1 = less DKA by .88
- Parental negativity:
  * for each 1 = more DKA by 1.5
- No correlation for responsibility of management tasks
- Decreased family support ➔ increased psych issues, decreased self esteem & social skills

**Family factors**

- Adherence & family function
- Warm, caring parents buffer the stress
- Diabetes support ➔ adherence to treatment
- Need high support at diagnosis, less over time:
  * Minimize negativity
- Fear of low is a barrier
  * Nocturnal low 2-4 hour before seizure (per sensor)

Behavioral

- Aggression, antisocial conduct adversely associate with poorer control
- Anxiety, depression
- Low socioeconomic
  * Supply availability = less control
- Less control, higher psych issues than general population
- Db out of control—increased risks of psych morbidity
  * Anxious children: more diligent self care

[Anatomy of a Teenager's Brain]
Thought control risks

- **Decreased mental efficiency** occurs with sugar fluctuations
  - BG > 400 mg/dl (22.2 mmol/L) = severe low

- **Behavior** impacted by blood sugar for the moment plus long term affects of poor control
  - Transient changes during acute low/high
  - Impairment of cognitive performance and mood
  - Disengagement and negativity

- **Externalizing behaviors** (agression, over activity, conduct problems) may provide backdrop in which hyperglycemia exists
  - IST: externalizing behaviors tied to diagnosis, strongly predictive of externalizing behaviors as teen
  - Externalizing behaviors as predictor of poor metabolic control
  - Also mental health problems in middle-aged adults

Academic & memory risks

No difference in cognitive function in type 1 VS those without type 1

Risks to academic achievement

- Reading scores and GPA lower with poor control
- Tight control with frequent lows also a risk
- Neither early onset of diabetes nor frequent missed school was associated with lower achievement scores

Risks for memory failure with increased frequency/severity of severe high and/or low episodes

- Disrupts memory function typical of hypoxia caused by injury
- High acidosis linked to ischemia

Memory recall for event & decreased rate of accurate memory

- Link to Alzheimer's (AL): AL is systemic failure: glucose is the energy for mitochondrial powerhouse, insulin allows glucose to enter, signals pathway

Pediatric care in general

- **Family centered care**
- **School**:
  - medical mgmt plan, IEP, 504
  - Supervision: 1 nurse/750
  - Safer at school?
  - Look at numbers night before
  - Sugar sweetened cereal
  - Summer break
- **Diabetes distress in parents**
- **Db burn out**
- **Ask about Db distress experience**
  - What are your needs as a parent?
  - support
- **JDRF parents**
Parent/family
Parenting style: most report authoritarian/democratic
Can’t assume parenting style not relevant
Work to keep parent participation, esp. mom, encourage authoritative parenting
Dev. Parent expertise 4 steps:
1. Set expectation,
2. Trial the plan
3. Pattern recognition,
4. Proactive management
Enable development of parent expertise

Parent as mentor:
Parented had less concerns, more confidence, perceived DB impact
Mentor added adjustment, careful selection needed
Seek help with G & D, sleep, eating habits, compliance

Parallel vigilance
Parent expertise
Better management of chronic illness
Evaluate:
How parent talks, enacts confidence;
Parents combine normal watchfulness & child care PLUS
Intense parallel focus: watch for Db problems

Resiliency
- Ability to cope with stress & adversity
- Source: back
- It is a process, not a trait
- Needs of individual's ability to interact with environment
- Resilience is the absence of harm & growth in positive areas
- Exhibit commitment,
  * dynamism, patience, optimism, faith, altruism
- Activation, self efficacy, resilience

Protective:
- Cognitive function,
- Positive relations,
- Competence in age-salient developmental tasks,
- High expectations,
- Meaning,
- Goals,
- Personal agency,
- Interpersonal & problem solving skills
Resilience may be moveable & teachable in influencing health, well-being, & QOL
Resiliency in Db

- How we develop coping measures impacts resiliency
- Primary coping skills:
  - Problem solving
  - Emotional expression
- Associated with:
  - Increases QOL
  - Higher competence
  - And better Db control

Primary coping skills:
- Increases QOL
- Higher competence
- And better Db control

(2010)

Secondary coping skills:
- Acceptance
- Distraction
- Related to:
  - Higher social competence
  - Better QOL
  - Better A1c
- Use of disengagement (withdrawal, denial) linked to poorer A1c, lower competence
- Teen more likely to use secondary, followed by primary
- Greater primary = resilience
- Educator:
  - Help determine most effective coping for the teen
  - Educate teen on coping strategies

5/3/2018 49

Bradshaw B G et al. The Diabetes Educator 2007;33:643-649

Figure 1. Adapted from the resiliency model of Richardson et al.36 Copyright Glenn Richardson.

Diabetes resilience model 2012

- Develop preventative interventions & protective skills R/t Db mgmt
- Protective programs (non Db) equip with skills protective of depression: need to:
  - build skills of executive function, problem solving, communication, benefit finding strategies, optimism, positive coping with Db burdens

(5/3/2018 50)

(2012)

- By overcoming risks, we achieve new behaviors & resiliency
- Action step is in the middle
- Outcome on Right

Building resiliency

Mentoring:
- take time to build & connect
- ID strengths, supports
- promote autonomy
- build on strengths

My goal setting to build resiliency & grit (drive & direction):
- What I manage well:
- My strengths:
- My support:
- My goal:
  - Automatic goals for A1c & activity
- My drive: (motivation)
- My direction: (baby steps)
Other risks

- Barrier to effective control is behavioral: early referral helps
- Increased risk:
  - older age at dx,
  - single parent,
  - lower SE status,
  - high family conflict,
  - poor problem solving & coping

Goals:
- provide positive network, supportive peers that promote self care,
- problem solving (coping skills) training
  - Wysocki, 2006

- Depression higher in Db:
- Depression Prevention programs,
- CBT: teach to monitor & evaluate thoughts,
- ID mood level,
- Recognize thoughts that trigger (not db article)
- Role transition through normal development can help (Merry, et al 2011)

Education

- ADA: monitoring in school classroom is allowed
- Team approach, developmentally appropriate, & ongoing education
  - Silverstein, et al 2005

Developmental Education:
- Foundation for lifelong care,
- Foster independence
- Positive attitude as child matures
  - Silverstein, et al, 2005

Age 2-4 yr:
- Increase child involvement,
- Allow more control of self, environment,
- Explore how things fit into daily life

From past to future...
Control besides puberty issues

- Celiac: A1c not as expected, absorption, number variability
- Thyroid: hyper: increased hunger, metabolism, insulin needs may go up.
  - Hypothyroid: watch hypoglycemia & bradycardia
- Obesity: increased resistance, needs more insulin to get the job done
- Alcohol: risk hypoglycemia, behavior, not recognize lows, or excessive quantity leads to high sugars

Questions?

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Thriving with diabetes

Character, strengths:
- Backbone to human condition,
- Strength, congruent activity is route to the psychological good
- Optimal resilient qualities:
  - happy,
  - subjective well being,
  - optimism,
  - faith,
  - self determined,
  - excellence,
  - wisdom,
  - creativity

Help to develop:
- strengths,
- skills to cope,
- recover from hardship,
- be prepared for challenges,
- develop ability to negotiate challenges – more resilient, capable & happy
- From healthychildren.org
How to do this

- Stress management
- Coping skills program:
  - Enhance social support.
  - Problem solving, add Db specific info & skills.
- Support self-management
- Serlachius, et al, 2011

Consider level of self mastery & teen perception how Db impact their life

Emotional resiliency during year 1
- After initial strain to family:
  - mom > dad with initial upheaval:
    - this resolved in 6 months,
  - in mom's by 1 year
- Quality of marriage not affected
- Perfect & Jaramillo, 2012

Careful attention to depression, anxiety & resilience should be in the design of multi-disciplinary approach to Db:
- ATE as central not correlated to knowledge
  - Mottona, et al, 2010

Parent/ family, cont.

- Coping skills training to mom:
  - Db self efficacy
  - More consistent care.
  - Child behavior not influence mom Db behavior.
  - Consistent Db regimen, better control
  - Parent stress ranges 10-74%
  - increased when child reported stress & depressive symptoms.

African American: increased importance on social support & family intervention

Recommendations:
- Screen for psychological stress,
- Family centered intervention:
  - Work on team work,
  - Communication,
  - Behavioral family therapy

Parent stress ranges 10-74%,
- increased when child reported stress & depressive symptoms.

Diabetes transition

- Self care not easy
- Lapses are anticipated
- Life gets in the way
- Set achievable goals
- All work/learn at different pace
- How to work with insurance, fill rx, make appt, have sick plan, who to contact for help

- Look at current skills
- What do they need to learn/do
- Practice skills at home now
- Work as a team
- Communicate, collaborate, problem solve
- Call your parents—they worry
  - Talk about normal things first
  - Anticipate challenges
Progression of glucose tolerance

- Patients who transition from normal glucose tolerance to prediabetes
  - Increase BMI/body weight
  - Increased insulin resistance
  - Decreased beta cell release of insulin

- Patients who transition from pre diabetes to type 2 diabetes
  - Increasing weight gain
  - Worsening insulin resistance
  - Concomitant beta cell failure

- Patients who remained normal glucose tolerant
  - Elevated BMI
  - Insulin resistance
  - ROBUST INSULIN SECRETORY RESPONSE