Kids to Adolescence with Diabetes Standards of Care

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Diabetes Management – From Tots to Teens

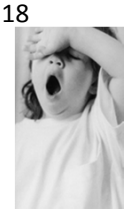
- Topics:
  - Standards of Care for Type 1 and Type 2
  - Normal growth and development
  - Optimal glycemic control
  - Minimal acute or chronic complications
  - Positive psychosocial adjustment
  - Self Care

Incidence of Type 1 in Youth

- Rate of 13.8 to 16.9 per 100,000 for Caucasian- American
- Rate of 3.3 – 11.8 per 100,000 for African-American
- 151, 000 children under age 20 in U.S. have type 1 diabetes
- Rate doubling every 20 yrs
- Many trials underway to detect and prevent (Trial Net)

Type 1 – New Diagnosis

- Diagnosis in infancy rare
- 75% new cases diagnosed before age 18
- 30% of new diagnosis present in DKA
- Complaints include:
  - Nocturia, enuresis, weeks of polyuria, polydipsia, wt loss, tired, infections. Polyphagia is rare.
  - Labs indicate hyperglycemia, glycosuria, ketonemia and ketonuria



Poll Question 1

- What percent beta cell function remains when someone is diagnosed with type 1 diabetes?

A. 20%
B. 20-30%
C. None
D. 15 – 40%

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The Honeymoon

- By diagnosis, 15-40% of beta cell function remains
- Length of honeymoon varies
  - 10-15% of teens and adults still have clinically significant insulin production > 5 yrs after DM onset (DCCT, NEJM 1993)
- Rate of beta cell loss is correlated with age
- Younger patients tend to have shorter honeymoons

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Type 1 Fact Sheet

- As many as **3 million Americans** may have type 1 diabetes.
- Each year, approximately **80 people per day** are diagnosed with type 1 diabetes in the U.S.
- Approximately **85%** with type 1 diabetes are adults, and **15%** are children.
- The rate of type 1 diabetes incidence among children under age 14 is estimated to **increase by 3 percent annually** worldwide.
- Type 1 diabetes accounts for **$14.9 billion** in healthcare costs in the U.S. each year.

Source: JDRF

ADA 2015 Standards of Care

11. Children and Adolescents

Diabetes Care 2015;38(Suppl. 1):S70–S76 | DOI: 10.2337/dc15-S014

TYPE 1 DIABETES

Three-quarters of all cases of type 1 diabetes are diagnosed in individuals <18 years of age. The provider must consider the unique aspects of care and management of children and adolescents with type 1 diabetes, such as changes in insulin sensitivity related to sexual maturity and physical growth, ability to provide self-care, supervision in child care and school, and unique neurological vulnerability to hypoglycemia and possibly hyperglycemia as well as diabetic ketoacidosis. Attention to family dynamics, developmental stages, and physiological differences related to sexual maturity are all essential in developing and implementing an optimal diabetes regimen. Due to the paucity of clinical

Recommendations: Pediatric Glycemic Control - Type 1 Diabetes

- An A1C goal of < 7.5% is recommended across all pediatric age groups

Pediatric Glycemic Control – Type 1

Blood glucose goal range			
Before meals	Bedtime/ overnight	A1C	Rationale
90–130 mg/dL (5.0–7.2 mmol/L)	90–150 mg/dL (5.0–8.3 mmol/L)	<7.5%	A lower goal (<7.0%) is reasonable if it can be achieved without excessive hypoglycemia

- Goals should be *individualized*, and lower goals may be reasonable based on benefit-risk assessment.
- Blood glucose goals should be modified in children with frequent hypoglycemia or hypoglycemia unawareness.
- Postprandial blood glucose values should be measured when there is a discrepancy between preprandial blood glucose values and A1C levels and to help assess glycemia in those on basal–bolus regimens.

ADA. 11. Diabetes Care 2015;38:S71; Table 11.1

Autoimmune Conditions -Type 1 Diabetes

Screening

- Assess for the presence of additional autoimmune conditions at diagnosis and if symptoms develop

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Poll Question 2

- What is the most common autoimmune condition associated with type 1 diabetes?
  - A. Thyroid disease
  - B. Celiac disease
  - C. DiaBulemia
  - D. Irritable bowel syndrome

Screen for Pediatric Celiac Disease – Type 1

- Screen for by measuring IgA anti-tissue transglutaminase or anti-endomysial antibodies
- Consider testing in children with
  - Positive family history of celiac disease
  - Growth failure
  - Failure to gain weight, weight loss
  - Diarrhea, flatulence, abdominal pain, signs of malabsorption
  - Frequent unexplained hypoglycemia or deterioration in glycemic control

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Children with Celiac Disease – Type 1

- Asymptomatic children with positive antibodies
  - Consider referral to gastroenterologist for evaluation with possible endoscopy and biopsy for confirmation of celiac disease
- Children with biopsy-confirmed celiac disease
  - Place on a gluten-free diet
  - Consult with a dietitian experienced in managing both diabetes and celiac disease

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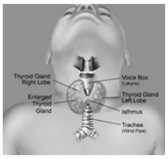
Screening for Pediatric Hypothyroidism - Type 1



- 25% positive for thyroid disease at diagnosis of type 1
- Screen for anti-thyroid peroxidase, anti-thyroglobulin antibodies soon after diagnosis
- Measure Thyroid-stimulating hormone (TSH) concentrations after metabolic control established.
  - If normal, consider rechecking every 1–2 years
  - Recheck if patient develops symptoms of thyroid dysfunction:
    - □ thyromegaly, abnormal growth rate, or unusual BG variation

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Poll Question 3

- What is the blood pressure target for kids with type 1 or 2 diabetes?
  - A. Less than 140/90
  - B. Less than 120/70
  - C. Depends on family genetics
  - D. Less than 90th percentile for age, sex, and height

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Screening for Pediatric Hypertension – Type 1 Diabetes

- Measure blood pressure at each routine visit;
  - confirm high-normal blood pressure or hypertension on three separate days
  - Hypertension in Peds:
    - Systolic BP or Diastolic BP consistently above 90th percentile for age, sex, and height – see resource page for link

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Treatment for Pediatric Hypertension-Type 1

- Diet and exercise, aimed at weight control
- If target BP not reached with 3–6 months of lifestyle intervention, consider pharmacologic treatment
- Pharmacologic treatment of hypertension
  - ACE inhibitors
  - Provide appropriate reproductive counseling due to potential teratogenic effects
- Goal of treatment
  - Blood pressure consistently below the 90th percentile for age, sex, and height

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Screening Pediatric Dyslipidemia - Type 1 Diabetes

Screening

- Obtain a fasting lipid profile in children ≥2 years of age soon after diagnosis (after glucose control has been established)
- If lipids are abnormal
  - Annual monitoring is reasonable
- If LDL cholesterol values are within accepted risk levels <100
- Repeat lipid profile every 5 years

ADA. 11. Children and Adolescents. Diabetes Care 2015;38:S70

Treatment for Pediatric Dyslipidemia - Type 1 Diabetes

Initial Therapy:

- Optimize BG, MNT using Step 2 AHA diet (see resource page) aimed at decreasing dietary saturated fat
- After age of 10 years, statin treatment is reasonable in those (after MNT and lifestyle changes) if:
  - LDL cholesterol >160 mg/dL or
  - LDL cholesterol >130 mg/dL plus one or > CVD risk factors
- Goal: LDL cholesterol <100 mg/dL

MNT=medical nutrition therapy

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Poll Question 4

- When is it indicated to start a statin for pediatrics with diabetes?

A. When LDL is greater than 100

B. After the age of 10

C. When LDL is more than 160

D. Both B and C

Screening and Treatment for Ped Nephropathy - Type 1

- Screen annually for albumin levels
  - start of puberty or age ≥10 years, whichever is earlier, once youth has had diabetes for 5 years
  - random spot urine sample for albumin-to-creatinine (UACR) ratio
- Measure creatinine clearance/ GFR at initial evaluation, then based on age, diabetes duration and treatment

Treatment

- Start ACE inhibitor when elevated UACR (>30 mg/g) confirmed on 2 of 3 urine samples from different days over 6-months

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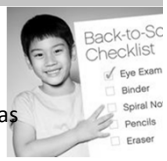
Pediatric Retinopathy Screening Guidelines Type 1 Diabetes

- Consider initial dilated and comprehensive eye examination:
- Start of puberty or age ≥10 years, whichever is earlier, once the youth has had diabetes for 3–5 years
- After initial examination
  - Annual routine follow-up generally recommended
  - Less frequent examinations may be acceptable on advice of an eye care professional



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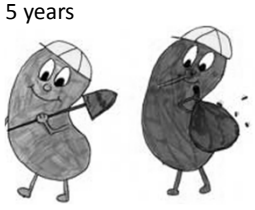
Pediatric Neuropathy Screening - Type 1 Diabetes

- Consider an annual comprehensive foot exam for the child at the start of puberty or at age ≥ 10 years, whichever is earlier, once the youth has had type 1 diabetes for 5 years



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Pediatric Diabetes Self-Management Education and Support – Type 1

- All should receive diabetes self-management education and support at diagnosis and routinely thereafter that is:

- Culturally sensitive
- Developmentally appropriate
- Individualized

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Poll Question 5

- Jason has type 1 diabetes for 7 years and is turning 18 this year. What will help him make a successful transition to diabetes self-care as an adult?

A. Encourage complete autonomy

B. Moving to his own apartment

C. Requiring he pay for his own diabetes supplies

D. Providing support and resources

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Prepare for Transition from Pediatric to Adult Care

- As teens transition to adulthood, health care providers / families must recognize vulnerabilities and prepare the developing teen at least 1 year prior to transition
- Both pediatricians and adult health care providers should assist in providing support and links to resources for the teen and emerging adult
- Encourage family involvement in diabetes management tasks
  - Recognize that premature transfer of diabetes care to the child can result in non-adherence and deterioration of glycemic control

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Recommendations for Pediatric Psychosocial Issues

- At diagnosis and during routine follow-up care, assess psychosocial issues and family stresses that could impact adherence with diabetes management
  - Provide appropriate referrals to trained mental health professions, preferably experienced in childhood diabetes

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Ongoing Care For Type 1

- See provider every 3 months
- Refer to behavioral specialist, CDE and RD at least yearly
- Eval for hypo awareness/frequency each visit
- Eval normal growth and development
  - If delayed, assess hyperglycemia, celiac or thyroid disease (screen every 1-2 yrs)
- Depression screening at 10 yrs of age

Poll Question 6

- Which factor put children at higher risk of getting type 2?

A. Higher Income families
B. Living in rural areas
C. Limited education
D. Eating a lot of sweets

Type 2 in Kids

- 7 fold increase 1990
- 1 in 6 overwt kids (age 12- 19) have prediabetes.
- ~2,500 to 3,700 new cases in U.S. annually.
- Highest risk: very obese, minority, female, low socioeconomic status, limited education
- In age range 12-19, less than 1% have Type 2 – NHANES
- Environmental changes to urgently needed

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Engaging and supporting Kids to help slow the epidemic

- Phases of Life
  - During Childhood

- Environment
  - Access to safe places to exercise
  - Access to healthy foods
  - Access to learning rich environments
  - Access to health care
- LifeStyle
  - Limit screen time to 2 hours a day
  - 1 hour a day of activity
  - Healthy Snacks
  - Limit junk food, sugary beverages
  - Fruits and Veggies

Engaging and supporting Kids to Adults to help slow the epidemic

Environment
LifeStyle

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Screening for Type 2
- children and adolescents –

- Test children who are Overweight
  - BMI >85% for age and sex, weight for height >85% or >120% of ideal for height
- Plus any 2 of the following risk factors
  - Signs of insulin resistance (acanthosis nigricans, HTN, dyslipidemia, Polycystic Ovary Syndrome – PCOS or small for gestational age birth weight
  - Maternal diabetes or GDM during child's gestation
  - Family history
  - American Indian, African American, Hispanic, Asian, South Pacific Islander
- Test at 10 yrs or puberty and every 3 yrs

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Management of Newly Diagnosed Type 2 in Children and Adolescents

- Summary of Key Action Statements – see Resource Page
- These evidence based guidelines are for patients ranging from 10-18 years old with type 2 diabetes (T2DM).
- Published in 2013

From the American Academy of Pediatrics

Clinical Practice Guideline

Management of Newly Diagnosed Type 2 Diabetes Mellitus (T2DM) in Children and Adolescents

Kenneth C. Copeland, MD, Janet Silverstein, MD, Kelly R. Moore, MD, Greg E. Prazar, MD, Terry Raymer, MD, CDE, Richard N. Shiffman, MD, Shelley C. Springer, MD, MBA, Vidhu V. Thaker, MD, Meaghan Anderson, MS, RD, LD, CDE, Stephen J. Spann, MD, MBA, and Susan K. Flinn, MA

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Type 2 Clinical Presentation

- Glycosuria without ketonuria
  - But 33% have ketonuria
  - To make dx, assess antibodies prn
  - May need insulin during acute phase
- Mild thirst, increased urination, little or no wt loss
- At onset, may have retinopathy, microalbuminuria, hypertension, hyperlipidemia

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Poll Question 7

- A 11 year old comes to ER with symptoms of new hyperglycemia and an A1c of 9.2%. What treatment must be started?

A. Insulin therapy

B. Try changes in diet immediately

C. Start exercise program STAT

D. Both B and C

New Type 2 - Start Insulin for:

- 10-18 yr olds w/ new onset hyperglycemia and:
  - BG 250 plus or
  - A1c greater than 9% or
  - Ketotic not sure if type 1 and type 2.
- Even if it turns out a ketone positive child has T2DM, insulin therapy helps stop glucose toxicity so beta cells can "rest and recover".
- Initiating insulin therapy early on may improve long term adherence by enhancing patients seriousness of disease.

Poll Question 8

- Which of the following medication is FDA approved for pediatrics after the age of 10?

A. Glipizide (Glucotrol)

B. Metformin (Glucophage)

C. Sitagliptin (Januvia)

D. Acarbose (Precose)

All other Type 2s– New Diagnosis

In all other instances, **initiate a lifestyle modification program and start Metformin therapy.**

- Since fewer than 10% of children with T2DM will attain BG goals with lifestyle changes alone, metformin should be initiated alongside to exercise and healthy eating
- Start metformin at low dose to mitigate GI side effects.

A1c Monitoring and Goals – Type 2

- **Monitor A1c every 3 months** in and intensify treatment if goals note being met.
- A1c goal is <7% in general, but individual goals may be adjusted depending on what is realistic for the pt/family.

Healthy Eating- For Type 2

- Incorporate Evidence Based Nutrition Guidelines as published by the Academy of Nutrition and Dietetics:
- Eat regular meals, reduce portion sizes,
- Choose calorie free beverages
- Limit juice to 1 cup per day
- More fruits, veggies, limit high fat foods.
- Choose less fast foods.

Activity Goals – Type 2

- **Engage in physical exercise** for at least 60 minutes daily
- Limit nonacademic screen time to less than 2 hours per day.
- Create an individualized approach that can be incorporated into the daily routine and is tailored to the child's physical ability and preferences while taking the families circumstances into account.

Poll Question 9

- When working with kids and families with type 2 diabetes, which approach work best to support behavior change?

  A. Take time to understand their perception of diabetes self-care

  B. Gently support avoidance of sugary treats.

  C. Remind them about the risk of complications.

  D. Remind them that unless they make changes, insulin may be needed.

Behavior Change

- Engage youth and family in decision making to maintain lifestyle changes and foster medication adherence.
- Goals must be realistic and take into account the families' health beliefs and behaviors.
- Strive to first understand the families perception of the disease to dispel any myths or misconception negotiating a management plan.
- Because type 2 disproportionately affects minority population, there is a need to ensure culturally appropriate, family-centered care along with ongoing education.

Focus on Lifestyle Changes

- Nutrition therapy and increased physical activity cornerstones of therapy
- Find realistic exercise
- Meds include metformin and insulin
- Social support and referrals

Risk Reduction Critical – will have diabetes for a long time

- Focus on prevention of complications
  - Vaccinations, oral care, eye exams
  - Glucose, lipid and blood pressure control
  - Lifetime weight management
  - Don't smoke
  - Keep active
  - Get support
  - Other

Treatment Standards for 2 Diabetes

- Due to the significant comorbidities associated with type 2 diabetes, these tests are recommended at diagnosis:
  - Blood pressure measurement
  - Fasting lipid panel
  - Albumin excretion assessment
  - Dilated eye examination
- Thereafter, screening and treatment guidelines for in youth with type 2 diabetes are similar to youth with type 1 diabetes

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The work of Diabetes – Self-Care

Focus on Survival Skills – At First

- BG testing / urine ketones
- Measuring and Administering Insulin
- When insulin works / timing
- Meal planning
- Hypoglycemia prevention/detection

Family in denial, grief, shock. Lots of emotional support and reassurance. Referrals critical.

BG Testing – Keep it Real

- No one likes getting poked
  - Keep matter-of-fact about need to check
  - Follow up w/ a hug or read a book together
  - Involve kids when ready
  - Use ultra-fine lancets / rotate sites

- Frequency
  - ADA – Minimum of 3x's a day w/ type 1 or type 2's on insulin
  - 1-2 times a day may be adequate for type 2s oral medications
- Reinforce benefit of log

Ketone Testing

- Test ketones (urine or blood)
  - if BG 300mg/dl or greater
  - During illness
- Ketone action levels
  - Urine - persistent moderate or large
  - Blood – greater than 0.6 mmol/L
- Action:
  - Contact provider, extra fluids and insulin required

Insulin

- Needle phobias common
  - Try pens, Auto Injectors, involve family
- Needles
  - 31 gauge short or mini needles
  - Use smallest barrel possible (ie 30 unit syringe)
  - Use ½ unit increment pens / syringes
- Sites –
  - Young children: legs, arm, buttocks
  - School age can also use abdomen
  - Consider insulin pumps

Insulin Dosing

- Younger children
  - Dose may be low during honeymoon period
  - After honey moon – dose is 0.5 – 1.0 unit/kg/day
  - Basal / bolus combo
  - If difficulty injecting bolus at lunch, consider NPH pre breakfast
- Pubertal hormones increase insulin required
  - up to 1.5 units/kg/day
- Keep it flexible, may need to inject after meals
- Consider insulin pump therapy

Special Focus on Hypo

- Fear of hypo big barrier to control
- In 10 – 20% of peds, extra exercise responsible for hypo events
  - At high risk for nocturnal hypo, even if hs BG > 130
  - Exercise can lower BG 1 – 16 hrs post event
- Prevention critical:
  - Extra carb to cover extra activity
  - 3 am checks if worried / Continuous Glucose Monitoring (7-17 yrs old)
  - May need insulin adjustment

Healthy Coping

- Parents overwhelmed with fear and stress of learning new skills and responsibilities
- Stress may cause family conflict
- Interdisciplinary team critical, especially a member with a mental health background

What Stage are They At?

- Considering normal characteristics in development of young children help to determine a realistic plan.

Erickson's Stages of Psychosocial Development

Stage One Oral-Sensory: from birth to one, trust vs. mistrust, feeding;
Stage Two Muscular-Anal: 1-3 years, autonomy vs. doubt, toilet training;
Stage Three Locomotor: 3-6 years, initiative vs. inadequacy, independence;
Stage Four Latency: 6-12 years, industry vs. inferiority, school;
Stage Five Adolescence: 12-18 years, identity vs. confusion, peer relationships;

Infant and Toddler (birth to 2 years)

- toddlers begin to separate, individuate
- require lots of sleep and naps
- 3-4 hour feeding schedule - regular nighttime feedings very important
- Lispro/aspart used after meals
- at risk for dehydration during illness, notify MD

Infant and Toddler Educational Approaches

- Education directed toward parents/primary caregivers
- Provide child with limited choices
- teach parents signs of hypoglycemia
  - pallor, listlessness, crying, clammy skin, sleepy, hunger, restless, shakiness

Preschool children (3 - 5) Educational Approaches

- Engage in magical thinking
  - play therapy helpful to express concerns
- Concerned about intactness of body
  - Reassure them that body will remain intact, use Band-Aids after injection
- Give limited choices
  - Would you like your injection on your right side or left side?
- Can identify s/s hypo and alert adults
- Provide education to staff in preschool/daycare

School-Age Child (6 - 12) Educational Approaches

- Speaks fluently, able to share and cooperate
  - games good teaching tools
- Power, protection of parent very important
  - Parent needs to assume most of responsibility
  - Child can participate in self-care
- Try to fit diabetes management into normal routine

Adolescence Overview

- hormones increase insulin resistance
- poor glucose control may be secondary to chronic family stress or parental over/under involvement
- Identity and self image concerns
- DKA & poor glycemic control can delay puberty
- movement to independence difficult due to parental protectiveness

Educational Content with Teens

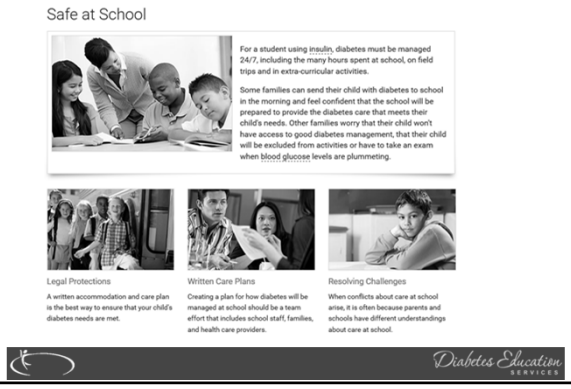
Education directed primarily toward adolescent with parents included

- substance abuse
- eating disorders
- risk taking behaviors
- sex, family planning and contraception
- driving considerations
- self care:
  - BGM before driving, carrying supplies, safety

Strategies for Working with Teens

- Avoid judgment
- Specific plan / realistic goals
- Teach real life meal planning
- Change appt format
- Gradual increase responsibility
  - Diabetes self-care
  - Doctors appts
  - Referrals / prescriptions

Resources at Diabetes.Org (ADA)



Diabetes and Rights

- The Individuals with Disabilities Education Act of 1991 and American Disabilities Act protect children and adults with diabetes against discrimination.
- Federal law requires ind assessment of child and accommodations in school setting
- For more information and care plans visit:
  - American Diabetes Association **www.diabetes.org**
  - Juvenile Diabetes Foundation **www.jdfcure.org**
  - **Childrenwithdiabetes.org**

Family Education and Support

- Diabetes dx can cause grief, anger, depression in parents and child
- Include all family members in self-mgmt ed
- Gear strategies to family can succeed
- Provide resources for coping

Thank You

- Questions?
- Email bev@diabetesed.net
- Web www.diabetesed.net

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