CASE STUDY 2:
FROM PAKISTAN TO PHILADELPHIA;
MANAGING DIABETES IN A TODDLER

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Disclosures

No conflict of interest.

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Objectives

- The learner will be able to state considerations for care and barriers to care in a young child (less than 6 years old) with diabetes during the first year of diagnosis.
- The learner will be able to recognize and problem solve health and math literacy barriers.
- The learner will be able to state the roles of various diabetes team members in diabetes management and recognize the importance of a team approach.

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Importance of Religion

According to the World Health Organization:

- **Islam: 96.03%**
  - *The national religion of Pakistan*
- Hindu: 1.85%
- **Christian: 1.59%**

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Initial Presentation - History

- Dx on 2/15/18, 17 months old
- History of Present Illness:
  - 17 month old female with no significant medical history who presents with constipation and polyuria.
  - **Two week history** of straining with bowel movements and abdominal pain. Tried glycerin enema 3 days prior to admission with minimal hard stool balls. She had no vomiting, but had **abdominal pain** and does not eat a diet rich in fiber.
  - A urinalysis was obtained due to concern for UTI and was positive for **500 glucose and >160 ketones**.
  - She subsequently had a POC glucose that was >600.
  - On further discussion with family, she had a history of both **polyuria** and **polydipsia**, although no weight loss.

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Initial Presentation – Physical Exam

- **pH of 7.28/ 25.8/11.9/-13.1 with an initial gap of 22**
- Started on the DKA pathway and given a bolus of normal saline prior to starting on a two bag system with insulin drip.
- **$HgBA_{1c}$ 10.5%**
- pH normalized to **7.38/32.4 with HCO3 17, glucose 166 and ketones 1.5**.
- Mental status was appropriate throughout stay in ED without concern for cerebral edema.
- Started with a **1.5 unit dose of Lantus**
- Admitted to endocrinology service for further management

Labs associated with DKA	Reference Values
Blood glucose	>250 mg/dL
Arterial pH	</= to 7.30
Anion gap	>10
Serum bicarbonate	</= to 18 mEq/L
Urinalysis	Ketones, glucose present
Serum Cr	Often elevated
Serum sodium	Often elevated or normal
Serum potassium	Often elevated or normal
Serum phosphate	Often elevated or normal
WBC	Mildly elevated

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Initial Presentation - Demographics

- Family History:
  - Maternal grandmother and paternal grandmother with history of T2DM.
  - No family history of T1DM or other autoimmune disorders.
- Social History:
  - Lives with mother, father, older sister, and maternal grandmother.
  - Receives early intervention speech therapy (common in a bilingual household).
  - No pets or smoke exposures.

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Social Situation

- Family recently moved from Pakistan—**little support** in the Philadelphia community
- Unclear if mom understood what was said or taught—refused an interpreter
  - *English was a second language*
  - *First language is Urdu*
- Difficult to manage a sick toddler and learn!
- During admission, left to look for a miracle by visiting multiple Philadelphia area Christian churches

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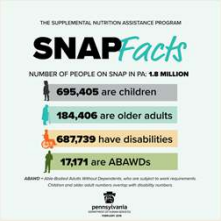
Social Situation



- Significant difficulty coping with diagnosis
- Food stamps (no cash assistance)
  - *At home, Pakistani food mainly served*

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Hospital Admission: Education

- Admitted for typical 3 days of instruction
- Mom and dad received teaching
  - *Carb counting class*
  - *Social work*
  - *CDE*
  - *Child-life specialist*
  - *Skills taught by bedside nurses*
- Family had to stay for 4 day admission due to difficult time with written exam
- Staff reported parents were overwhelmed and anxious

Hospital Admission: Education

- Day 1 parents missed 1-2 test questions on assessment exam.
- Day 2 parents missed 4-6 test questions on assessment exam.
- Father needs reinforcement for treating lows.
- Both parents **unsure about insulin** and BG management with snacking within 3h of last dose—not always dosing.
- Mother reports **"it's a lot."**
- Father states that mother is **quitting her job** and **"she's doing it all."**
- **Mom asks if diabetes is contagious by poking herself with daughter's needle by accident**
- Multiple family teach-backs with bedside RN with plan for further skills practice.
- **Family continues to need further practice** using Accu-Check Meter, lancing device, and home blood ketone meter.
- **Team recommends reinforcement** of safety skills for home Diabetes Management with Day 3 class.

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Hospital Admission: Diabetes Team

Inpatient team member roles

- Endocrine attending and fellows
  - *Responsible for primary medical management*
- Clinical nurse specialist
  - *Care coordination*
- CDE and coach
  - *Initial teaching and point of contact for families*
- Bedside nurse
  - *Provides ongoing monitoring of patient and family including supplemental teaching and holistic care*
- Social worker
  - *Assesses patient and family coping; insurance issues, assist with case management*
- Dietitian
  - *Assesses nutrition status and provides education*
- Child Life
  - *Provides developmentally appropriate support for patient and siblings around diagnosis and treatment*

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Plan for management

- Started on basal bolus regimen
  - *0.8u/kg=7.5u/d*
  - *Titrated during stay*

Basal:	**2 units q AM, 2 units q PM**
ISF:	**0.5 units : 120 mg/dL**
ICR:	**0.5 units : 18 carbs**
Target BG:	**120 mg/dL (AM&PM)**

- Split dose basal
- Using syringe/vial
- Monitor blood sugars pre-meal, bedtime, 2am
- Bolus coverage for carbs and high blood sugars

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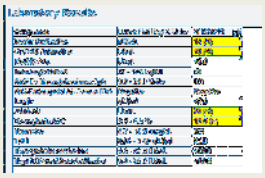
Follow up during T1Y1

- 2 weeks: NP/MD and CDE
  - *Initial meeting with the outpatient team*
  - *Review admission labs and identify issues*
  - *Introduce technology options*
- 2 month: NP/MD and dietitian, SW
  - *Evaluation of progress*
- 5-6 month: NP and CDE
  - *Assess use of technology*
  - *Advanced Home Management education*
- 8-9 months: NP and dietitian
  - *Assess problem solving ability*
  - *Plan for follow up in year 2*
- 12 months: NP and CDE
  - *Assess year one and plan for year 2*



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T1Y1 Follow Up: Team Roles

- CDE (four scheduled visits the first year)
  - *Contacts the family daily, weekly and as needed for coaching*
- Endocrinologist (once per year) & NP (all other visits)
  - *NP is the coordinator for the team, labs, medical management, dose adjustment*
- Dietitian (two times per year)
  - *Assesses nutrition management & education*
- Social Worker & psychologist (one time and PRN)
  - *Assess family coping and social issues*
- Child Life Specialist (PRN)
  - *Developmentally appropriate support for patient and siblings around treatment*

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T1Y1 Follow Up: Challenges

- Continued search for a "miracle"
- Patient starts passing out with injections due to fear
- Mom's anxiety increases
- **Mom driving with patient on her lap**
- Lacking support at home
- Challenging clinic visits

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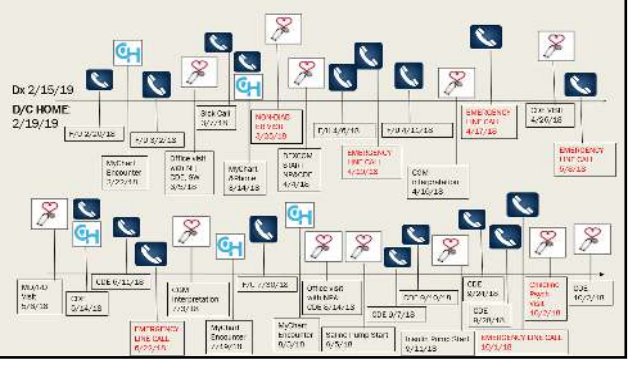
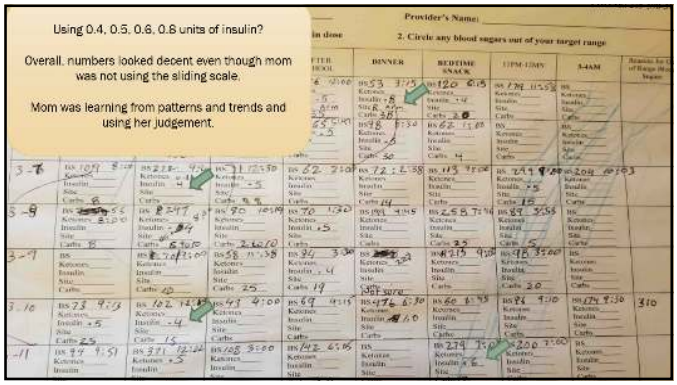
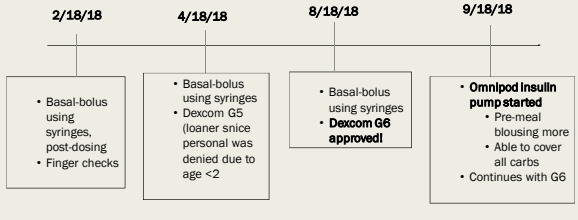


CDE Follow-up during T1Y1

- Frequent contact and appointment with CDE post-discharge
- Challenges–
  - *Difficult to communicate on the phone in the beginning, refusal of interpreter and thick accent*
  - *Mom fearful of hypoglycemia*
  - *Low health literacy*
    - Unable to use sliding scale
    - Unclear if able to carb count appropriately
  - *No computer at home to upload devices*



Timeline of Insulin Delivery and Blood Sugar Monitoring



T1Y1 Follow Up: Solutions

- Quickly moved to a continuous monitoring system
  - Dexcom G5—used loaner until age 2
  - Anxiety with insertion—but fewer fingersticks!
- Quickly started an insulin pump
  - Omnipod allowed mom to remote bolus

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T1Y1 Follow Up: Solutions

- Support, support, support
  - Frequent phone calls
  - Use of patient portal for communication
  - Photos sent of blood sugars and food
  - More frequent visits

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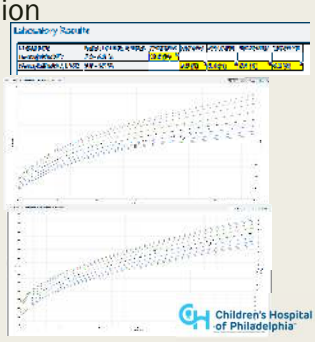
T1Y1: Clinical Progression

- HbA1c during the year
- Growth & development
- Insulin requirements doubled from diagnosis



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T1Y1: One Year Later

- HbA1c = 8.5%
- Mom feels empowered to be able to manage diabetes while still searching for a "miracle"
- Mom understood basic concepts
  - *carbs=BG up, insulin=BG down*
- Patient completely cooperative during the visit and for the physical exam!

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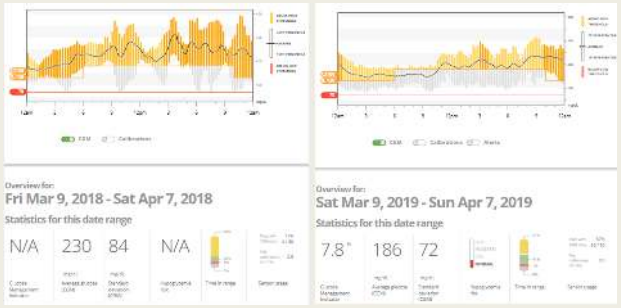

How did this work?

- Mom and team developed a strong bond
  - *Mom trusted team*
- Team empowered mom to make independent dose adjustments that were unconventional
- Mom had transportation to get to CHOP and a working cell phone to communicate
- Mom able and willing to come to clinic frequently to upload pump or sensor
  - *Mom eventually able to use cell phone to upload sensor data remotely*
- Mom had family at home to help when patient did not want to cooperate with diabetes care

References

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- Photos:
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  - *Slide 2:* https://www.pcimag.com/articles/101810-valspar-colors-brighten-childrens-hospital-of-philadelphia-addition
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  - *Slide 20:* *https://www.google.com/search?biw=1680&bih=956&tbm=isch&sa=1&ei=N62nXNTSOoWlgseC97e4Ag&q=carb+counting&oq=carb+counting&gs_l=img.3..0i10.33568.36687..36747...5.0..0.90.1123.17.....1....1..gws-wiz-img.....35i39j0i67j0i5i30j0i8i30.-2iD3IFrpX8#imgrc=3K1IyUE0zi2sM:&spf=1554492765648*
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