Increasing the percentage of blood glucose levels tested in pediatric Type 1 Diabetic patients

Stephen Fortson, Community Health Worker
Cincinnati Children’s
December 2019
**Problem:** Nonadherence of blood glucose checks (*and recording the value*) in between follow up diabetes appointments is problematic for some children which can lead to **serious medical consequences** and can make treatment planning and optimization difficult for the healthcare providers.

**Evidence-basis**: We know from the literature that children who are less compliant with checking their blood glucose at home are more likely to be admitted and are at higher risk for life-threatening diabetes complications.

**Alignment:** This project aligns with CCHMC’s SP2020 Inpatient Bed Day Disparity project where the goal is reduction of the number of days children spend in the hospital. One focus is on **chronic conditions** (i.e. diabetes) and this work is approached through an **equity lens**.

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Theory

Increasing Blood Glucose Checks Key Driver Diagram (KDD)

Project Leader(s): Stephen Fortson, Community Health Worker

Global Aim

That children with diabetes are as healthy as possible and free from complications of their disease

SMART Aim

To increase the percent of blood glucose levels checked in Type 1 Diabetic children from 49% to 60% by April 15, 2020.

Population

Fixed cohort of 5 Type 1 diabetic patients

Key Drivers

- Readily available and access to supplies
- Engaged and involved parents
- School RNs and Teachers in Alignment
- Adequate adjustment to chronic illness for patients and families
- Seamless, bi-directional, up to date communication to/from Endocrine Clinic and School RNs
- Daily structure / routine to incorporate blood glucose testing

Interventions (LOR #)

- Implement alarm clock usage (LOR #)
- Facilitate CMH Resource (LOR #)
- Utilize an "after hours" clinic for evening blood sugar checks (LOR #)
- Implement calendar / tracker with the patients for time management (LOR #)
- Teacher in-service by RN (LOR #)
- Offer incentives for weekend blood glucose checks (LOR #)

Legend

- Potential intervention
- Active intervention
- Adopted/Abandoned intervention
LEARNING CYCLES

PDSA Worksheet – Blood Glucose Testing

Plan SMART Aim: To increase the percent of blood glucose levels checked in Type 1 Diabetic children from 49% to 60% by April 15, 2020.

What key driver does this test reflect?
- Daily structure / routine to incorporate blood glucose testing

What is the objective of the test?
- To help the kid’s self-regulate/manage their BG checks

Plan:

A. Briefly describe the test.
- Will implement a calendar / log tracking system for the kids

B. What would be the successful test look like?
- The kids like “owning” their blood glucose log and thereby increase their checks

C. How will you measure the success of this test?
- By the number of blood glucose levels recorded

D. What do you predict will happen?
- 3 out of 5 patients will maintain the log

E. Plan for collection of data:
- Manual

F. Tasks:

<table>
<thead>
<tr>
<th>List the tasks necessary to complete this test (what)</th>
<th>Person responsible (who)</th>
<th>When</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create tracking log</td>
<td>Stephen</td>
<td>11/13/19</td>
<td>CCHMC</td>
</tr>
<tr>
<td>Distribute log to each patients</td>
<td>Stephen</td>
<td>11/15/19</td>
<td></td>
</tr>
<tr>
<td>Instruct patient, caregivers, School RAs on log</td>
<td>Stephen</td>
<td>12/15/19</td>
<td></td>
</tr>
<tr>
<td>Patients record daily BG and send log to Stephen each week</td>
<td>Patients</td>
<td>11/18 ~ 12/19</td>
<td></td>
</tr>
</tbody>
</table>

DO: Test the changes.
- Was the cycle carried out as planned? [ ] Yes or [ ] No
- Record data and observations.

STUDY:
- Did the results match your predictions? [ ] Yes or [ ] No
- Compare the result of your test to your previous performance:
- What did you learn?

ACT:
- Decide to Adapt, Adopt or Abandon (shade one box).
  - [ ] Adapt. Improve the change and continue testing the plan. Plan/changes for next test:
  - [ ] Adopt. Select changes to implement on a larger scale and develop an implementation plan and plan for sustainability.
  - [ ] Abandon. Discard this change idea and try a different one.
RESULTS

Data Tracker & Learning

- Stratifying data
- Identifying patterns and opportunities for testing!

Run Chart

- Also tracking clinical outcome measures like HgA1C

<table>
<thead>
<tr>
<th>Day of Week</th>
<th>Date</th>
<th>Morning</th>
<th>Lunch</th>
<th>Dinner</th>
<th>Bedtime</th>
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</thead>
<tbody>
<tr>
<td>Saturday</td>
<td>9/20/2019</td>
<td>370</td>
<td>263</td>
<td>317</td>
<td>600</td>
</tr>
<tr>
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<td>9/21/2019</td>
<td>370</td>
<td>263</td>
<td>317</td>
<td>600</td>
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<td>370</td>
<td>263</td>
<td>317</td>
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<tr>
<td>Tuesday</td>
<td>9/23/2019</td>
<td>370</td>
<td>263</td>
<td>317</td>
<td>600</td>
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<tr>
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<td>9/24/2019</td>
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<td>263</td>
<td>317</td>
<td>600</td>
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<tr>
<td>Thursday</td>
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<td>263</td>
<td>317</td>
<td>600</td>
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<td>600</td>
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</table>

Snapshot from one child’s tracker.
Seeing trends in missing blood sugar checks at bedtime and on weekends predominantly.
Morning and lunch are usually done at school.
MOST PROUD & WHY

<table>
<thead>
<tr>
<th>QI Learning (Ex. Learned benefits of failing on a small scale)</th>
<th>Leadership Learning (Ex. Importance of communicating with stakeholders)</th>
<th>Project Process Learning (Ex. Importance of documenting throughout the project)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QI Learning 1: • Hands-on approach helps accelerate learning (i.e. practicing the tools)</td>
<td>Leadership Learning 1: • Helps to tie in RN with provider and families</td>
<td>Project Process Learning 1: • Staying flexible is important – had to tweak initial project and scope</td>
</tr>
<tr>
<td>QI Learning 2: • Process Map / sFMEA – new to learn • Looking at failures + interventions has been helpful</td>
<td>Leadership Learning 2: • Beyond just communicating with, but making sure I have the right stakeholders</td>
<td>Project Process Learning 2: • Self collecting data is time consuming and challenging</td>
</tr>
<tr>
<td>QI Learning 3</td>
<td>Leadership Learning 3: • Networking across systems is very important (e.g. CHD school nurses supervisor)</td>
<td>Project Process Learning 3</td>
</tr>
</tbody>
</table>

❖ Proud of all the learnings
❖ Knowing that this work will make a difference for children with T1DM for their health and wellbeing
GREATEST CHALLENGE

- Home environment is challenging – affects data collection
- Endocrine Clinic communication to School RN – suboptimal at times
- Teachers and RNs – lack of being on the same page

- Early on in the QI journey
- I am still learning!

- Lots of differences from provider to provider, school to school, home to home
- Impacts rapid nature of feedback

- Behavior change for kids and parents
- Teachers with competing priorities

Systems Thinking

Understanding Variation

Theory of Knowledge/Testing

Change Management/Psychology
With thanks

TEAM MEMBERS

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Dr. Nana Jones, CCHMC Endocrine Clinic
Dr. Yao, CCHMC Endocrine Clinic
School RNs
Parents and Families
Teachers