Type 2 Insulin Self-wean Project

Stacey Hardegree RN MSN CCM Diabetes Educator
DR Alejandro de la Torre, Physician investigator

9/11/2026

Cook Children's Endocrine and Diabetes Clinic

OUR TEAM

- Doctors: 16 (13 FTE)
- APP: 9 (3 CDCES)
- Clinical Pharmacist: 1 with CDCES
- Diabetes RN/CDCES: 13 (11 FTE) -3 CDCES
- Endocrine RN: 12 FTE
- Registered Dieticians: 4 (3 FTE)- 1 RD CDCES
- Clinical Therapists: 4 (2.5 FTE)
- Social Worker: 2
- Child Life Specialist: 2 (inpatient and outpatient)

POPULATION

- Total Patient <18yo with T1D approximately 1950 PwT1D and 380 PwT2D annually
- Newly diagnosed annually: ~300
- Payor Mix: 45% Medicaid

LOCATIONS

- Fort Worth- Medical Center
- Prosper- Medical Center
- Satellite Clinics
  - Abilene
  - Alliance
  - Denton
  - Hurst
  - Mansfield
  - Midland
  - San Angelo
  - Southlake
  - Waco

CookChildren's

Problem Identified:
Insulin weaning lost to follow up

- For families who followed up weekly by phone we identified that weaning could be accomplished in an 8-week period.
- Families were instructed to call daily for 5 days after insulin administration then weekly for blood glucose review and insulin weaning.
- We identified that only approximately 30% were completing insulin wean by the first 3 month follow up clinic visit.

Original Insulin Wean Protocol

7/22/2019

If approximately 60% of BGs are GREATER THAN 150mg/dL:				METFORMIN
STEP 1:	No insulin change OR INCREASE AS NEEDED Reinforce metformin, CHO limit and 60 min of moderate to vigorous activity per day			Titrate per protocol to 1000mg BID - If symptomatic on Metformin, HOLD titration for one week and encourage food before dose - If symptoms continue after ONE WEEK, change medication to Metformin XR (per protocol) and continue titration
If approximately 60% of BGs are LESS THAN 150mg/dL:				
	BOLUS INSULIN	**BASAL INSULIN**	**CORRECTION FACTOR**	
STEP 2:	Decrease by 50%	Continue	Continue use as needed	
STEP 3:	**STOP BOLUS INSULIN**	Continue	Continue use as needed	
STEP 4:		Decrease by 25% of **original** dose	Continue use as needed	
STEP 5:		Decrease by 25% of **original** dose	Continue use as needed	
STEP 6:		Decrease by 25% of **original** dose	Continue use as needed	
STEP 7: INSULIN WEAN COMPLETE		**STOP BASAL INSULIN**	Continue use as needed	
	-if having frequent lows may decrease bolus and basal at the same time **Continue lifestyle changes.** Call clinic if BG over 200 more than twice in one week.			

Original Insulin Wean Protocol

Dependent on Families to *call* clinic weekly for blood glucose review and insulin weaning

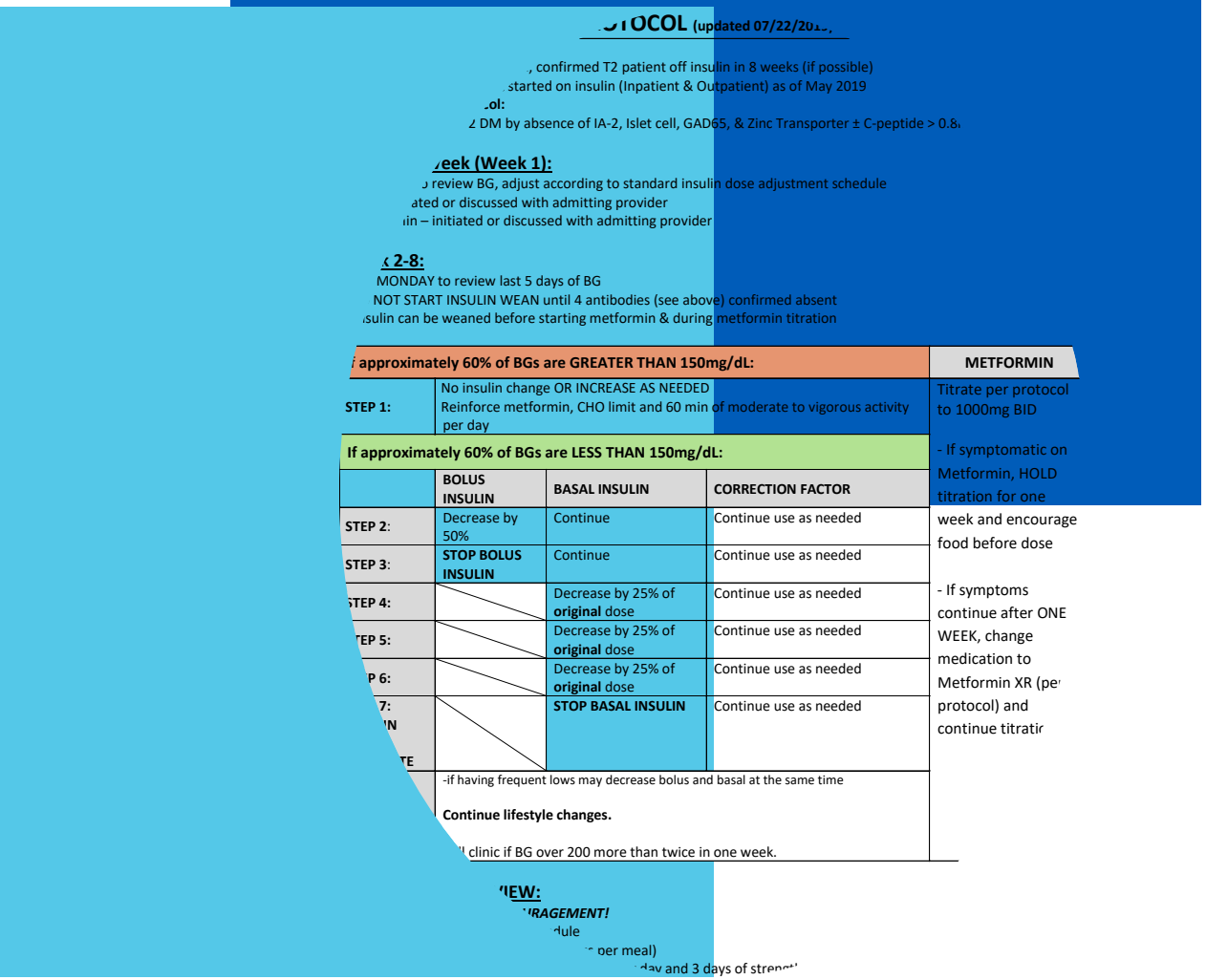
Result: most families failed to call and were at same insulin doses at next 3-month clinic visit.

How do we?

Motivate - calls to clinic for continuation of insulin weaning

Decrease loss to follow-up

Empower families to get improve health and wean insulin.



…OCOL (updated 07/22/20…

…, confirmed T2 patient off insulin in 8 weeks (if possible)
…started on insulin (Inpatient & Outpatient) as of May 2019
…ol:
… DM by absence of IA-2, Islet cell, GAD65, & Zinc Transporter ± C-peptide > 0.8…

…eek (Week 1):
… review BG, adjust according to standard insulin dose adjustment schedule
…ated or discussed with admitting provider
…in – initiated or discussed with admitting provider

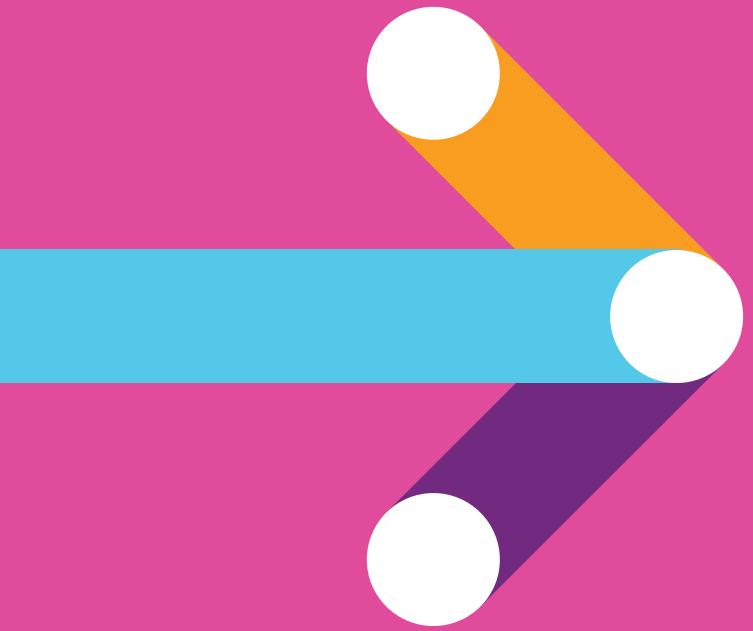
… 2-8:
MONDAY to review last 5 days of BG
NOT START INSULIN WEAN until 4 antibodies (see above) confirmed absent
…sulin can be weaned before starting metformin & during metformin titration

… approximately 60% of BGs are GREATER THAN 150mg/dL:				METFORMIN
STEP 1:	No insulin change OR INCREASE AS NEEDED Reinforce metformin, CHO limit and 60 min of moderate to vigorous activity per day			Titrate per protocol to 1000mg BID - If symptomatic on Metformin, HOLD titration for one week and encourage food before dose - If symptoms continue after ONE WEEK, change medication to Metformin XR (pe… protocol) and continue titrati…
If approximately 60% of BGs are LESS THAN 150mg/dL:				
	BOLUS INSULIN	**BASAL INSULIN**	**CORRECTION FACTOR**	
STEP 2:	Decrease by 50%	Continue	Continue use as needed	
STEP 3:	**STOP BOLUS INSULIN**	Continue	Continue use as needed	
…TEP 4:		Decrease by 25% of **original** dose	Continue use as needed	
…EP 5:		Decrease by 25% of **original** dose	Continue use as needed	
…P 6:		Decrease by 25% of **original** dose	Continue use as needed	
…7: …N …TE		**STOP BASAL INSULIN**	Continue use as needed	
	-if having frequent lows may decrease bolus and basal at the same time **Continue lifestyle changes.** …l clinic if BG over 200 more than twice in one week.			

…IEW:
…*RAGEMENT!*
…dule
… per meal)
… day and 3 days of streng…

Studies show that the roughly 45% to 50% of youth with newly diagnosed Type 2 diabetes are most successful at weaning insulin off within the first several months after diagnosis.

Hao S, Westbrook A, Sinha C ...
Insulin Discontinuation in Youth With New-Onset Type 2 Diabetes Presenting With and Without Diabetic Ketoacidosis
Endocrine Practice , 2025; 32, 194-200



How to put the control and power of weaning insulin with the patient?

AIM 50% wean off insulin using self-wean protocol in 8-weeks by the end of 2024

Self-Wean Protocol

Protocol

Type 2 Diabetes Self Weaning

Definition: Standardized process to allow Type 2 diabetes patients and family to wean insulin at home over an 8 week period if possible.

Criteria to enter protocol:
Type 2 Diabetes strongly anticipated based on clinical phenotype.
Type 1 antibodies collected during initial hospitalization for initiation of insulin
Patient is started on Metformin 500mg titration protocol in hospital

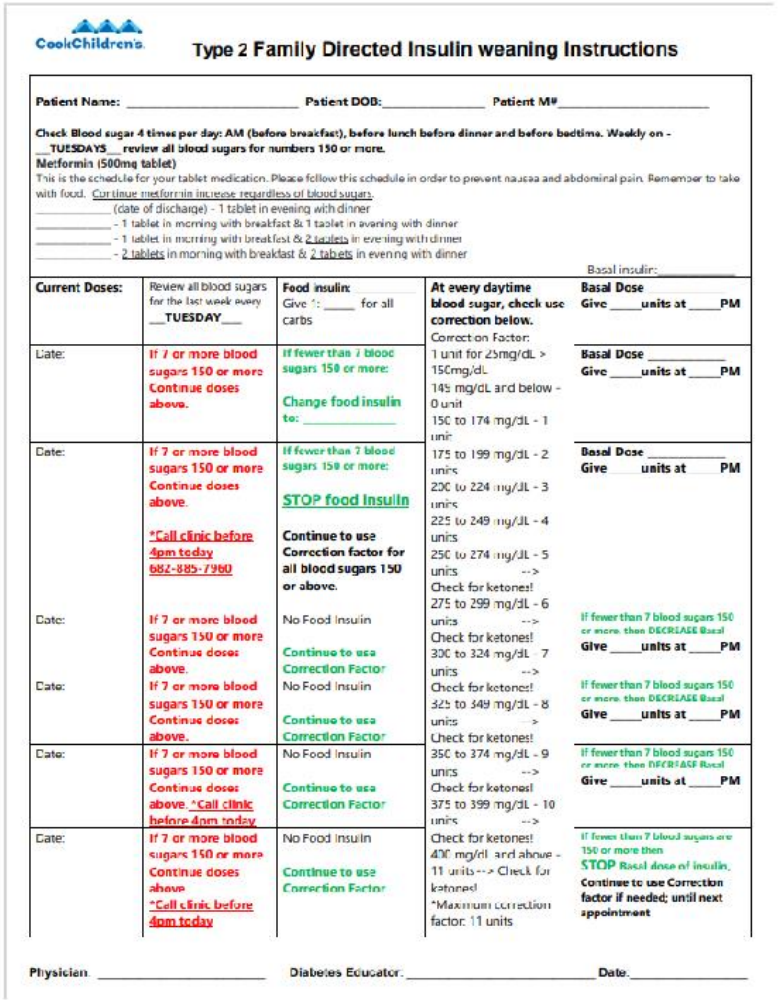
Diagnosis Week (Week 1):
Abs – initiated by admitting provider in hospital
Metformin 500mg titration initiated by admitting provider and instructions given at discharge to continue the escalation to dose of 1000mg with breakfast and 1000mg with dinner every day.

Week 2-8:

- Families are instructed to check blood sugar and log along with insulin doses 4 to 5 times per day.
- Families are instructed to call anytime blood sugars are below 70 for 2 days in a row or 2 times in one day.
- Families follow insulin self-wean protocol reviewing logs every TUESDAY for the past 7 days.
- Metformin titration continues week 2 through week 4.
- Families are instructed to call clinic on Tuesdays if more than 7 blood glucose readings in a 7 day period are 150mg/dL or more.
- Clinic Diabetes Educator will call families at 2 week intervals if they have not contacted the clinic already to check in on weaning process.

Education:
See Next Page for patient weaning schedule which will be completed by Diabetes Educator.
Education about self-wean process will be provided by Inpatient Diabetes Educator.

PDSA 1- Family Directed Insulin Weaning



CookChildren's

Type 2 Family Directed Insulin weaning Instructions

Patient Name: _____ **Patient DOB:**_____ **Patient M#**_____

Check Blood sugar 4 times per day: AM (before breakfast), before lunch before dinner and before bedtime. Weekly on - __TUESDAYS__ review all blood sugars for numbers 150 or more.

Metformin (500mg tablet)

This is the schedule for your tablet medication. Please follow this schedule in order to prevent nausea and abdominal pain. Remember to take with food. Continue metformin increase regardless of blood sugars.

_____ (date of discharge) - 1 tablet in evening with dinner
_____ - 1 tablet in morning with breakfast & 1 tablet in evening with dinner
_____ - 1 tablet in morning with breakfast & 2 tablets in evening with dinner
_____ - 2 tablets in morning with breakfast & 2 tablets in evening with dinner

Basal insulin:_____

Current Doses:	Review all blood sugars for the last week every **__TUESDAY__**	**Food insulin:** Give ^: _____ for all carbs	**At every daytime blood sugar, check use correction below.** Correction Factor:	**Basal Dose** **Give ____units at ____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above.**	If fewer than 7 blood sugars 150 or more: **Change food insulin to: _____**	1 unit for 25mg/dL > 150mg/dL 149 mg/dL and below - 0 unit 150 to 174 mg/dL - 1 unit	**Basal Dose _____** **Give ____units at ____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above.** ***Call clinic before 4pm today 682-885-7960**	If fewer than 7 blood sugars 150 or more: **STOP food insulin** **Continue to use Correction factor for all blood sugars 150 or above.**	175 to 199 mg/dL - 2 units 200 to 224 mg/dL - 3 units 225 to 249 mg/dL - 4 units 250 to 274 mg/dL - 5 units -->Check for ketones! 275 to 299 mg/dL - 6 units -->Check for ketones!	**Basal Dose _____** **Give ____units at ____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above.**	No Food Insulin **Continue to use Correction Factor**	300 to 324 mg/dL - 7 units -->Check for ketones!	If fewer than 7 blood sugars 150 or more, then DECREASE Basal **Give ____units at ____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above.**	No Food Insulin **Continue to use Correction Factor**	325 to 349 mg/dL - 8 units -->Check for ketones!	If fewer than 7 blood sugars 150 or more, then DECREASE Basal **Give ____units at ____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above. *Call clinic before 4pm today**	No Food Insulin **Continue to use Correction Factor**	350 to 374 mg/dL - 9 units -->Check for ketones! 375 to 399 mg/dL - 10 units -->	If fewer than 7 blood sugars 150 or more, then DECREASE Basal **Give ____units at ____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above *Call clinic before 4pm today**	No Food Insulin **Continue to use Correction Factor**	Check for ketones! 400 mg/dl and above - 11 units --> Check for ketones! *Maximum correction factor 11 units	If fewer than 7 blood sugars are 150 or more then **STOP Basal dose of insulin. Continue to use Correction factor if needed; until next appointment**

Physician _____ **Diabetes Educator:** _____ **Date:**_____

IMPLEMENTATION FEBRUARY 2024

- Development of 8-week take home plan based on the Type 2 insulin weaning protocol.
- 2-week check-in reminders
- Individualized doses decreasing per protcol
- family has weaning schedule in home to review weekly
- Available in Spanish

CookChildren's

	above.	Change food insulin to: _____	0 unit 150 to 174 mg/dL - 1 unit 175 to 199 mg/dL - 2 units 200 to 224 mg/dL - 3 units 225 to 249 mg/dL - 4 units 250 to 274 mg/dL - 5 units --> Check for ketones! 275 to 299 mg/dL - 6 units --> Check for ketones! 300 to 324 mg/dL - 7 units --> Check for ketones! 325 to 349 mg/dL - 8 units --> Check for ketones! 350 to 374 mg/dL - 9 units --> Check for ketones!	
Date:	**If 7 or more blood sugars 150 or more Continue doses above.** ***Call clinic before 4pm today 682-885-7960**	**If fewer than 7 blood sugars 150 or more:** **STOP food insulin** **Continue to use Correction factor for all blood sugars 150 or above.**		**Basal Dose _____** **Give _____units at _____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above.**	No Food Insulin **Continue to use Correction Factor**		**If fewer than 7 blood sugars 150 or more, then DECREASE Basal** **Give _____units at _____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above.**	No Food Insulin **Continue to use Correction Factor**		**If fewer than 7 blood sugars 150 or more, then DECREASE Basal** **Give _____units at _____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses**	No Food Insulin **Continue to use**		**If fewer than 7 blood sugars 150 or more, then DECREASE Basal** **Give _____units at _____PM**

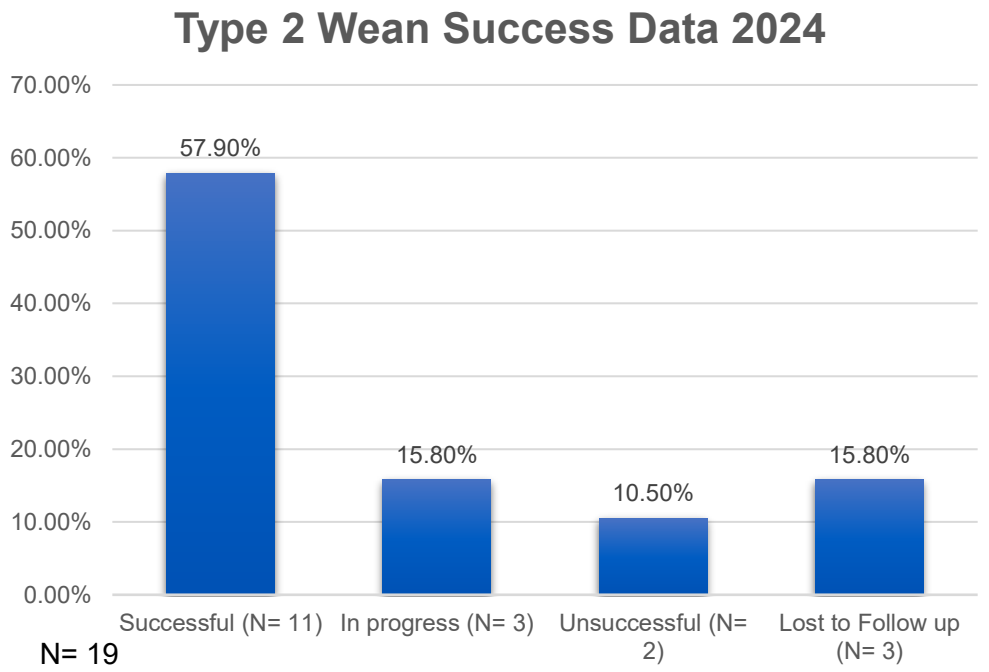
Results PDSA 1 - 2024

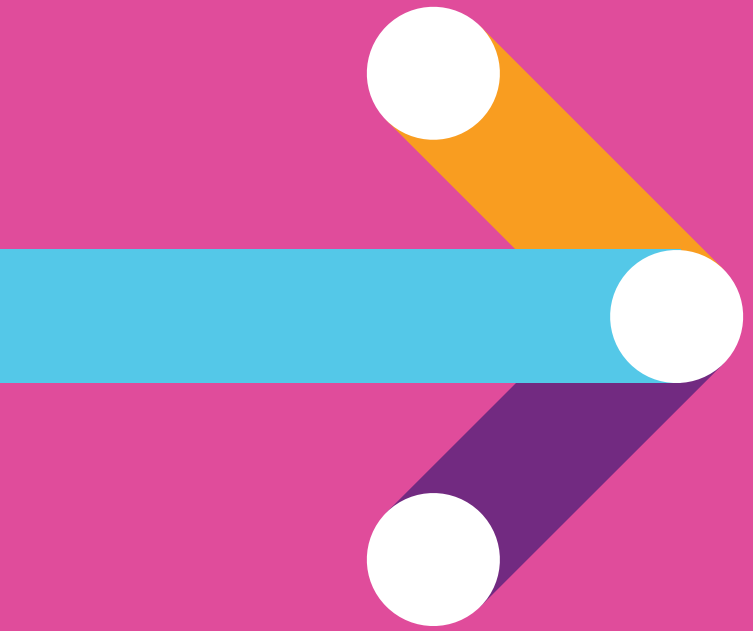
57.9 % off insulin within 8 weeks

Data:

19 families were given the Self-Wean Protocol

- 11 families showed documented success at visit
- 3 families were still weaning insulin
- 2 families were determined to need insulin long term
- 3 families were lost to follow up





2025

AIM 60% wean off insulin in 8-weeks using self-wean protocol by the end of 2025

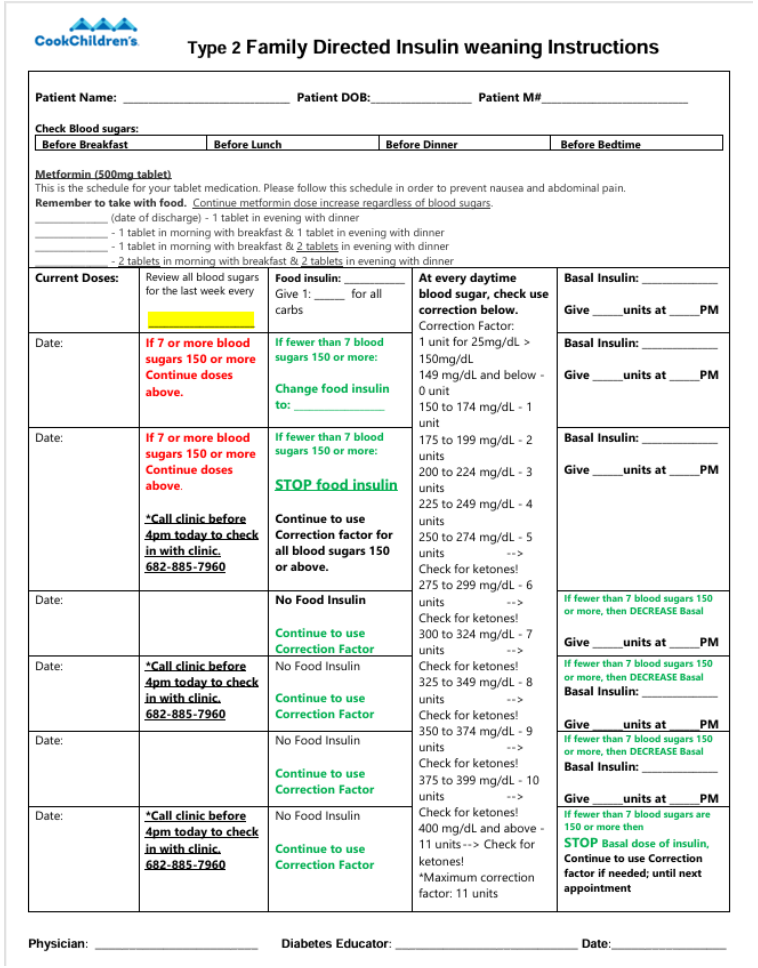
PDSA 2 - 2025

PDSA change for 2025

Form changed to provide simplicity and readability

Making form easier to read

- Removal of large amount of red text to make form less negative
- Reminder to call clinic every 2 weeks
- Changed the call day to correspond with the day the weaning protocol was initiated (previously was call on Tuesday)



CookChildren's

Type 2 Family Directed Insulin weaning Instructions

Patient Name: _____ **Patient DOB:**_____ **Patient M#**_____

Check Blood sugars:

Before Breakfast	Before Lunch	Before Dinner	Before Bedtime

Metformin (500mg tablet)
This is the schedule for your tablet medication. Please follow this schedule in order to prevent nausea and abdominal pain.
Remember to take with food. Continue metformin dose increase regardless of blood sugars.
_____ (date of discharge) - 1 tablet in evening with dinner
_____ - 1 tablet in morning with breakfast & 1 tablet in evening with dinner
_____ - 1 tablet in morning with breakfast & 2 tablets in evening with dinner
_____ - 2 tablets in morning with breakfast & 2 tablets in evening with dinner

Current Doses:	Review all blood sugars for the last week every _____	**Food insulin:** _____ Give 1: _____ for all carbs	**At every daytime blood sugar, check use correction below.** Correction Factor: 1 unit for 25mg/dL > 150mg/dL 149 mg/dL and below - 0 unit 150 to 174 mg/dL - 1 unit 175 to 199 mg/dL - 2 units 200 to 224 mg/dL - 3 units 225 to 249 mg/dL - 4 units 250 to 274 mg/dL - 5 units --> Check for ketones! 275 to 299 mg/dL - 6 units --> Check for ketones! 300 to 324 mg/dL - 7 units --> Check for ketones! 325 to 349 mg/dL - 8 units --> Check for ketones! 350 to 374 mg/dL - 9 units --> Check for ketones! 375 to 399 mg/dL - 10 units --> Check for ketones! 400 mg/dL and above - 11 units --> Check for ketones! *Maximum correction factor: 11 units	**Basal Insulin:** _____ **Give _____units at _____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above.**	If fewer than 7 blood sugars 150 or more: **Change food insulin to:** _____		**Basal Insulin:** _____ **Give _____units at _____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above.** ***Call clinic before 4pm today to check in with clinic. 682-885-7960**	If fewer than 7 blood sugars 150 or more: **STOP food insulin** **Continue to use Correction factor for all blood sugars 150 or above.**		**Basal Insulin:** _____ **Give _____units at _____PM**
Date:		**No Food Insulin** **Continue to use Correction Factor**		If fewer than 7 blood sugars 150 or more, then DECREASE Basal **Give _____units at _____PM**
Date:	***Call clinic before 4pm today to check in with clinic. 682-885-7960**	No Food Insulin **Continue to use Correction Factor**		If fewer than 7 blood sugars 150 or more, then DECREASE Basal **Basal Insulin:** _____ **Give _____units at _____PM**
Date:		No Food Insulin **Continue to use Correction Factor**		If fewer than 7 blood sugars 150 or more, then DECREASE Basal **Basal Insulin:** _____ **Give _____units at _____PM**
Date:	***Call clinic before 4pm today to check in with clinic. 682-885-7960**	No Food Insulin **Continue to use Correction Factor**		If fewer than 7 blood sugars are 150 or more then **STOP Basal dose of insulin, Continue to use Correction factor if needed; until next appointment**

Physician: _____ **Diabetes Educator:** _____ **Date:**_____

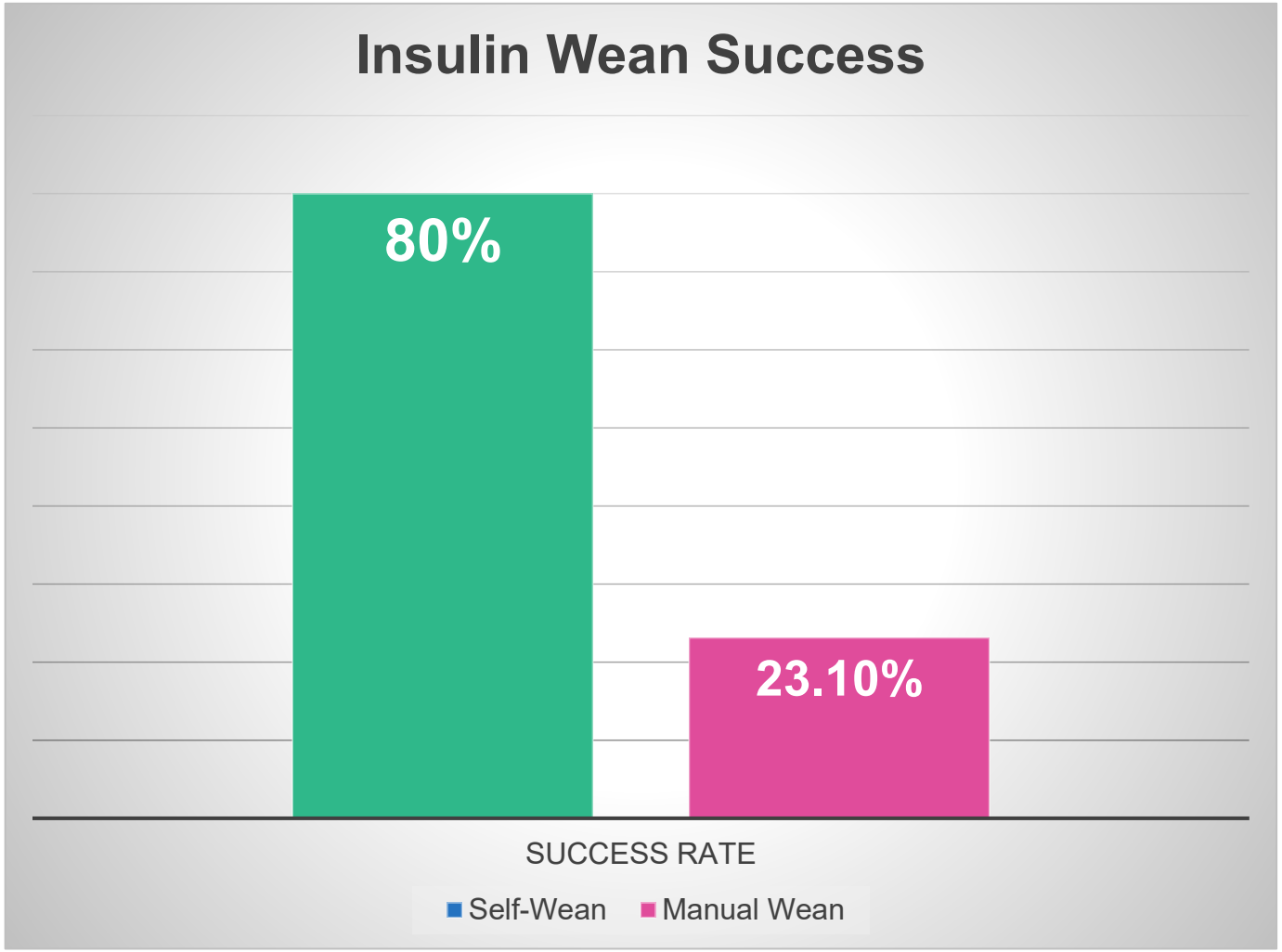
Date:	**If 7 or more blood sugars 150 or more Continue doses above.**	**If fewer than 7 blood sugars 150 or more:** **Change food insulin to: _____**	1 unit for 25mg/dL > 150mg/dL 149 mg/dL and below - 0 unit 150 to 174 mg/dL - 1 unit 175 to 199 mg/dL - 2 units 200 to 224 mg/dL - 3 units 225 to 249 mg/dL - 4 units 250 to 274 mg/dL - 5 units --> Check for ketones! 275 to 299 mg/dL - 6 units --> Check for ketones! 300 to 324 mg/dL - 7 units --> Check for ketones! 325 to 349 mg/dL - 8 units --> Check for ketones! 350 to 374 mg/dL - 9 units -->	**Basal Insulin: _____** **Give _____units at _____PM**
Date:	**If 7 or more blood sugars 150 or more Continue doses above.** ***Call clinic before 4pm today to check in with clinic. 682-885-7960**	**If fewer than 7 blood sugars 150 or more:** **STOP food insulin** **Continue to use Correction factor for all blood sugars 150 or above.**		**Basal Insulin: _____** **Give _____units at _____PM**
Date:		**No Food Insulin** **Continue to use Correction Factor**		**If fewer than 7 blood sugars 150 or more, then DECREASE Basal** **Give _____units at _____PM**
Date:	***Call clinic before 4pm today to check in with clinic. 682-885-7960**	No Food Insulin **Continue to use Correction Factor**		**If fewer than 7 blood sugars 150 or more, then DECREASE Basal** **Basal Insulin: _____** **Give _____units at _____PM**
Date:		No Food Insulin		**If fewer than 7 blood sugars 150**

2025 Intervention Group

54 insulin initiations

Overall Off Insulin
21/54 (38.9%)

Still on Insulin
33/54 (61.1%)



Self-Wean Protocol Associated with Higher Insulin Discontinuation

2025

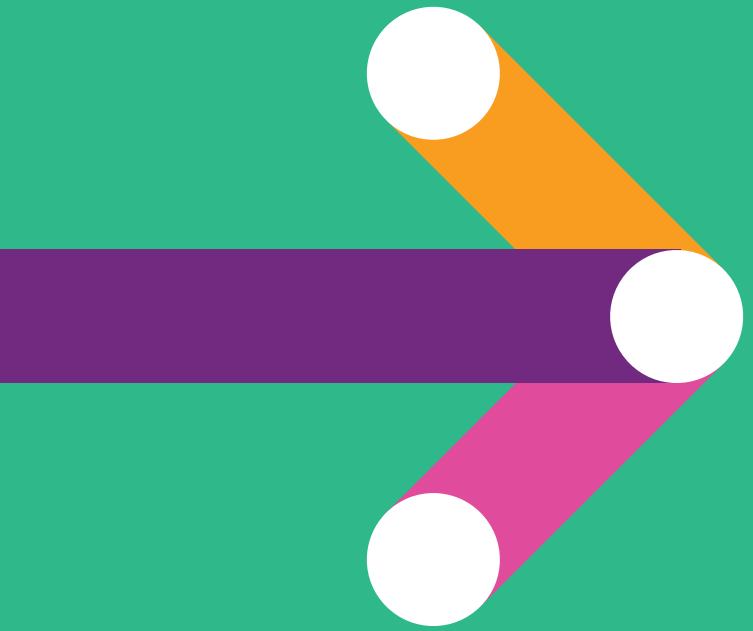
	Self-Wean Protocol	Manual Wean
Total Patients	15	39
Off insulin	12	9
Remaining on insulin	3	3
Success Rate	80%	23.1%

Results PDSA 2 – 2025

Self-Wean Protocol Associated with Higher Insulin Discontinuation

Key Findings

- **Self-wean success: 80% (12/15)**
- **Manual wean success: 23.1% (9/39)**
- **Relative Risk = 3.45**
- **Fisher Exact p ≈ 0.0002**
- **Self-wean participants generated 57.1% of all successful discontinuation**



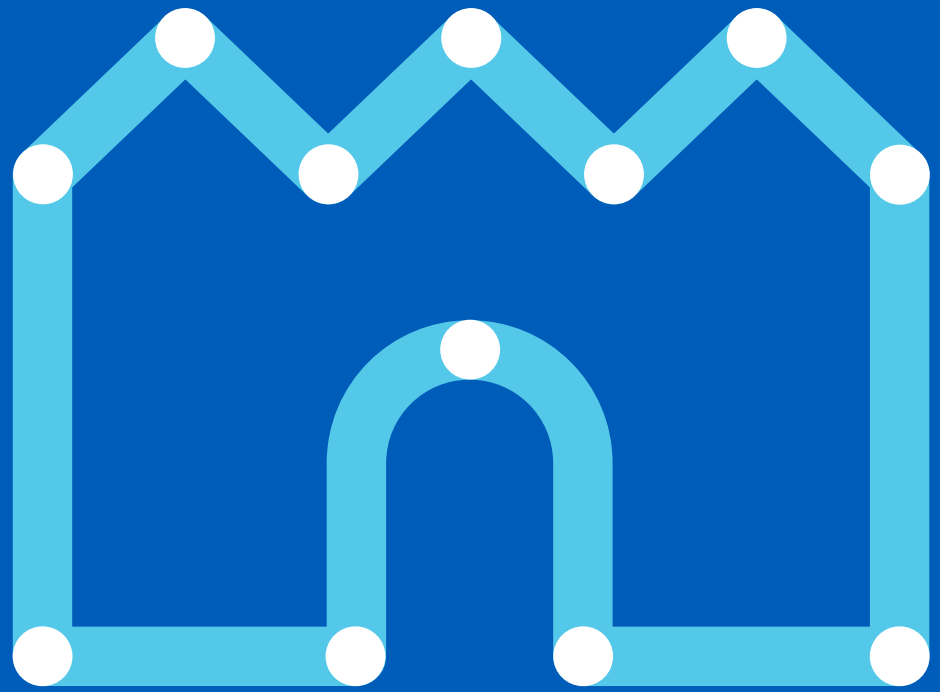
Patients participating in the self-wean protocol had a higher likelihood of achieving insulin discontinuation compared with patients who did not participate.

(80.0% vs 23.1%; RR – 3.47; p ≈ 0.0002)

Practice Drift

Workflow standardization

Implementation Adaptation



CookChildren's

Thank You

Stacey Hardegree RN MSN CCM Diabetes Educator
DR Alejandro de la Torre, Physician investigator
Cook Children's Endocrine and Diabetes
cookchildrens.org