

Implementation of 2020 ADA Recommendations for the Initial Management of Overweight and Obese Pediatric Patients with New Onset Diabetes



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Introduction:

Historically, ECU Pediatric Endocrinology admitted most patients with new onset diabetes to the hospital and initiated full basal/bolus (intensive) insulin regardless of age, weight and likelihood of Type 2 diabetes (T2D). While the 2020 American Diabetes Association (ADA) Standard of Medical Care in Diabetes for Children and Adolescents recommends that initial therapy for overweight and obese patients with new onset diabetes should address hyperglycemia and metabolic derangements, the guidelines also suggest that less intensive treatment regimens initiated in the outpatient setting may achieve target HgbA1c in patients with presumed T2D. Thus, our previous management strategies may have led to unnecessary hospitalizations with overly intensive insulin regimens.

Project Design:

- Develop a standardized protocol for initial management of overweight/obese patients 10 to 17 years of age with new onset diabetes based on HgbA1c, blood glucose, renal/liver function and acid/base status.
- Retrospectively apply the protocol to patients with T2D managed in our clinic to determine the expected change in hospital admission rates and use of intensive insulin.
- Utilize PDSA cycles to implement the protocol, monitoring the following quarterly:
 - Admission rates at the time of diagnosis.
 - Percentage of patients initially managed by one of five treatment regimens defined by escalation of insulin therapy.
 - Rates of adherence to the protocol.

PDSA Cycles:

Retrospective Review:

- Baseline data obtained from retrospective chart review
- PDSA 1: Proposed protocol applied to the same patients to provide predicted change

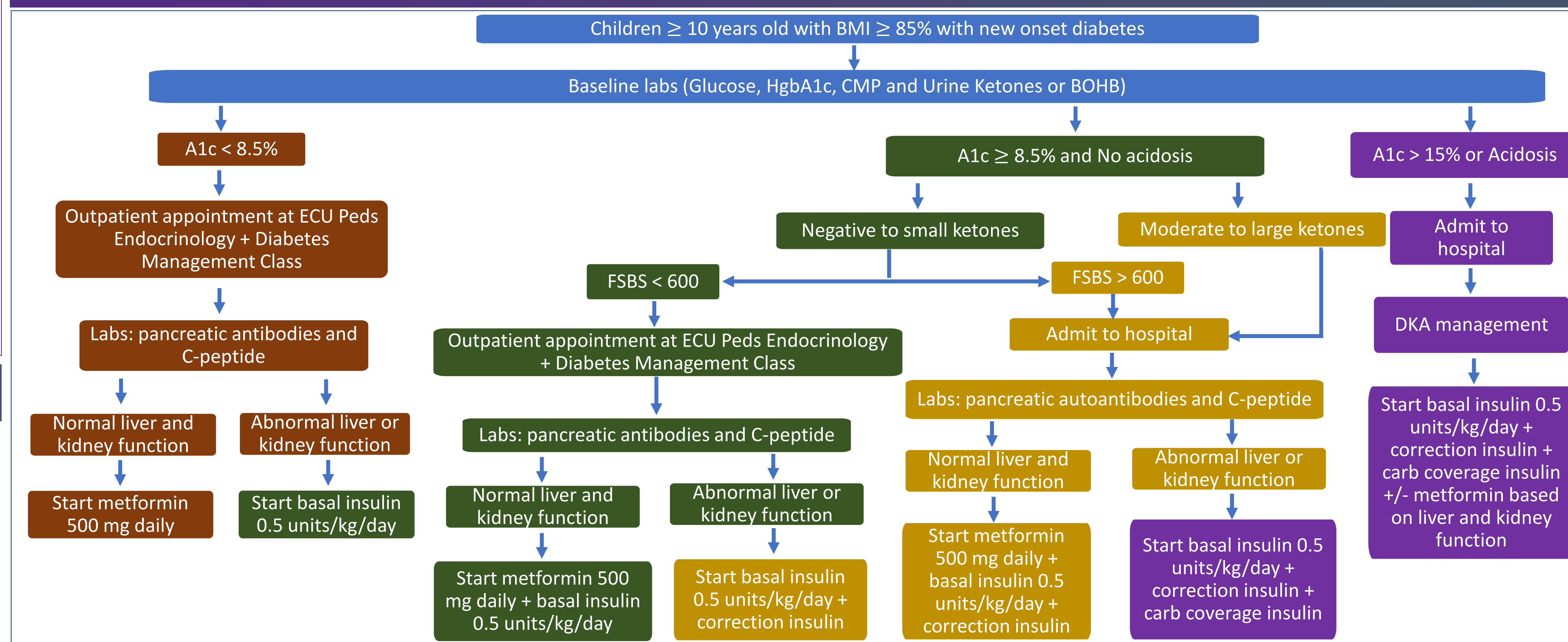
Prospective Implementation:

- PDSA 2: Informal discussion & development of protocol (6/23/20 - 9/8/20)
- PDSA 3: Formal implementation of protocol (9/11/20 - 12/31/20)

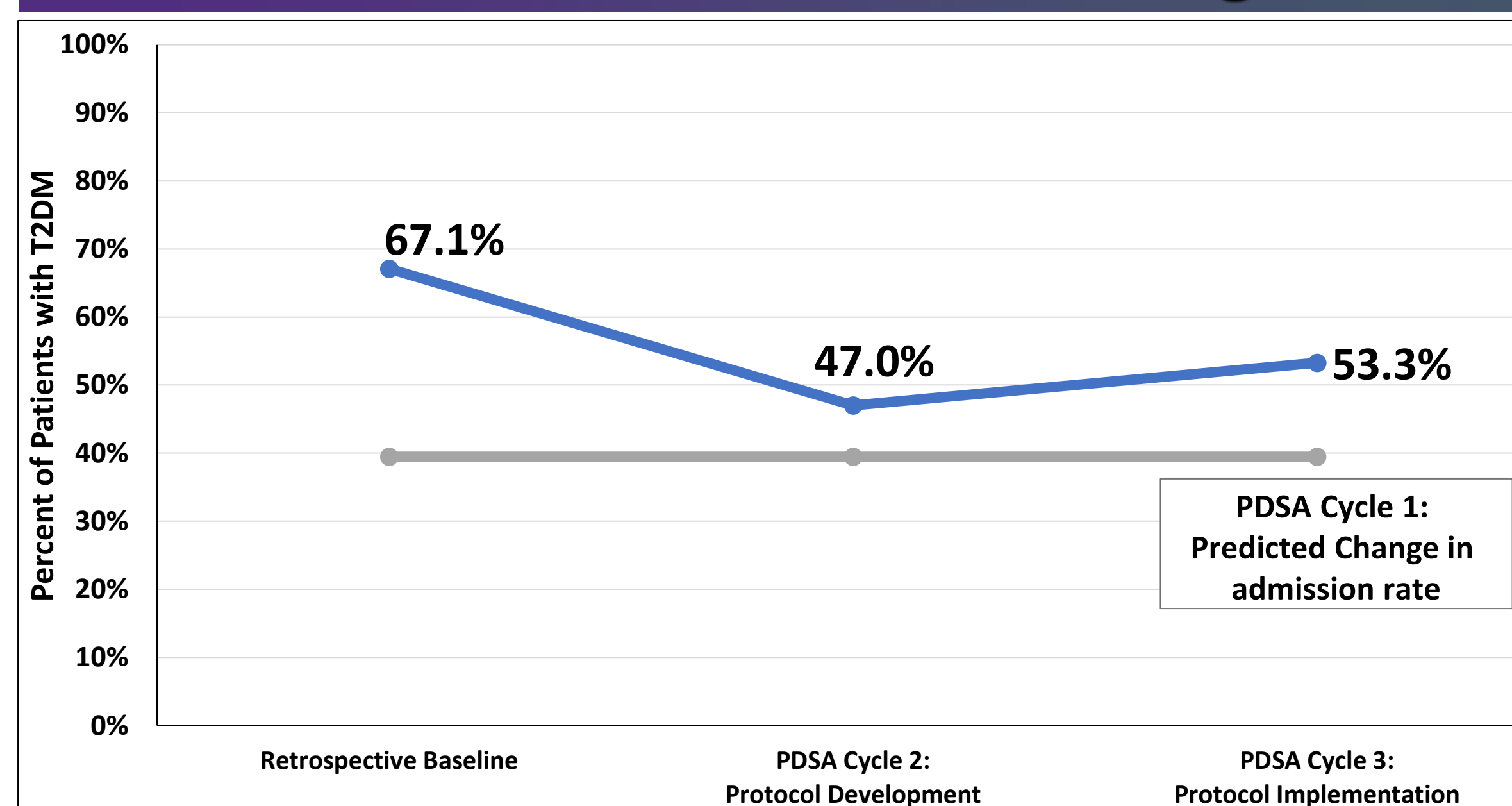
Project Aim: Standardize the initial management of overweight/obese patients 10 to 17 years of age with new onset diabetes cared for by ECU Pediatric Endocrinology during the next 12 months such that our practice aligns with the 2020 ADA recommendations with the goal to:

- Decrease hospital admission rates at the time of diagnosis from 67% to 40%.
- Decrease percentage of patients receiving intensive insulin treatment at diagnosis from 66% to 20%.
- Increase percentage of overall adherence to the new protocol by 15% during each PDSA cycle.

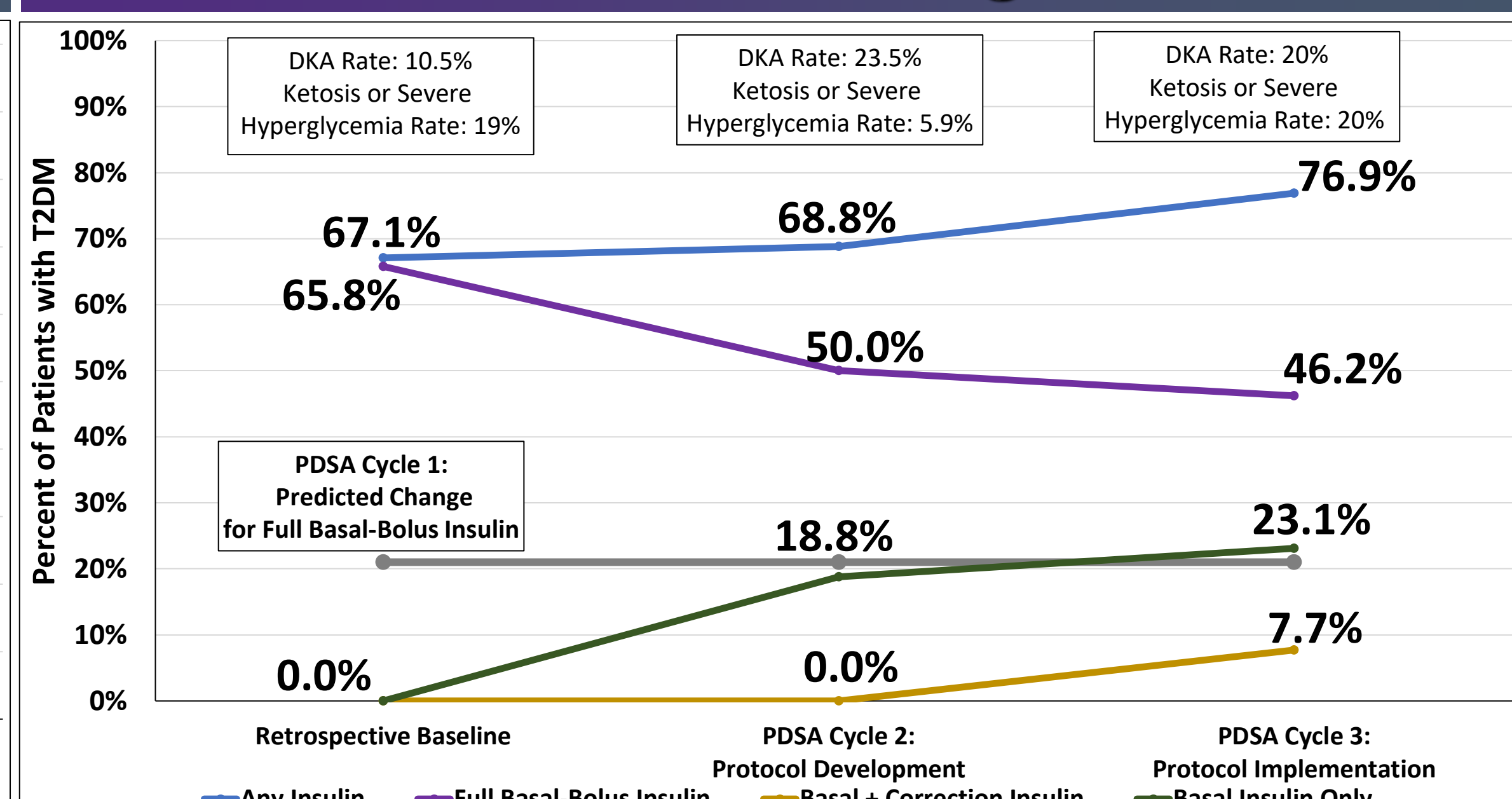
Standardized Protocol



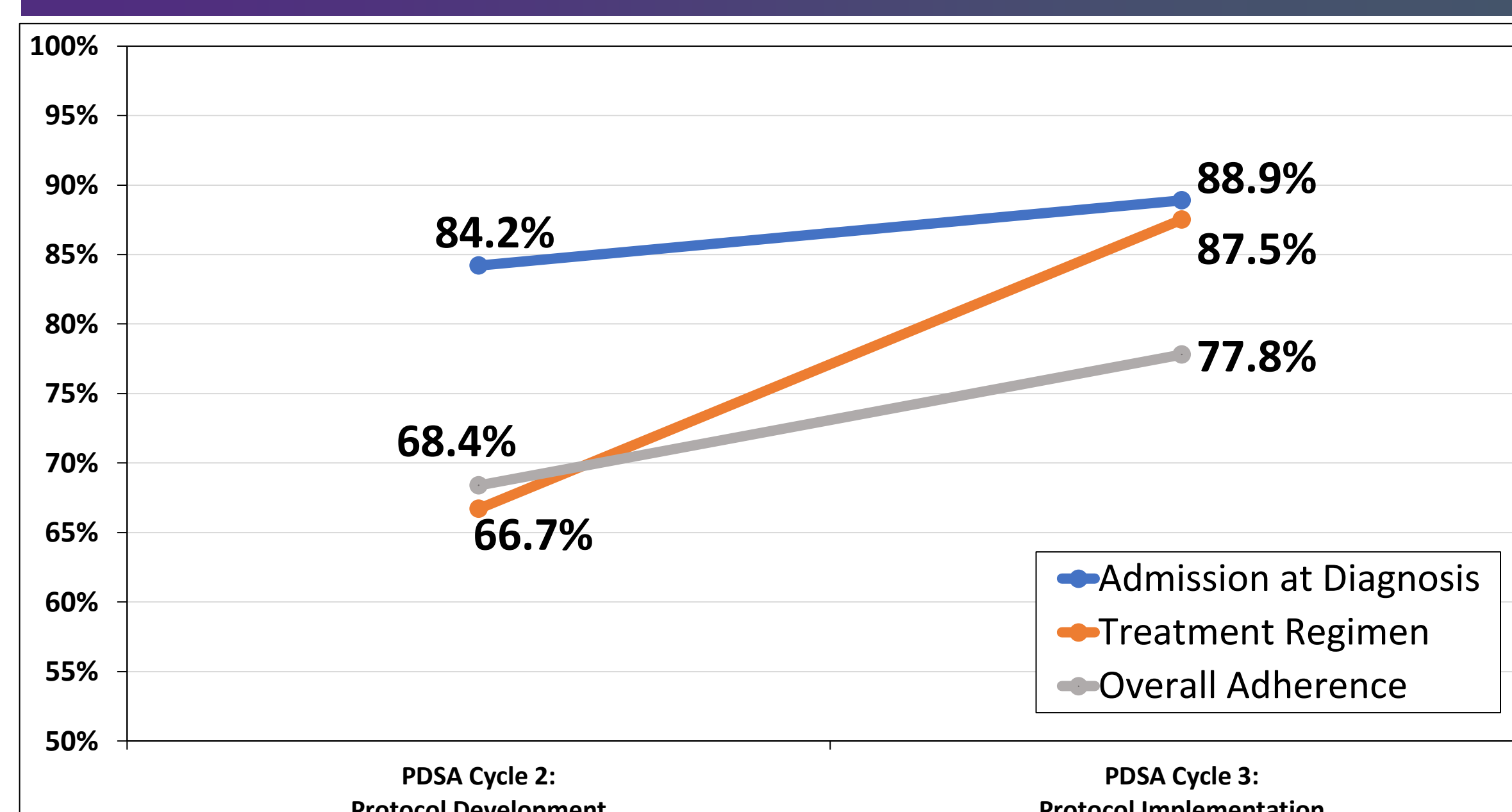
Results: Admission Rates at Diagnosis



Results: Insulin Use at Diagnosis



Results: Adherence to Protocol



RESULTS: Unanticipated Outcomes

	PDSA 2:	PDSA 3:
Exclusion from follow up analysis	Total: 4/19 Type 1 Diabetes: 2 (10.5%) Not diabetic: 1 Lost to follow up: 1	Total: 7/18 Type 1 Diabetes: 3 (16.7%) Not diabetic: 1 Lost to follow up: 3
Unanticipated outcomes	1/19 (5.3%) Patient was admitted to hospital from first outpatient appointment with escalation of treatment regimen	1/18 (5.6%) Patient presented to another ER the next day and was admitted to different hospital

Discussion:

While previous management strategies likely led to unnecessary hospitalizations with overuse of intensive treatment regimens, a re-analysis of baseline patients using the proposed protocol predicted a reduction in admission rates and the use of full basal-bolus insulin.

Following implementation of the protocol, the admission rate at diagnosis decreased to 53%. While there was an increase in the percentage of patients receiving any insulin at diagnosis in correlation with a higher degree of metabolic derangement at presentation, fewer patients were started on full basal-bolus insulin in favor of less intensive regimens.

Following full implementation of the protocol, adherence rate for admission at diagnosis was 89%. Initially, adherence to the treatment regimen was 67% with patients receiving both more and less aggressive regimens than indicated. Following formal implementation, adherence improved to 88% with only 2 patients receiving less aggressive management than suggested based on their liver function and A1c.

Conservative management with delay in insulin therapy resulted in unanticipated outcomes in two patients leading to hospital admissions after initial presentation. Both patients presented with glucose levels over 400 mg/dL.

Next Steps:

- Define threshold in protocol to differentiate between normal vs. abnormal kidney and liver function.
- Define threshold in protocol to differentiate between negative to small vs. moderate to large ketones.
- Adjust protocol such that patients with initial A1c between 6.5-6.9% can choose to treat with lifestyle and diet changes only without this being a deviation in treatment regimen.
- Re-evaluate initial management to prevent delaying insulin therapy if needed to avoid unanticipated outcomes.
- Follow-up patients for 1 year post T2DM diagnosis to determine time to target A1c and continued insulin needs.

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