

# Improving Emergency Department Management of Diabetic Ketoacidosis in Children

Nicole Dumas, MSN, RN, CPEN, Katherine Leaming-Van Zandt, MD

## Background

Diabetic ketoacidosis (DKA) occurs in 26% of children with new-onset type 1 diabetes and is the leading cause of morbidity and mortality in children with diabetes. For patients with DKA, the main principles of management include rapid assessment and treatment with insulin and intravenous fluid administration. A nursing-led process was designed to improve identification of this high-risk population and expedite the delivery of insulin within one hour from insulin order and two hours from triage assessment.

## Project Aims

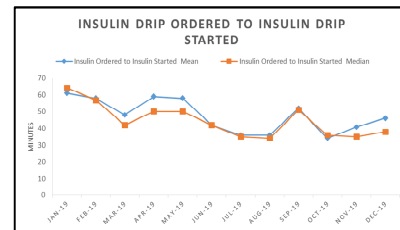
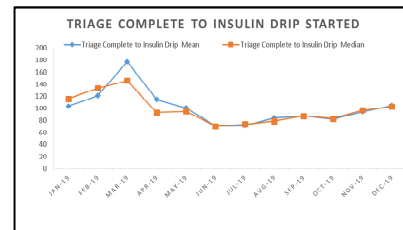
To decrease the time to initiation of insulin for all DKA patients presenting to the pediatric emergency department (ED) to less than 120 minutes from arrival.

## Methods

Key stakeholders, including nursing, physician, and ancillary staff (i.e., child life, pharmacy, respiratory therapy) leaders, recognized the need for resource allocation and workflow improvements to expedite the identification and treatment of DKA patients. A multidisciplinary ED “Swarm Team”, previously created to facilitate rapid mobilization of ED resources and enhance team communication and collaboration, was tasked with the evaluation and management of all DKA patients. All members of the “Swarm Team” underwent targeted education and training on DKA management. Ancillary tools, such as a DKA worksheet and pre-programmed timer, assisted team members in tracking desired time stamps/goals, specifically “triage-to-insulin” and “insulin order-to-insulin” administration. EPIC and worksheet-derived data was collected and trended for improvement opportunities.

## Results

Since initiating the DKA “Swarm Team” in June 2019, there was a 39-minute (32%) reduction in the average time from “triage-to-insulin” administration for DKA patients (n=32). Additionally, we noted a 16-minute (28%) reduction in the average time from “insulin order-to-insulin” administration. Overall, an increase of 46% in the number of DKA patients who received insulin within 120 minutes of arrival was observed.



Timer	Goal	If not met
Timer 1	Lab orders entered within 15 minutes from arrival	Re-notify MD 4.
Timer 2	IV access and blood gas 30 minutes post arrival of patient	Call VAT for access assistance.
Blood gas resulted.	Blood gas resulted within 35 minutes.	Follow up with respiratory.
Timer 3	Insulin Ordered 45 minutes post arrival.	If not evaluate barriers with provider.



## Discussion

The development and utilization of a “Swarm Team” and clearly communicated process with defined time stamps/goals and ancillary tools improved patient care by reducing the time to insulin for DKA patients. Importantly, our “Swarm Team” model and associated interventions can be easily adapted and sustained for DKA patients and other high risk patient populations.