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# Reducing DKA at diagnosis of type 1 diabetes in children.

Initiative Type

System Improvement

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Plan

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## Summary

In Queensland approximately 45% of children present with Diabetic Ketoacidosis (DKA) at diagnosis of Type 1 diabetes. DKA is the major cause of mortality in children with Type 1 Diabetes. DKA is a metabolic emergency requiring intensive care that can be avoided by recognising the signs of high blood glucose and prompt commencement of insulin therapy. Increasing community awareness and

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GP education for early diagnosis and prompt insulin treatment for Type 1 diabetes is vital to prevent Paediatric emergencies. The project will prepare an awareness campaign to reduce preventable Diabetic Ketoacidosis (DKA) at diagnosis of Type 1 Diabetes in Queensland children under 16. Consumers, clinicians and other relevant stakeholders will be consulted to co-design campaign messaging and material. Resources and campaign messaging will be developed ready for the next stage of the project which is the delivery of a state wide awareness campaign.

### Key dates

Oct 2019

Nov 2020

### Implementation sites

Townsville HHS, CHQ HHS, Mater HHS

### Partnerships

Playgroup Queensland, Primary Health Networks, JDRF, Diabetes Australia Queensland, 13Health, PHNs, Childcare Alliance Queensland, Independent Schools Queensland, Diabetes Australia Queensland, Child and Youth Health Services

## Key Contacts

Bronwyn Buckley

7145

[Anonymous](#)

DKA Prevention Project Officer

QCH

07 3068 1697

## **Aim**

Reduce rates of preventable Diabetic Ketoacidosis (DKA) at diagnosis of Type 1 Diabetes (T1D) in children under 16 in Queensland. Improve parent, carers and community knowledge of the symptoms of hyperglycaemia and seek early health care. Identify stakeholders to improve preventable delays in diagnosis of hyperglycaemia and DKA

## **Benefits**

Lower Paediatric Intensive Care Unit (PICU) admissions and hospital length of stay  
Decreased morbidity and complications of T1D associated with DKA  
Improved psychosocial adjustment to a chronic disease for the family and child

## **Background**

A Queensland state wide audit of Paediatric Diabetes Services by Paediatric Endocrinologists Jerry Wales from Queensland Children's Hospital and Jason Yates of The Townsville Hospital reported DKA in 44.7% of new cases of T1D in 2017. Presentation in DKA is a Paediatric emergency and can lead to immediate morbidity and mortality. A literature review confirms international rates vary from 13% to 80% with 25% the accepted mean. Many publications cite delayed diagnosis is related to subtle symptoms or an inter-current illness that can make the diagnosis challenging for Primary Care Physicians who rarely diagnose the disease. Yet T1D can be simple and inexpensive to diagnose and many researchers recommend the need for public awareness campaigns and education to health care providers to improve symptom recognition. Several published public awareness campaigns report a reduction in DKA rates following campaigns. This project will use lessons learnt from previous national and international public awareness campaigns and use collaborative design methodology for healthcare improvement.

## **Solutions Implemented**

Based on the co-designed methodology used in the diagnostic phase of the project, the following solutions were developed and will be implemented with the support of a wide range of collaborators by 31st October, 2020 ready for world diabetes day on Saturday 14th November 2020. **For**

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## Clinicians:

- Content added in the Child and Youth Health Nurses Clinical Practice Manual to support the recognition of the signs of high blood glucose in children.
- iLearn for QH staff and online CPD available for primary care nurses via Nursing CPD Institute.
- Content on the 4Ts signs of high blood glucose for parents in the Child Health Information booklets in the Personal Health Record
- Development of a new RACGP clinical guideline for the recognition of hyperglycaemia in children under 16. When finalised by the RACGP a webinar will be produced and recorded. Dissemination will be made possible through our collaboration with Primary Health Networks throughout Queensland.
- Red flags for hyperglycaemia will be added in HealthPathways used in General Practice for common childhood conditions. A statewide update to HealthPathways will be made possible through a collaboration with the statewide HealthPathways network and Primary Health Networks.

**Public awareness campaign:** Townsville Hospital Public Affairs department will oversee the campaign launch with the campaign resources they developed. Resources include a consumer video, A4 poster, magazine feature, factsheet and consumer story. Resource messaging was informed from a parent survey made possible by a collaboration with Playgroup Queensland. This survey found that parents do not know to be concerned to seek medical care for two of the important signs of high blood glucose: thirst and going to the toilet frequently or return to bed wetting. Recognising the signs of high blood glucose can prevent DKA. This finding was used in the campaign message identifier: *Diabetes, don't know, Ask*. Campaign resources will be distributed through our collaborations with key community organisations to reach our target audience of parents, grandparents and carers of well children. Key community organisations include Playgroup Queensland, Lions Club, Queensland Country Women's Association, Childcare Alliance Queensland, Education Queensland, School Nurses, Independent Schools Queensland, Catholic Education Queensland, Primary Health Networks, 13Health, QNMU, Child and Youth Community Health. Resources will be distributed in the lead up to World Diabetes Day on 14th November.

## Evaluation and Results

The outcome measure is a target rate of 25% for DKA at diagnosis of type 1. In 2019 the rate was 45% in the audit by Drs Yates and Wales, published in the Journal of Paediatrics and Child Health, with estimates of 50% this year. Analytics can be collected from: iLearn and CPD views Resource downloads 13Health factsheets sent Collaborator website analytics

## Lessons Learnt

<https://www.healthcodesign.org.nz/> was helpful to guide co-design methodology. The Strategy Planning and Improvement team at Queensland Children's Hospital fostered health improvement

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best practice for the project officer whom they hosted. Meeting to learn lessons learnt from others who were further along in a health improvement project. Otter app was very helpful for consumer interview transcript recording. Solutions for this health issue required the project to focus on community organisations like Playgroup Queensland which was vital to reach parents of well children. GP stakeholder feedback on a implementation solution suitability for the primary care sector was important for the success of primary care strategies. Engaging with Primary Health Networks was essential for a statewide distribution of new resources for clinicians working the primary care sector. Microsoft Teams was invaluable for a statewide project led by Townsville HHS with Mater HHS and CHQ HHS.

## References

Wales J and Yates J. Peer review of rural and tertiary Queensland paediatric diabetes services: A pilot project from the National Health Service. *Journal of Paediatric and Child Health* 55(20)2019 701-706. Patwardhan R et al. DKA incidence in children at first presentation of T1D at an Australian regional hospital: The effect of health professional education. *Paediatric Diabetes* 2018; 1-7 King BR et al. A diabetes awareness campaign prevents DKA in children at their initial presentation with T1D. *Paediatric Diabetes* 2012;13:647-651 Vaneli et al. Effectiveness of a prevention program for DKA in children. An 8 year study in schools and Private Practices. *Diabetes Care* 1999; 22(1):7-9

## Further Reading

Pawlowicz M et al. Difficulties or mistakes in diagnosing T1D in children? demographic factors influencing delayed diagnosis. *Paediatric Diabetes* 2009;10:542-549 Bui H et al. Is DKA at Disease Onset a Result of Missed Diagnosis? *The Journal of Paediatrics* 2010;156:472-7 Lokulo-Sodipe et al. Identifying targets to reduce the incidence of DKA at diagnosis of T1D in the UK. *Arch Dis Child* 2014;**99**:438-442

## Resources

[DKA Poster\\_FINAL\\_PR.pdf](#)