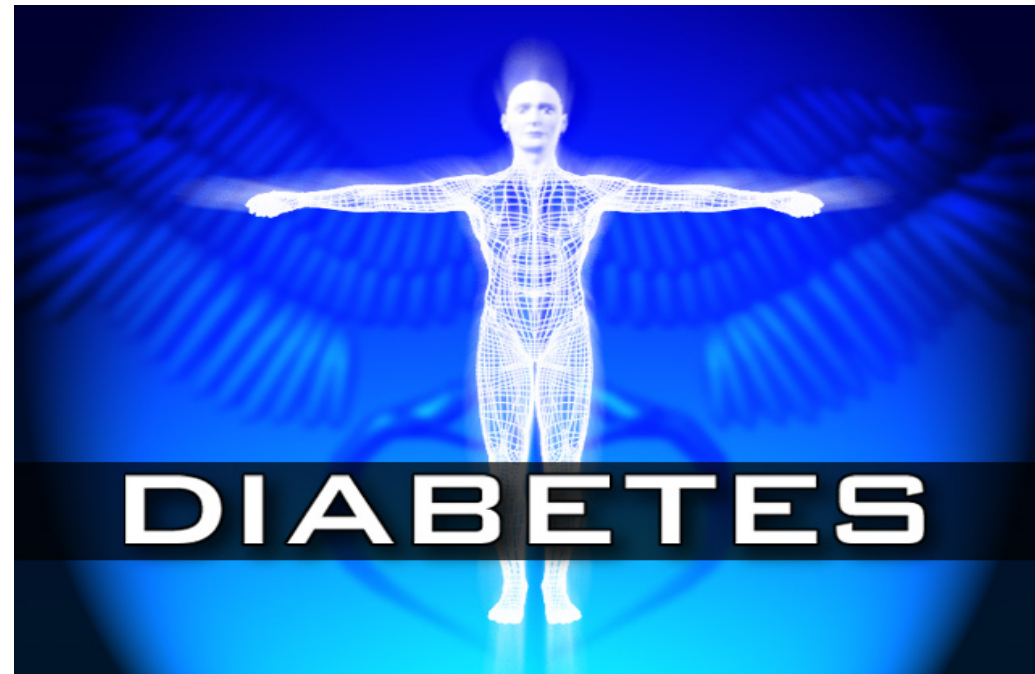


# Implementing a New Diabetic Algorithm for Ophthalmology Day Surgery Patients at the Royal Alexandra Hospital (RAH)

Dr. Rany Al-Agha, Dr. Hermina Strungaru, Hilary Salmonson, Dr. Keith Drader, Dr. Kevin Gregg, Pamela Mathura & Dr. Karim F. Damji



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# Steps to Implementing the New Diabetic Algorithm:

- **DEFINE OPPORTUNITY**
- **BUILD UNDERSTANDING**
- **MANAGE CHANGE**
- **ACT TO IMPROVE**
- **SUSTAIN RESULTS**
- **SHARE LEARNING**



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# Background

- The Ophthalmology Day Surgery Service at the RAH serves upwards of 25 patients/day of which 3-4 patients are diabetic on insulin.
- Patients with diabetes mellitus scheduled for eye surgery are tested for glucose levels on the morning of surgery.
- They are instructed to withhold oral hypoglycemic medication on the day of surgery.
- All diabetic ophthalmology day surgery patients (average of 80 diabetic patients a month) received intravenous insulin infusion protocols as part of the regular glucose control at the RAH.



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**Current insulin infusion protocols may compromise the safety of day surgery ophthalmology patients by increasing the diabetic patient's pre-op preparation time; resulting in operating room delays that are costly.**



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## Current State Analysis:

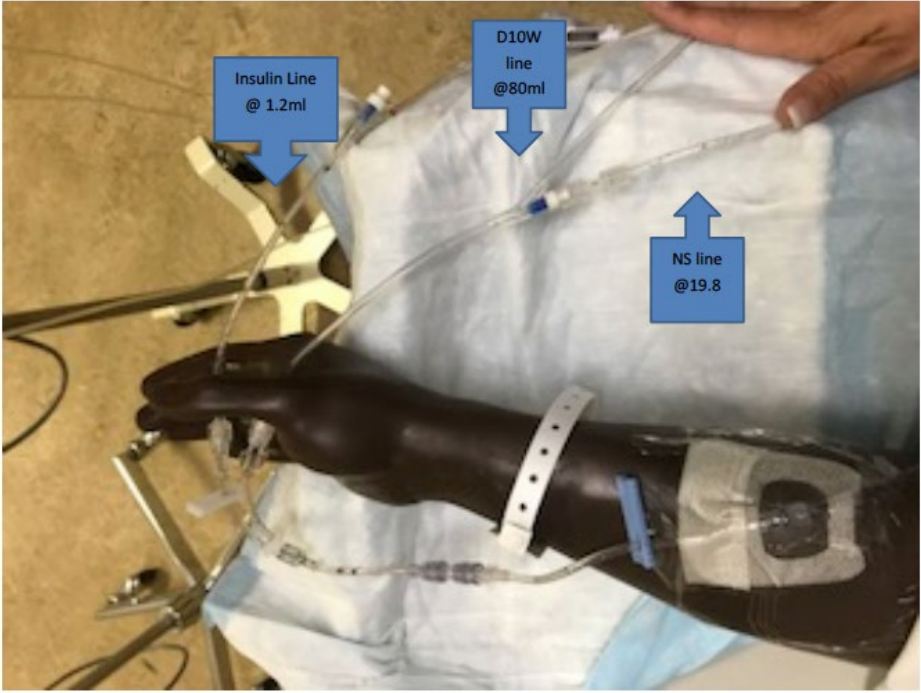
- The current insulin infusion protocol for pre-op ophthalmology day surgery patients resulted in hypoglycemic events.
- Using the pre-op insulin protocol required on-site nursing interaction and multiple additional materials and supplies
- This protocol also caused higher adverse events related to calculations and imputing the correct dosage of Insulin.



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# Current Insulin Infusion Protocol for Diabetic Day Surgery Ophthalmology Patients:



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# Baseline data

- August 2016- July 2017 there were **13 RLS** (Reporting & Learning System) reports filed regarding the previous diabetic protocol being used on the ophthalmology .
- Majority of these reports were problems related to the initial set up of the protocol and how the protocol was handled incorrectly in the OR.
- Serious hypoglycemic incidents were documented related to this protocol in 2 RLS reports.



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# Our Goal:

Develop and implement a new diabetic algorithm for day surgery ophthalmology patients to decrease the diabetic patient's pre-op preparation time while improving safety.



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# Process for Reaching Our Goal:

A multidisciplinary project team was assembled including Ophthalmologists, Endocrinologists, Anesthesiologists, Professional practice, Management and Nurses.

Results from a literature review provided strong evidence that the insulin pump increased hypoglycemic events.

A cost benefit analysis suggested that replacing the pre-op insulin protocol with a new algorithm could save money for our Department.



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## A New Plan is Developed:

- Leveraging best practices from literature, the team brainstormed a new algorithm to safely treat diabetic patients prior to eye surgery.
- The new algorithm utilizes the insulin protocol only when blood glucose is higher than 20 mmol/L.



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# New Diabetic Algorithm implemented on August 1, 2017



## Memorandum

<b>Date:</b>	July 31, 2017
<b>To:</b>	Ophthalmology Physician Group, Ophthalmology Resident Group
<b>cc:</b>	Dr. Karim Damji, Chief/Chair of Ophthalmology Department Dr. Keith Drader, Anesthesiology Dr. Rany Al-Agha, Internal Medicine Dr. Kevin Gregg, Anesthesiology Kim Kostiuik, Executive Director, Ambulatory Care, Emergency, Endoscopy & Ophthalmology Bonnie Kissick, PCM, GOR Ophthalmology/Otolaryngology/Adult Day Surgery/Preadmission Jennifer Brouwer, Manager - Inner City Health & Wellness Program & Professional Practice Karen Harris, PCM Ophthalmology
<b>From:</b>	Hilary Salmonson, Unit Manager Unit 22- Ophthalmology, RAH
<b>RE:</b>	New Diabetic Algorithm for Ophthalmology Day Surgery Patients

Dear Physicians:

Starting August 1, 2017 we will be implementing a new diabetic algorithm to treat our Ophthalmology Day Surgery patients on Unit 22.

Changing to this new diabetic algorithm will decrease the patients pre-op preparation time, will improve their patient experience and will prevent errors from occurring with management of our diabetic patients by reducing the number of patients receiving insulin drips on the day of their surgery.

Stakeholders including Internal Medicine, Anesthesia, Professional Practice, our Ophthalmology Physician group and Management have invested their time and have been dedicated to supporting this change to allow us to improve the care provided to our diabetic patients.

We will also be implementing a tracking tool with the new algorithm that will collect information regarding how effective the new algorithm has been. The nursing staff on Unit 22 will gather data about the patient's diabetic journey during their stay on Unit 22.

Please share this memo with your teams.  
If you have any concerns, questions or feedback please feel free to contact me.

Hilary Salmonson  
Unit Manager- Unit 22 and Cataract Day Surgery (B160)  
Royal Alexandra Hospital  
780-735-4373

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Department of Ophthalmology and Visual Sciences  
ATC 23, 10240 – Kingsway Avenue NW, Edmonton, AB T5H 3V9 Tel: 780-735-5583 Fax: 780-735-5242  
[www.albertahealthservices.ca](http://www.albertahealthservices.ca)



## Ophthalmology Day Surgery

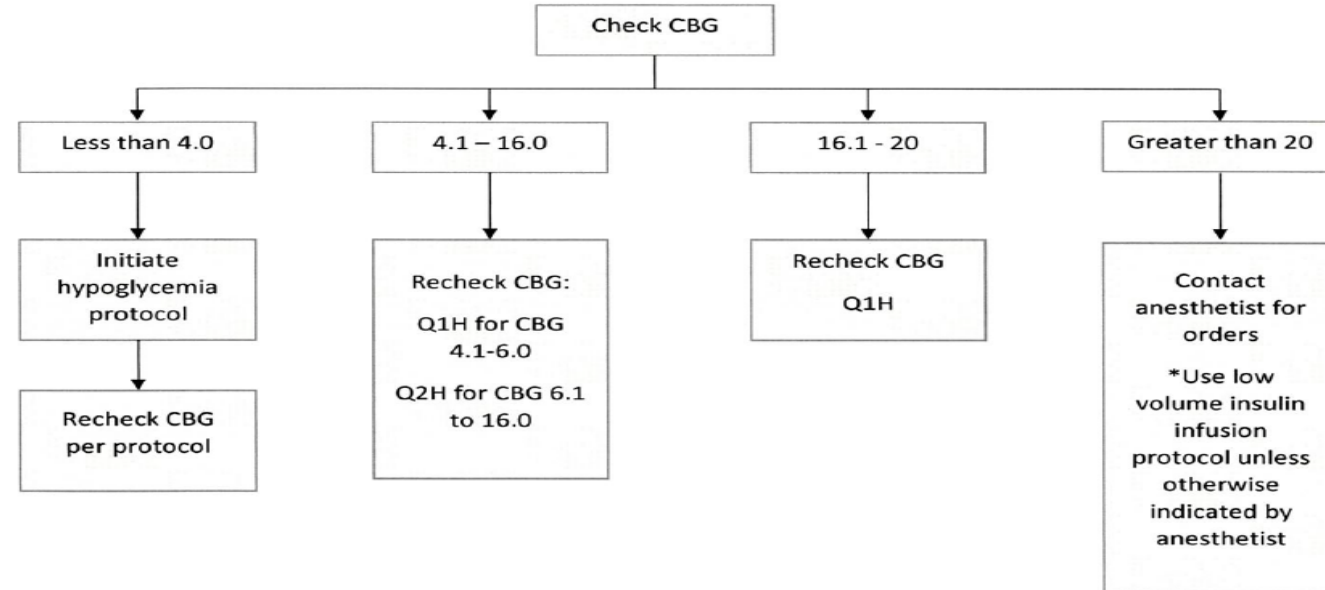
### Management of Adult NPO Insulin Dependent Patients

### Nursing Algorithm

#### Preoperative Diabetic Management

On arrival to unit:

- Confirm patient NPO since midnight
- Confirm AM medications taken as instructed
- Confirm patient withheld diabetic medications as instructed
- Check Capillary Blood Glucose (CBG) and follow algorithm below



#### Post-Operative Management

- Check CBG on arrival to PCU
- Provide a snack when appropriate
- Resume usual dose insulin or oral
- If patient remains on unit longer than 2 hours post-operatively, check capillary blood glucose every 4 hours, or more frequently if clinically required, until discharge

# Set up of New Diabetic Algorithm



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# Results of Implementing New Diabetic Algorithm for Day Surgery Ophthalmology Patients:

- August 1, 2017 to July 31, 2018 there have been **zero RLS** reports submitted related to the diabetic algorithm. No reports of pre-op or post-op hyper/hypo glycemc events were reported through the RLS system.
- The data shows that an average of 2 (2.5%) diabetic patients a month needed the previous insulin protocol after implementing the new algorithm which decreased from 100%, thus decreasing the cost and the error rate. This innovation will be shared throughout the hospital, other hospitals and the province.
- Reduction in nurses set up time: new diabetic algorithm takes approximately 7 minutes to initiate and can be successfully set up by one nurse. Previous Insulin diabetic protocol requires approximately 30 minutes and two nurses to set up.



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# Measurement Plan

- August 1, 2018, data collection and analysis: The Ophthalmology team continues to enter and analysis the data every few months.
- Results shared at the Ophthalmology Department and quality council meetings.
- The algorithm will be updated to improve quality and outcomes as needed.
- Our extended analysis of the months of August 2017 to July 2018 showed zero RLS reports.



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# Lessons Learned

The new diabetic algorithm real-time tracking tool to measure ongoing utilization and effectiveness proved challenging.

The core improvement team championing this test of change was vital to making this initiative a priority within the hospital ophthalmology surgery unit.

Improving patient safety and hospital experience, as well as provider experience, were key motivating factors to successful innovation development and implementation.

Approximately 1000 diabetic patients on insulin attend the Ophthalmology Day Surgery Service at the RAH every year; of which around 25 patients/year may require the insulin infusion protocol after implementing the the new Diabetic Algorithm.



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# Quotes from our Ophthalmology team 1 year after implementation the New Diabetic Algorithm.

**Retina Surgeon Quote:** “It has worked out very well. Thanks.”

**Anesthesiologist Quote:** “I’m very happy with the new nursing algorithm for ophtho day surgery patients. It is straightforward, shows common sense and is a huge improvement in patient safety for our diabetic patients.”



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# This resulted in a 97.5% reduction in the use of insulin pumps for diabetic patients



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<https://www.nestegg.com.au/images/article-826x550/growth-arrowup-826.jpg>

# Comparison Data:

<u>Supplies</u>	Former Pre-Op Insulin Protocol	New Diabetic Algorithm	Savings
IV LINES (3 lines)	13.92	4.64	9.28
1L NS (1 bag)	13.32	13.32	0
1L D10W (1 bag)	18.84	0	18.84
100 mL NS (1 bag)	1.26	0	1.26
Humulin R insulin (100U)	1.25	0	1.25
<b>Total per patient</b>	<b>48.59</b>	<b>17.96</b>	<b>30.63</b>
Average 4 pt per day	194.36	71.84	122.52
<u>Time in Minutes</u>	Former Pre-Op Insulin Protocol	New Diabetic Algorithm	Savings
RN #1	20	7	13
RN #2	10	0	10
<b>Total per patient</b>	<b>30</b>	<b>7</b>	<b>23</b>
Average 4 pt per day	120	28	92



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**And also greatly improved patient safety and the patient experience.**



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