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RETROSPECTIVE REFINEMENT AND VALIDATION OF A HYPOGLYCEMIA DECISION TOOL FOR PARAMEDICS

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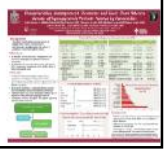
BACKGROUND

BACKGROUND: OUR PREVIOUS STUDY

- **Hypo1A.** ***Characteristics, Management, Outcomes and Short-Term Adverse Events of Hypoglycemia Treated by Paramedics***
  - Determine predictors of repeat access to paramedics / ED care within 3 days
  - Insulin negative predictor of AE regardless of initial transport; AdjOR 0.4



CAEP, Jun 2016
Paramedic Chiefs of Canada, Jun 2016

BACKGROUND: OUR PREVIOUS STUDIES

- **Hypo1B.** ***Hypoglycemic Patients Treated by Paramedics & the Prehospital Predictors of Admission***
  - Determine the prehospital predictors of admission within 3 days of initial prehospital hypoglycemic event
  - Increased risk: corticosteroids, CVD
  - Decreased risk: on insulin, tolerate complex CHO/protein

OBJECTIVES – HYPO 2

- **Refine and validate a decision tool derived to identify patients with hypoglycemia that could safely not be transported to hospital after being assessed and treated by ACP or PCP paramedics**

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METHODS

- **Design:** 6-month health record review of paramedic call reports & ED records (Jul 1, 2015 – Dec 31, 2015)
- **Setting:** Ottawa Paramedic Service, Ottawa, ON
- **Inclusion:** adults (>/=18yrs) with a prehospital BG <72mg/dl (4.0mmol/L)
- **Exclusion:** cardiac arrest and palliative patients
- **Outcomes measured:** proportion transported, management, patient outcome, short-term AEs

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METHODS

- **Data collection:** CRFs from previous study plus the following variables: *homelessness, liver disease, renal disease & on chemotherapy*
- **Analysis**: performed descriptive, logistic regression analysis and test characteristics of the decision tool
- **REB approval**: obtained from the Montfort, Queensway Carleton & Ottawa Health Science Network REBs

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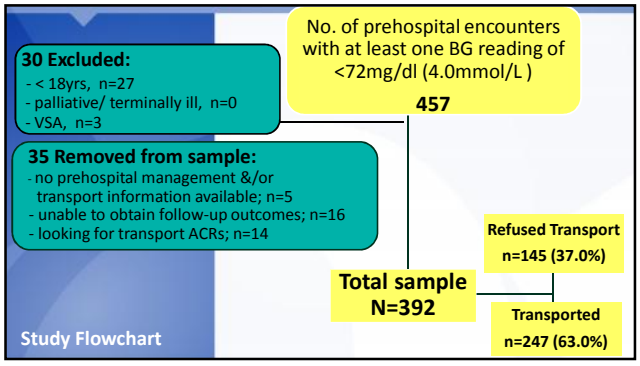

PATIENT CHARACTERISTICS (N=392)

Mean Age – yrs [range]	57.5 [18-97]
Male sex	55.9%
Diabetes (any type)	72.5%
Cardiovascular disease	28.0%
Renal disease*	11.0% *
ETOH dependency	10.7%
Seizure disorder	5.1%
Liver disease*	3.6% *

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PATIENT CHARACTERISTICS (N=392)

Homeless*	1.8% *
Insulin	60.2%
Any oral diabetic agent	24.0%
Sulfonylureas	9.4%
Corticosteroids	8.7%
Chemotherapy*	1.3% *

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PARAMEDIC & PATIENT CHARACTERISTICS (N=392)

Advanced Care Paramedic	**81.1%**
Initial mean blood glucose – mg/dl	**45.7**
50% IV Dextrose	**43.9%**
Glucagon IM	**23.5%**
Simple CHO/Oral glucose	**51.3%**
Complex CHO/protein	**29.3%**
Final mean blood glucose – mg/dl	**137.0**

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OUTCOMES (N=392)

Transported to ED	**63.0%**
Short-term Adverse Events	**22.7%**
Repeat Access to Care	**9.4%**
Repeat Access for Hypo	**3.3%**

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UNIVARIATE LOGISTIC REGRESSION – OR (95%CI)

Predictor of Repeat Access (within 3days)	
Homeless	10.4 (2.2-49.5)

Predictors of Admission (within 3days)	
Liver disease	4.4 (1.4-13.6)
Renal disease	3.2 (1.5-6.6)

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HYPLOGYCEMIA DECISION TOOL

To consider for non-transport if the following 9 criteria are met

- √ On insulin
- √ NOT on any oral diabetic agents
- √ NOT on oral corticosteroids
- √ NOT have cardiovascular disease
- √ NOT have a seizure disorder
- √ Tolerates complex CHO/protein snack
- √ NOT homeless*
- √ NOT have a liver disease*
- √ NOT have a renal disease*

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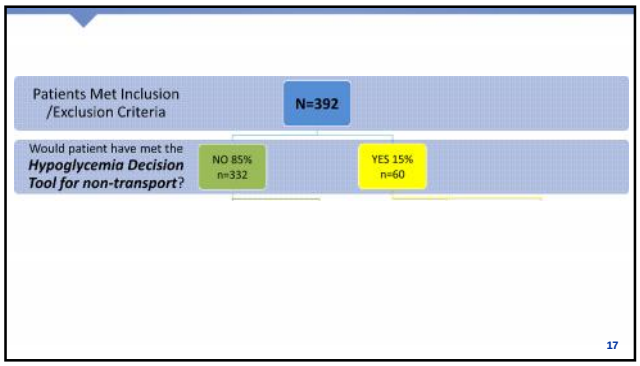

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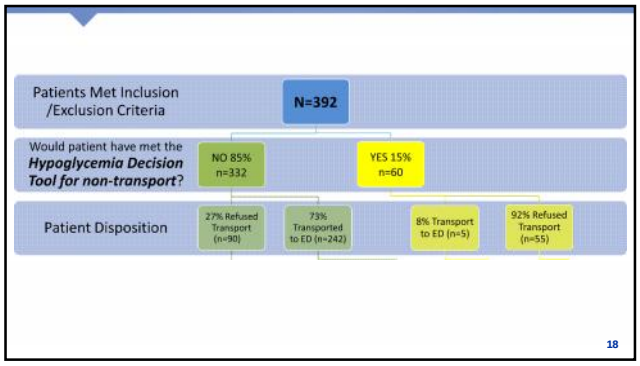

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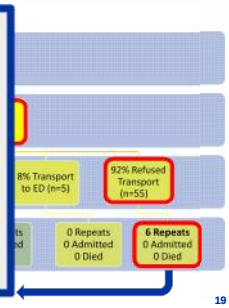
- 6 Repeats
- Age range 21 – 77 yrs
- 5 repeat access to paramedics
  - 3 hypoglycemia *(2 transported/discharged)*
  - 1 N/V
  - 1 lift assist
- 1 repeat access to ED for hypoglycemia (& glucometer renewal)



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Met Hypoglycemia Decision Tool Criteria?	Short-term AE (within 3 days) YES	NO
meeting criteria for transport = NO *	83	249
YES	6	54

SENSITIVITY = 93.3% **PPV = 25.0%**
SPECIFICITY = 17.8% **NPV = 90.0%**

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DISCUSSION

- Of those that met all 9 criteria:
  - 10% short-term AE within 3 days (vs 25%)
    - & 6.7% related to hypoglycemia
- May lead to an increase in transports (63% to 85%)
- Help guide discussion with patients for transport

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LIMITATIONS

- Retrospective data
- Single paramedic service
- Relatively small number of cases
- Follow-up limited to surrounding hospitals
- Varying EDs/admission practices
- Other pertinent risk factors?

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CONCLUSION & NEXT STEPS

- The Hypoglycemia Decision Tool is potentially safe to rule out transport to hospital for a subset of patients
- Next steps to develop an accurate risk stratification of prehospital patients with hypoglycemia
- Conduct a multi-site prospective validation study
- Evaluate the patient experience/patient satisfaction

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THANK YOU

Questions?

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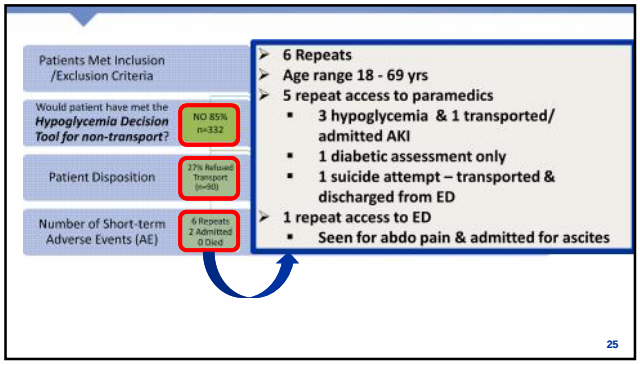

ED OUTCOMES & MANAGEMENT (n=247)

Discharged from ED	**71.3%**
LWBS/ LAMA	**5.3%**
Admitted	**23.1%**
Recurrent hypo in ED	**16.6%**
Dextrose given	**19.0%**
CHO &/or Protein given	**39.3%**
- Change to diabetic meds	**16.0%**
- Changes to diet	**9.3%**

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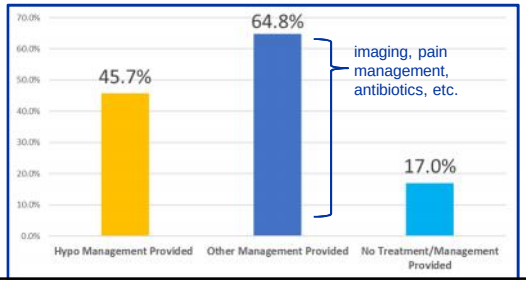
ED MANAGEMENT (n=247)



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