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### **Food Insecurity in People with Type 1 Diabetes and Glycemic Outcomes**

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#### **Abstract:**

**Background:** This multi-center study aims to explore relationships between individuals with type 1 diabetes (T1D) who are at risk for food insecurity and glycemic outcomes. **Methods:** Electronic health record data from T1D Exchange Quality Improvement Collaborative (T1DX-QI) categorized completed Hunger Vital Signs (HVS) questionnaires into at risk and no risk for food insecurity. At-risk individuals were defined as selecting "often true" or "sometimes true" to screening questions, whereas primary outcome was recent A1c levels. Demographic information and diabetes related covariates were assessed for potential relationships. **Results:** In the total T1D cohort (N=4453), 3.8% were at risk for food insecurity. Stratifying by age, 6% of youth (<18 years) and 5% of adults (>18 years) were at risk. Statistically significant differences were observed among food insecurity risk and insurance type. Of those at risk, 54% had public insurance compared with 7% private. Individuals at risk had a higher mean HbA1c when compared with individuals not at risk (9.4% vs 8.5% respectively,  $p < .001$ ). The odds of an individual having an HbA1c >7% were higher in the group at risk relative to the group not at risk OR1.4 (95% CI 0.9,2.1). **Conclusion:** Individuals in this population who were at risk for food insecurity also had elevated A1c levels. Interventions are needed to identify effective ways of improving food insecurity among people with T1D.

Variables	Overall T1D Population Food Insecurity Risk		Pediatric Population Food Insecurity Risk		Adult Population Food Insecurity Risk	
	At Risk N= 168	No Risk N=3249	At Risk N= 70	No Risk N=1266	At Risk N= 98	No Risk N=1983
<b>Gender- no. (%)</b>						
Male	88(52)	1741(54)	42(60)	698(55)	46(47)	1043(53)
Female	80(48)	1506(46)	28(40)	567(45)	52(53)	939(47)
<b>Age<sup>a</sup>, years, mean (SD)</b>	27.2(16.5)	28.6(19.3)	12.8(3.1)	12.2(3.9)	37.5(14.4)	39.2(17.8)
<b>Insurance<sup>a</sup></b>						
Public	88(52)	687(21)	52(74)	364(29)	36(37)	323(16)
Private	9(5)	557(17)	4(6)	315(25)	5(5)	242(12)
Other/Unknown	71(42)	2005(62)	14(20)	587(46)	57(58)	1418(72)
<b>Race/ethnicity<sup>a</sup>, no. (%)</b>						
Non-Hispanic White	44(26)	1627(50)	10(14)	568(45)	34(35)	1059(53)
Non-Hispanic Black	36(21)	361(11)	6(9)	76(6)	30(31)	285(14)
Hispanic	47(28)	271(8)	39(56)	200(16)	8(8)	71(4)
Other/unknown	41(24)	990(30)	15(21)	422(33)	26(27)	568(29)
<b>Insulin<sup>a</sup> - no. (%)</b>						
Pump	29(17)	1231(38)	7(10)	355(28)	22(22)	876(44)
MDI	139(83)	2018(62)	63(90)	911(72)	76(78)	1107(56)
<b>Glycemic Outcomes</b>						
Mean A1c <sup>a</sup> (SD)	9.4(2.3)	8.4(1.9)	9.1(2.1)	8.5(2.0)	9.6(2.3)	8.4(1.9)
<b>A1c<sup>a</sup> - no. (%)</b>						
<7%	18(11)	688(21)	9(13)	266(21)	9(9)	422(21)
7-8%	66(39)	1629(50)	29(41)	626(49)	37(38)	1003(51)
>9%	84(50)	932(29)	32(46)	374(30)	52(53)	558(28)
<b>DKA Event<sup>a,†</sup> - no. (%)</b>						
Yes	64(38)	964(30)	22(31)	477(38)	42(43)	497(25)
No	104(62)	2285(70)	48(69)	789(62)	56(57)	1496(75)
<b>Severe Hypo Event<sup>a,†</sup> - no. (%)</b>						
Yes	16(10)	160(5)	2(3)	30(2)	14(14)	130(6)
No	152(90)	3089(95)	68(97)	1236(98)	84(86)	1853(93)

<sup>a</sup>Event (patient reported ambulatory or inpatient visit), <sup>†</sup>p-value <0.05 observed when comparing at risk and no risk populations

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