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Supplementary Table 1. Eligibility and Exclusion Criteria

Eligibility Criteria
1) Clinical diagnosis of type 1 diabetes and using daily insulin therapy for at least one year and an insulin infusion pump for at least 6 months
   The diagnosis of type 1 diabetes is based on the investigator's judgment; C peptide level and antibody determinations were not required.
2) Age 3 to 14 years
3) Glycated hemoglobin level ≤8.5% (69 mmol/mol)
   - Measured with DCA2000 or equivalent device for assessing eligibility
   - Based on an analysis of the JDRF CGM RCT dataset [20], participants higher than 8.5% (69 mmol/mol) are not expected to meet the minimum amount of nocturnal hypoglycemia (at least one night with a CGM glucose value ≤60 mg/dL or at least three different nights with a sensor glucose value ≤70 mg/dL).
   - Glycated hemoglobin measurements performed as part of usual clinical care within 2 weeks prior to obtaining informed consent for participation in the trial may be used.
4) Availability of internet access for periodic upload of study data

Exclusion Criteria
1) Diabetic ketoacidosis in the past 3 months
2) Hypoglycemic seizure or loss of consciousness in the past 6 months
3) History of seizure disorder (except for hypoglycemic seizure)
4) History of any heart disease including coronary artery disease, heart failure, or arrhythmias
5) Cystic fibrosis
6) Current use of oral/inhaled glucocorticoids, beta-blockers or other medications, which in the judgment of the investigator would be a contraindication to participation in the study.
7) History of ongoing renal disease (other than microalbuminuria). Creatinine level to have been obtained within the last year if participant has diabetes of >10 years duration. If creatinine is > 1.5 mg/dL (0.08 mmol/L), the participant is excluded.
8) Medical or psychiatric condition that in the judgment of the investigator might interfere with the completion of the protocol such as:
   ➢ Inpatient psychiatric treatment in the past 6 months
   ➢ Uncontrolled adrenal disorder
   ➢ Abuse of alcohol
9) Pregnancy
   If female and sexually active, must agree to use a form of contraception to prevent pregnancy while a participant in the study. A negative serum pregnancy test will be required for all premenopausal women who are not surgically sterile. Participants who become pregnant will be discontinued from the study.
10) Liver disease as defined by an ALT greater than 3 times the upper limit of normal
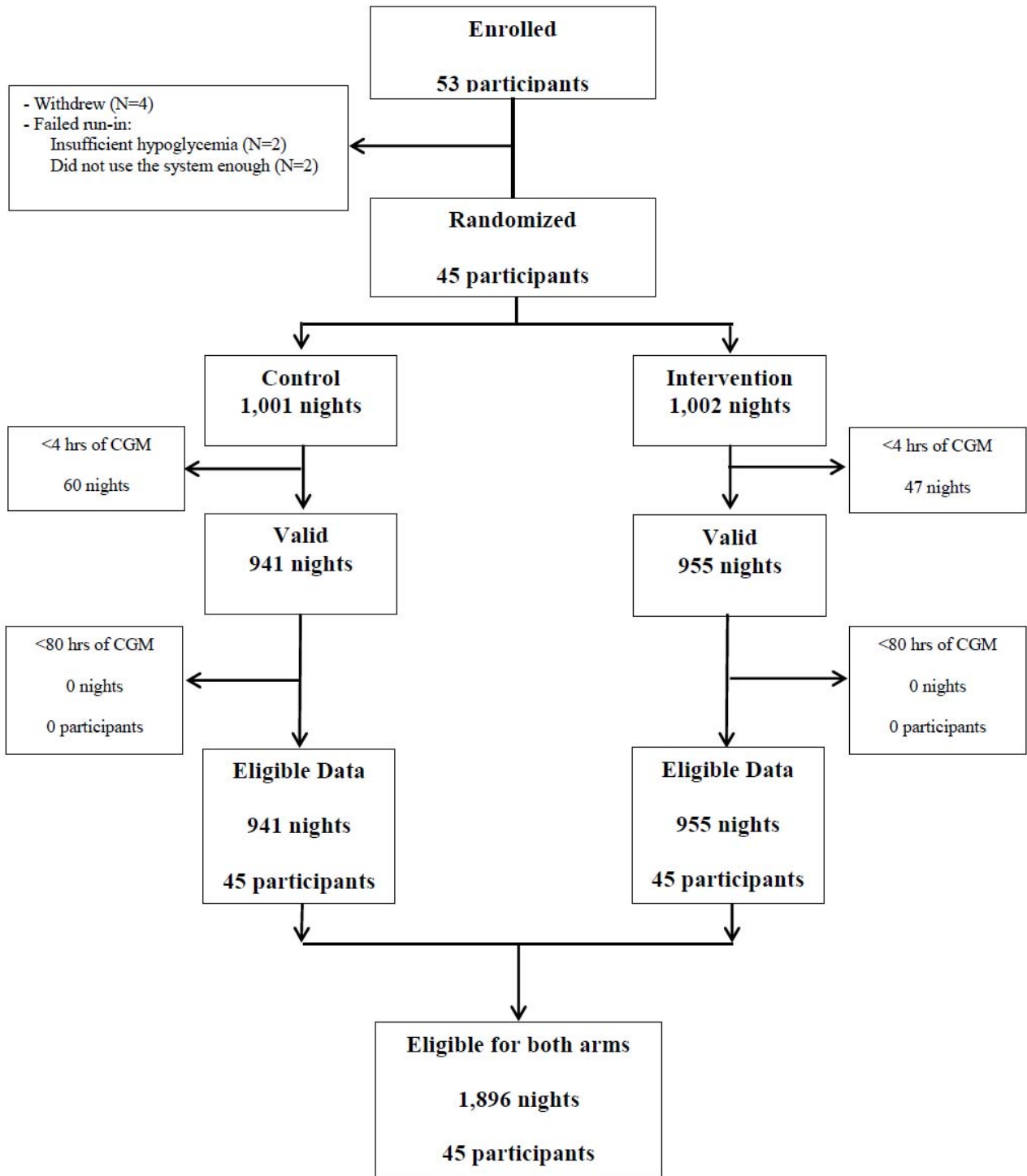
SUPPLEMENTARY DATA

Supplementary Table 2. Participant Characteristics at Enrollment – *medians (IQR)* **or** *n (%)*

Characteristic	Participants 11-14 Years of Age (N=45)	Participants 4-10 Years of Age (N=37)
Age (yrs)	13 (11, 13)	8 (6, 9)
Range	11 to 14	4 to 10
Male	25 (56%)	17 (46%)
Race		
White non-Hispanic	43 (96%)	35 (95%)
Hispanic	1 (2%)	2 (5%)
Asian	1 (2%)	0
Diabetes duration (yr)	6 (3, 9)	3 (2, 5)
Body-mass index percentile [*]	69 (44, 82)	69 (51, 82)
HbA1c (%)	7.7 (7.3, 8.2)	7.8 (7.5, 8.0)
HbA1c (mmol/mol)	61 (56, 66)	62 (58, 64)
Daily insulin dose (U/kg/day)	0.83 (0.72, 0.96)	0.76 (0.69, 0.86)

[*] Body-mass index percentiles adjusted for age and gender were computed using the 2000 CDC population growth chart data
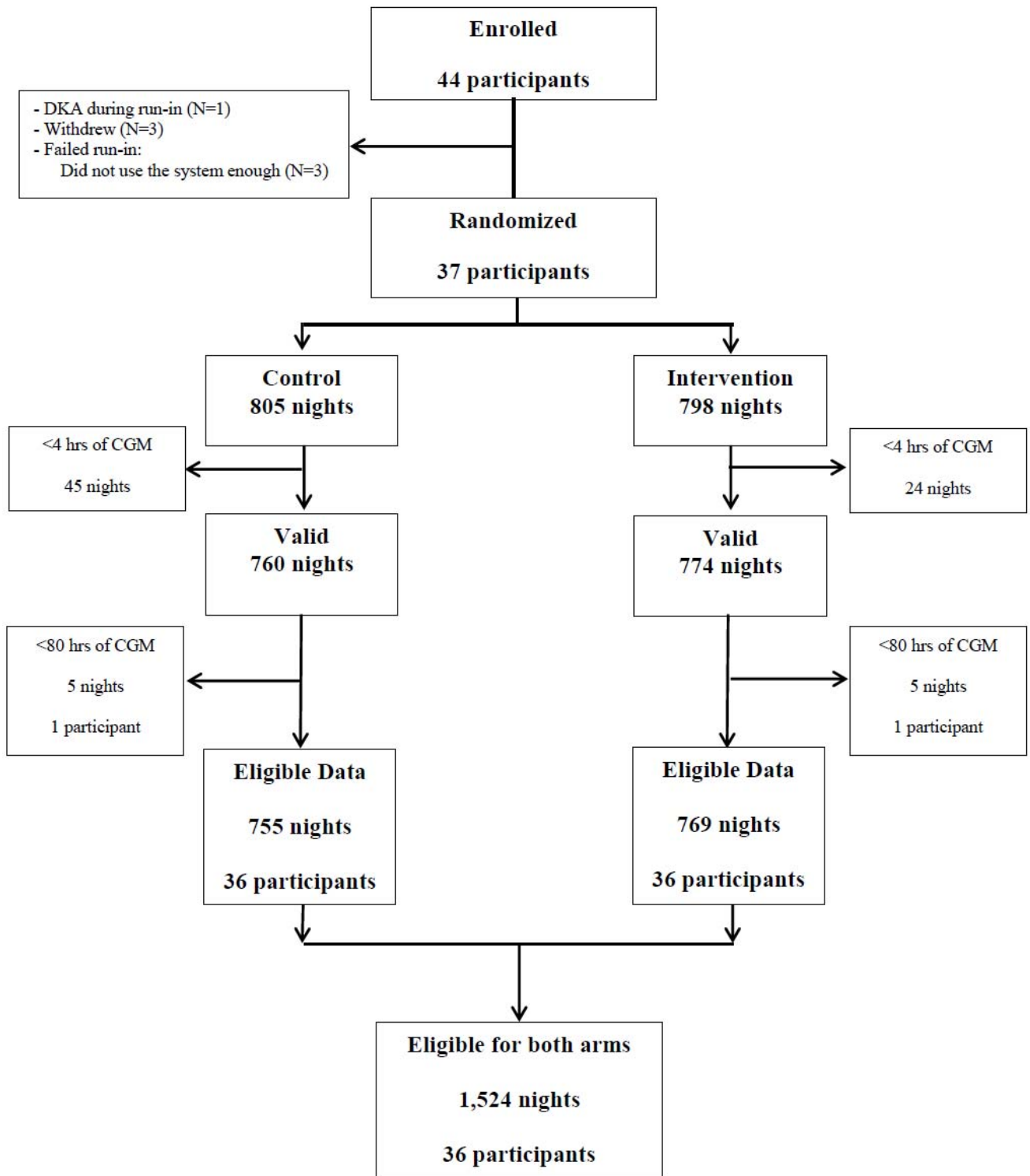*(Kuczmarski RJ, Ogden CL, Grummer-Strawn LM, et al. CDC growth charts: United States. Adv Data 2000:1-27).*

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Supplementary Figure 3A. Among Participants 11-14 Years of Age, Study Flowchart

Supplementary Figure 3B. Among Participants 4-10 Years of Age, Study Flowchart

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Supplementary Table 4. Number of Nights Required to Complete 42 Nights

	Participants 11-14 Years of Age	**Participants 4-10 Years of Age**
# participants enrolled	45	37
# participants with at least 80hr of CGM in each arm	45 (100%)	36 (97%)
# participants completing 42 nights.	44 (98%)	34 (92%)
# nights to complete study		
Median (*IQR*)	59 (52, 69)	63 (54, 71)
42-47 nights	2 (5%)	1 (3%)
48-53 nights	11 (25%)	6 (18%)
54-59 nights	9 (20%)	7 (21%)
60-65 nights	6 (14%)	6 (18%)
66-70 nights	6 (14%)	5 (15%)
$\geq$71 nights	10 (23%)	9 (26%)
# nights skipped *median (IQR)*	15 (9, 25)	18 (11, 25)
# nights with <4 hours of CGM data *median (IQR)*	1 (1, 3)	1 (0, 2)

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Supplementary Table 5. Additional Efficacy and Safety Secondary Outcomes*

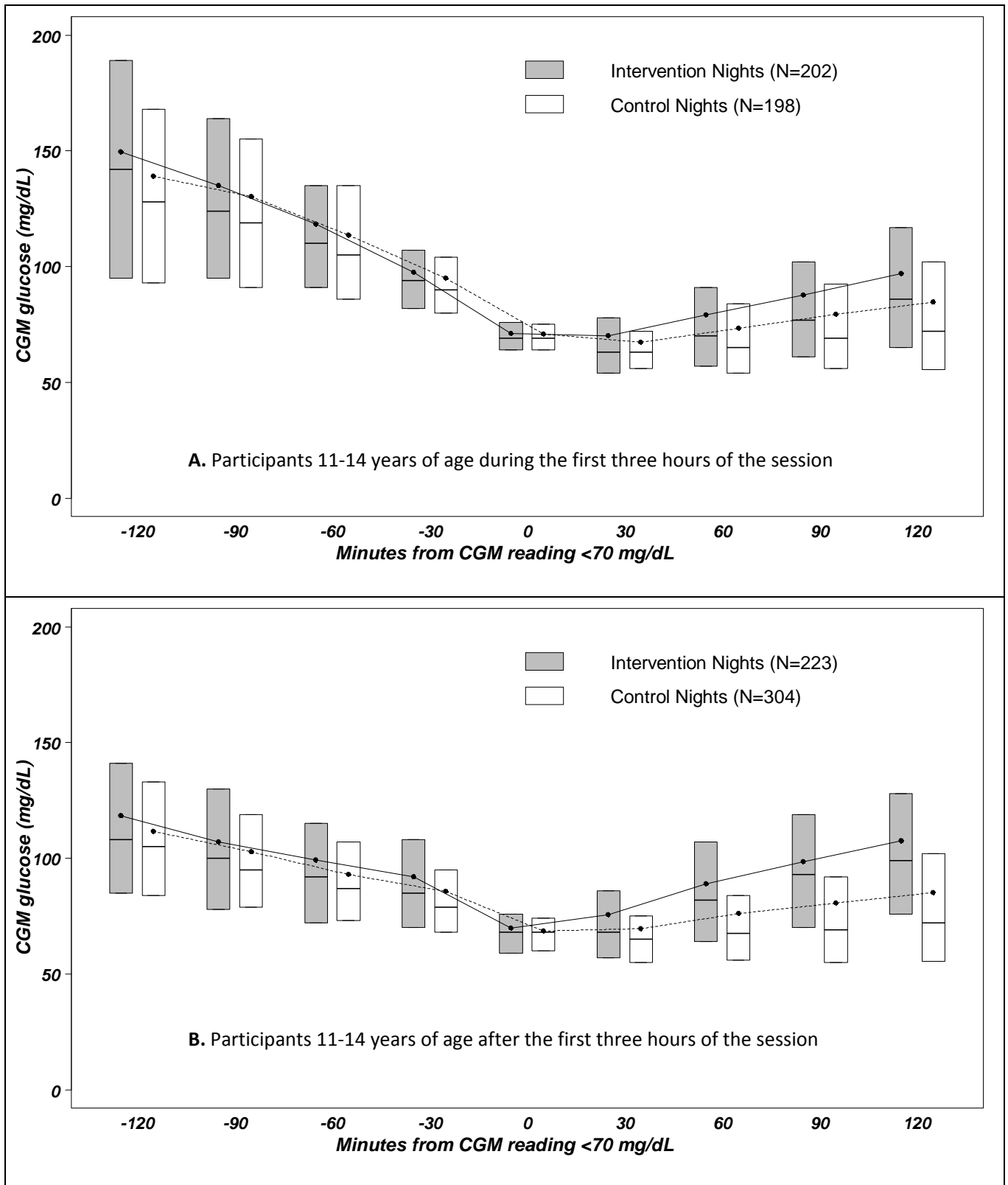|	Participants 11-14 Years of Age (N=45)			Participants 4-10 Years of Age (N=36†)		
	Control Nights	**Intervention Nights**	**P-value**	**Control Nights**	**Intervention Nights**	**P-value**
	941	955		755	769	
Hypoglycemia Outcomes						
% of nights with glucose level <70 *mg/dL* for a cumulative duration of						
> 30min	31%	23%	<0.001	26%	18%	<0.001
> 60min	26%	17%	<0.001	19%	12%	<0.001
> 120min	18%	9%	<0.001	12%	6%	<0.001
> 180min	13%	5%	<0.001	6%	3%	0.002
% of nights with glucose level <60 *mg/dL* for a cumulative duration of						
> 30min	21%	14%	<0.001	16%	10%	<0.001
> 60min	15%	9%	<0.001	10%	6%	0.005
> 120min	11%	4%	<0.001	6%	3%	0.002
> 180min	7%	2%	<0.001	3%	1%	0.002
% of nights with events of glucose <70 *mg/dL* continuously‡ for						
> 10min	36%	31%	0.006	32%	25%	0.001
> 25min	32%	23%	<0.001	25%	18%	<0.001
> 60min	23%	14%	<0.001	15%	10%	0.003
> 120min	14%	7%	<0.001	8%	4%	<0.001

*Glucose results from CGM unless specified as blood glucose.
†One participant with 5 intervention nights and 5 control nights was excluded for <80 hours of CGM glucose data.
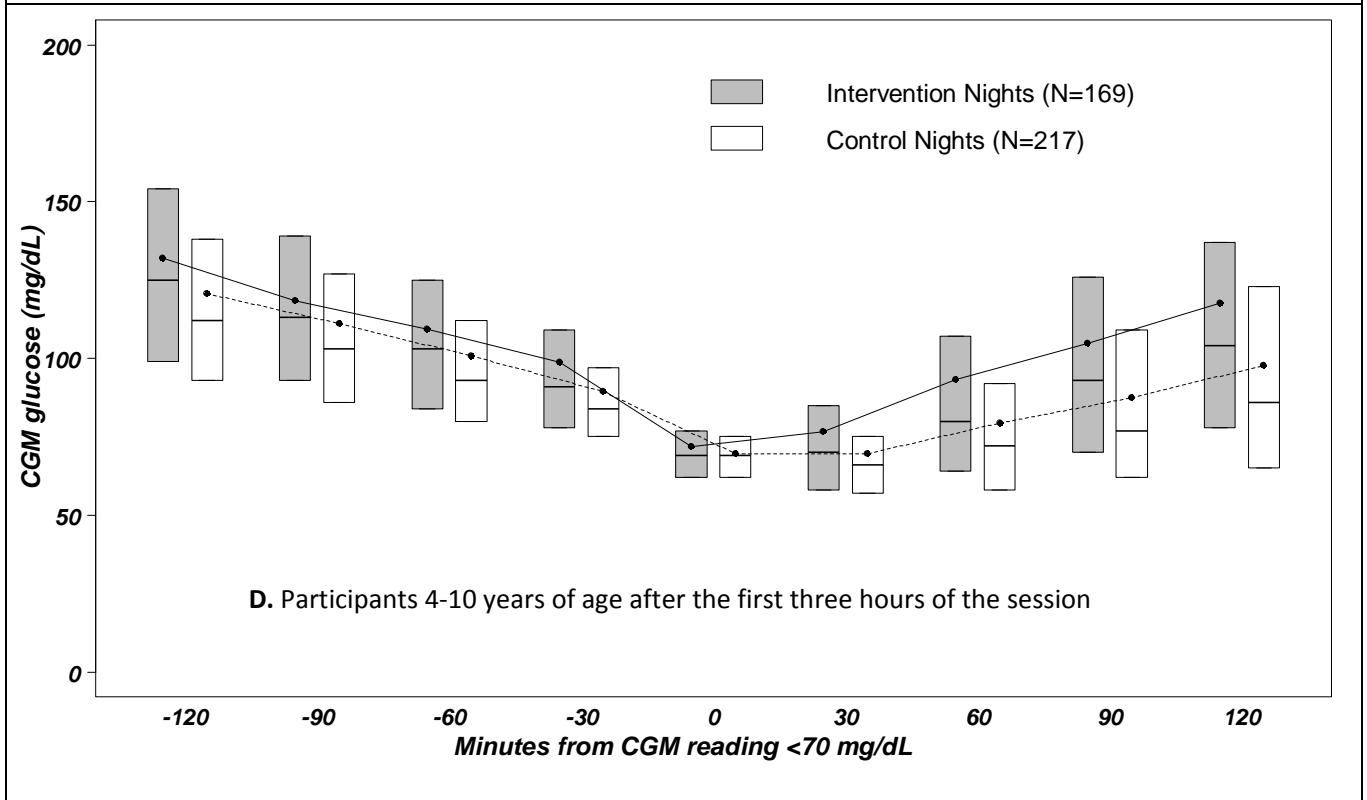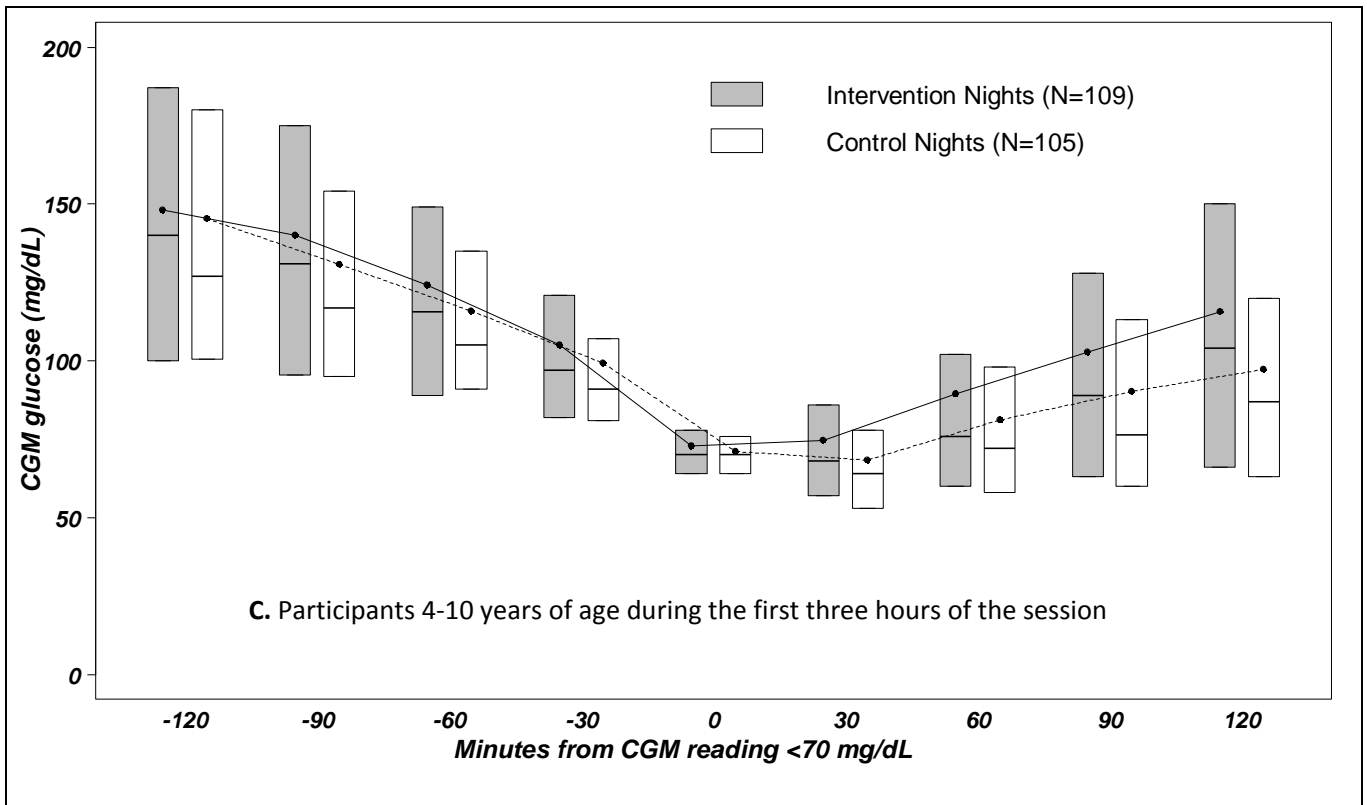‡Hypoglycemia event assessment based on continuous CGM values below threshold was added to statistical analysis plan post hoc

Supplementary Figure 6. Mean Glucose hours before and 2 hours after Occurrences of CGM Glucose <70 mg/dL.

A. Participants 11-14 years of age during the first three hours of the session

B. Participants 11-14 years of age after the first three hours of the session

C. Participants 4-10 years of age during the first three hours of the session

D. Participants 4-10 years of age after the first three hours of the session

Supplementary Table 7. Application of Algorithm to Control Nights[*]

	Age Group		
	All	**11-14**	**4-10**
# Control Nights overall	1,696	941	755
# w/ prediction of CGM glucose <80 mg/dL	1,148	647	501
On nights when predicted, did CGM glucose actually drop to <80 mg/dL within 2 hours?			
No	548 (48%)	294 (45%)	254 (51%)
Yes	600 (52%)	353 (55%)	247 (49%)
On nights when CGM glucose dropped to <80 mg/dL, time from pump suspension recommendation to CGM glucose <80 mg/dL			
A) within 30 min	306 (51%)	179 (51%)	127 (51%)
B) 30-<60 min	168 (28%)	100 (28%)	68 (28%)
C) 60-<120 min	126 (21%)	74 (21%)	52 (21%)

[*] The first 15 minutes of the night were ignored because it was possible for the sensor glucose to start out <80 mg/dL.

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Supplementary Table 8. Assessment of Sensor Accuracy

		Age Group			
		11-14 Years of Age		**4-10 Years of Age**	
		Control N=2,193	*Intervention N=2,143*	*Control N=2,173*	*Intervention N=2,129*
Sensor minus Reference Glucose	Mean ± SD	-20.8 ± 40.2	-20.4 ± 42.7	-19.2 ± 37.3	-18.4 ± 39.8
	Median (IQR)	-15.0 (-36.0, 1.0)	-15.0 (-38.0, 3.0)	-15.0 (-37.0, 3.0)	-13.0 (-36.0, 4.0)
Reference Meter Glucose					
≤70 mg/dL	N	81	54	117	45
	Mean ± SD	-0.5 ± 18.7	+0.2 ± 18.7	+2.4 ± 23.2	+14.8 ± 35.8
	Median (IQR)	-3.0 (-11.0, 7.0)	-2.0 (-15.0, 10.0)	1.0 (-10.0, 11.0)	8.0 (-5.0, 18.0)
71-120 mg/dL	N	578	467	578	489
	Mean ± SD	-12.1 ± 21.5	-4.3 ± 28.2	-7.1 ± 23.4	-3.7 ± 22.4
	Median (IQR)	-12.0 (-24.0, 1.0)	-6.0 (-23.0, 9.0)	-6.0 (-21.0, 6.0)	-3.0 (-17.0, 8.0)
121-180 mg/dL	N	756	768	653	722
	Mean ± SD	-15.2 ± 30.0	-15.6 ± 31.9	-15.7 ± 31.7	-13.8 ± 32.8
	Median (IQR)	-13.0 (-32.0, 3.0)	-13.0 (-34.0, 2.0)	-14.0 (-34.0, 2.0)	-11.0 (-30.0, 4.0)
>180 mg/dL	N	778	854	825	873
	Mean ± SD	-35.0 ± 54.5	-34.9 ± 53.0	-33.5 ± 45.1	-32.2 ± 47.4
	Median (IQR)	-26.0 (-56.0, -4.0)	-28.0 (-60.0, -1.0)	-30.0 (-57.0, -7.0)	-28.0 (-56.0, -4.0)

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		Age Group			
		11-14 Years of Age		**4-10 Years of Age**	
		Control *N=2,193*	*Intervention* *N=2,143*	*Control* *N=2,173*	*Intervention* *N=2,129*
Relative Absolute Difference[†]	Mean ± SD	18% ± 16%	19% ± 17%	18% ± 17%	18% ± 19%
	Median (IQR)	14% (7%, 26%)	15% (6%, 27%)	14% (7%, 25%)	13% (6%, 24%)
Reference Meter Glucose					
≤70 mg/dL	N	81	54	117	45
	Mean ± SD	22% ± 28%	24% ± 20%	23% ± 37%	40% ± 73%
	Median (IQR)	15% (8%, 28%)	20% (12%, 31%)	16% (8%, 28%)	18% (11%, 33%)
71-120 mg/dL	N	578	467	578	489
	Mean ± SD	20% ± 16%	21% ± 19%	19% ± 16%	17% ± 15%
	Median (IQR)	16% (7%, 30%)	16% (7%, 29%)	15% (6%, 27%)	12% (6%, 25%)
121-180 mg/dL	N	756	768	653	722
	Mean ± SD	17% ± 15%	18% ± 15%	18% ± 16%	17% ± 16%
	Median (IQR)	13% (6%, 23%)	13% (6%, 25%)	14% (7%, 25%)	13% (6%, 25%)
>180 mg/dL	N	778	854	825	873
	Mean ± SD	18% ± 16%	19% ± 17%	17% ± 14%	17% ± 15%
	Median (IQR)	13% (6%, 25%)	15% (6%, 27%)	14% (7%, 23%)	14% (7%, 24%)

[†]Defined as the absolute value of the difference divided by the reference value, expressed as a percentage

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Supplementary Table 9. Sensor Accuracy when Sensor Glucose below 70 mg/dL and a Paired Meter Blood Glucose was Available.

Reference Meter Glucose	*Total N=772*	Age Group					
		11-14 Years of Age			**4-10 Years of Age**		
		All N=417	*Control N=260*	*Intervention N=157*	*All N=355*	*Control N=231*	*Intervention N=124*
<70 mg/dL	194 (25%)	93 (22%)	55 (21%)	38 (24%)	101 (28%)	77 (33%)	24 (19%)
70-79 mg/dL	111 (14%)	63 (15%)	45 (17%)	18 (11%)	48 (14%)	36 (16%)	12 (10%)
80-89 mg/dL	105 (14%)	59 (14%)	45 (17%)	14 (9%)	46 (13%)	27 (12%)	19 (15%)
≥90 mg/dL	362 (47%)	202 (48%)	115 (44%)	87 (55%)	160 (45%)	91 (39%)	69 (56%)

Supplementary Table 10. Among Intervention Nights with Pump Suspensions*, Number of Pump Suspensions and their Duration by Time of Night - *median (IQR)*

Age Group	*Time of Night[†]*	*# Events*	*Duration per Event (min)*	*# Nights[‡]*	*Total Duration (min)*
11-14	Before Midnight	686	13 (5, 29)	370	30 (11, 56)
	Midnight to 4:00AM	1211	11 (5, 25)	439	40 (19, 77)
	After 4:00AM	826	10 (5, 19)	364	25 (10, 46)
4-10	Before Midnight	476	11 (5, 23)	250	21 (10, 45)
	Midnight to 4:00AM	752	14 (5, 26)	274	45 (20, 80)
	After 4:00AM	676	10 (5, 20)	297	27 (14, 54)

[*] N=671 and 503 intervention nights with one or more pump suspensions among the 11-14 and 4-10 years of age respectively.

[†] Based on the when the suspension was initiated.

[‡] Number of nights with at least one event starting during the indicated time period.