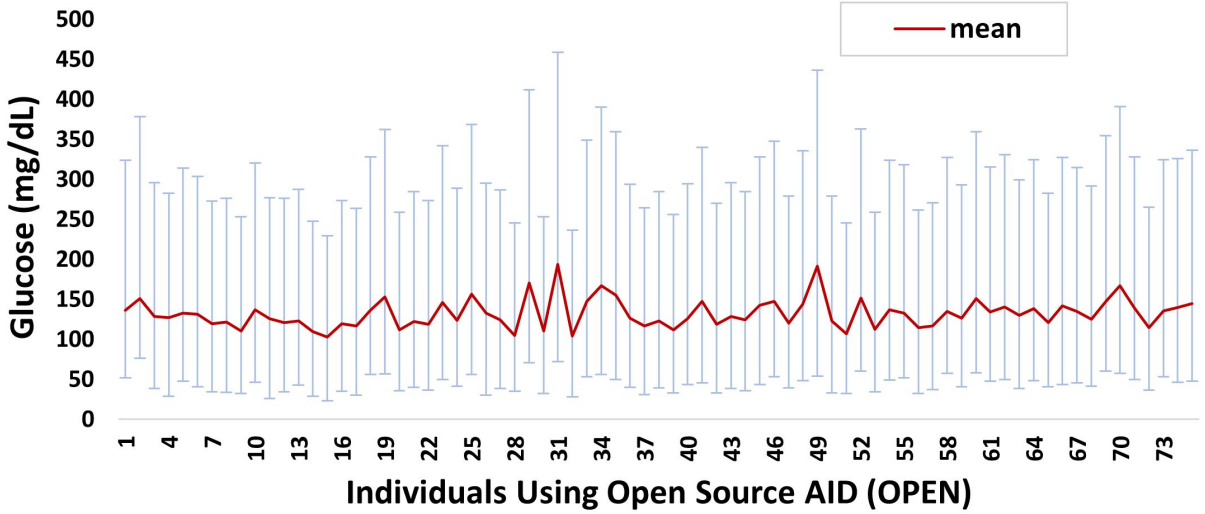
Supplemental Appendix

Glucose Variability Analysis in Two Large-Scale and Real-World Datasets of Open-Source Automated Insulin Delivery Systems

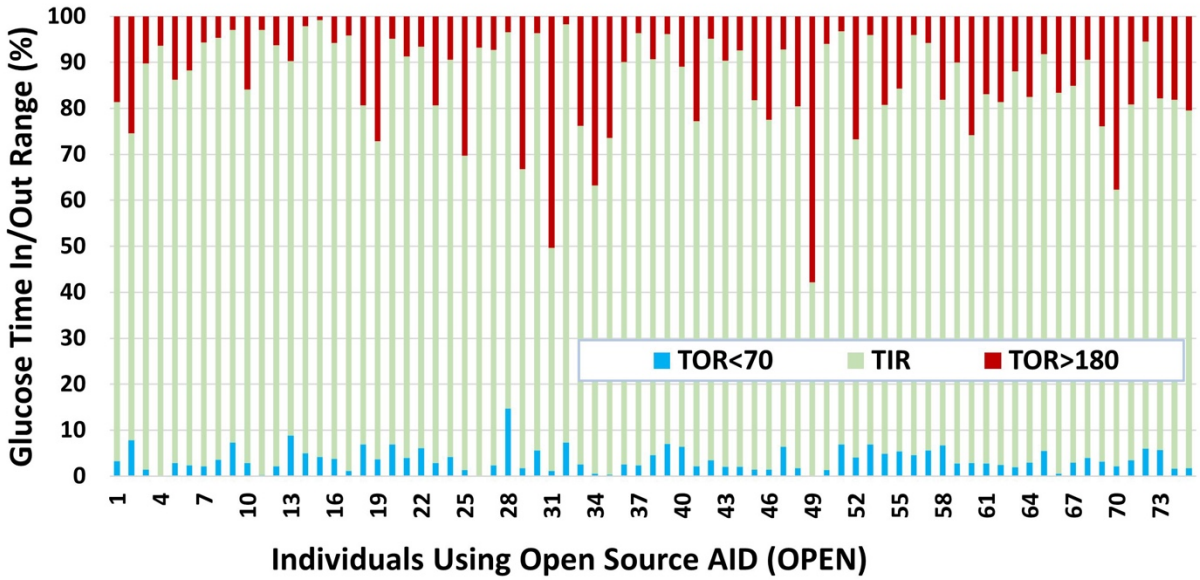
Drew Cooper, Bernd Reinhold, Arsalan Shahid, and Dana M. Lewis

Count of Demographics Data for OPEN dataset

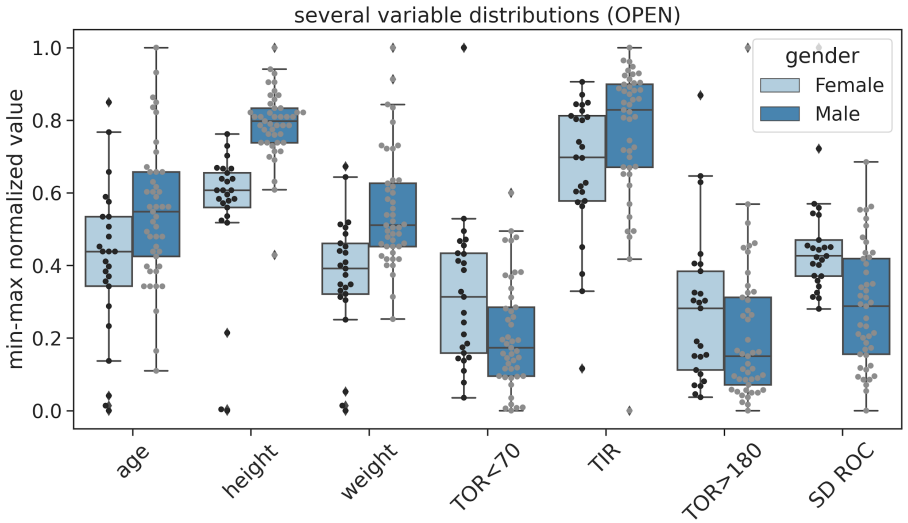
Demographic Features	Available Reports	Missing Reports
Total Number of Individuals	75	0
Diagnosed Date	73	2
Date of Pump Use	72	3
Date of CGM Use	74	1
Date of Closed Loop Initiation	74	1
AID Type	74	1
DOB	74	1
Country	74	1
Weight	71	4
Height	72	3
Last A1c	61	14
Last A1c Date	60	15
Gender	74	1



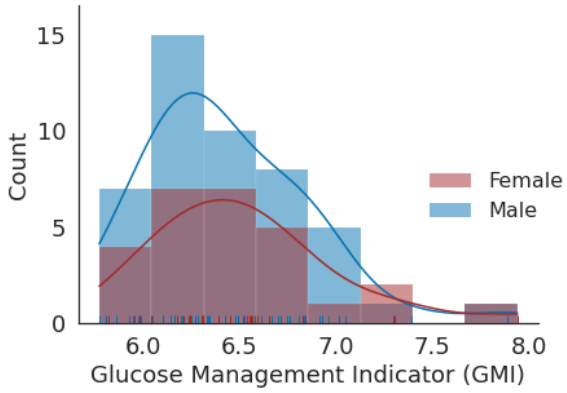
Glucose mean and distribution for insulin-requiring individuals using open-source AID systems. Total number of individuals (n) = 75. Average glucose mean is 132.20 mg/dL and SD across the individuals is 43.34 mg/dL.



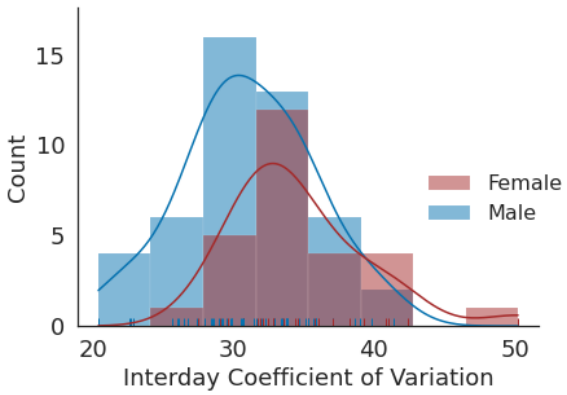
Glucose TIR and TOR for insulin-requiring individuals using open-source AID systems. Total number of individuals (n) = 75. The average TIR (TOR<70, TOR>180) for insulin-requiring individuals in the OPEN datasets is 82.08%, (3.66%, 14.3%).



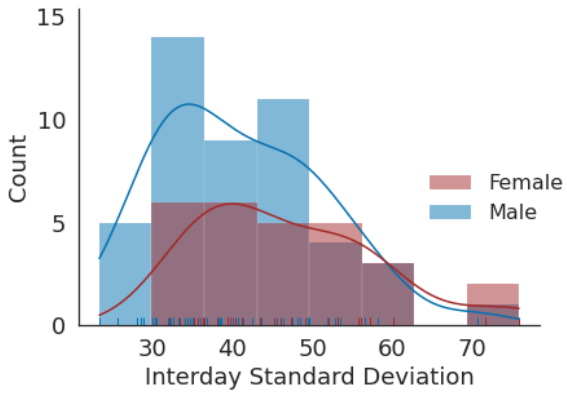
Gender-wise distributions of age, height, weight, TOR<70, TIR, TOR>180, and standard deviation glucose rate of change (SD ROC). The age, height, and weight were reported by 21 and 43 females and males, respectively. Other glucose analysis metrics are reported for 27 females and 47 males.



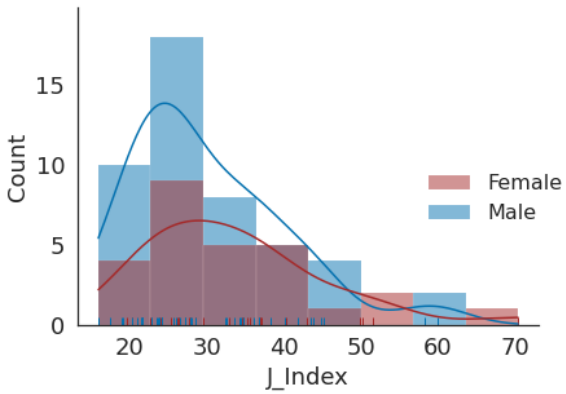
(A)



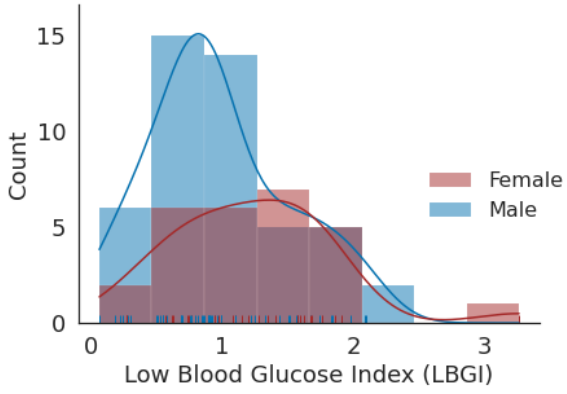
(B)


Count
Female
Male
Interday Standard Deviation

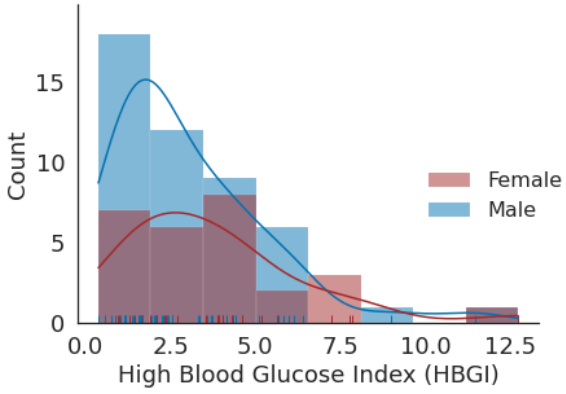
(C)


Count
Female
Male
J_Index

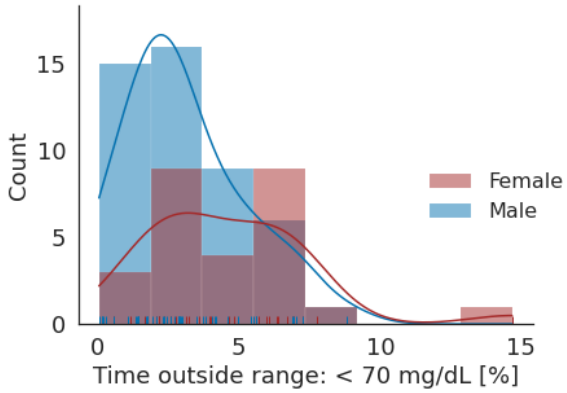
(D)


Count
Female
Male
Low Blood Glucose Index (LBGI)

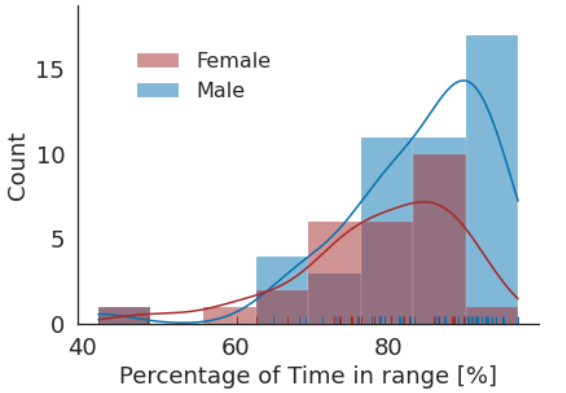
(E)


Count
Female
Male
High Blood Glucose Index (HBGI)

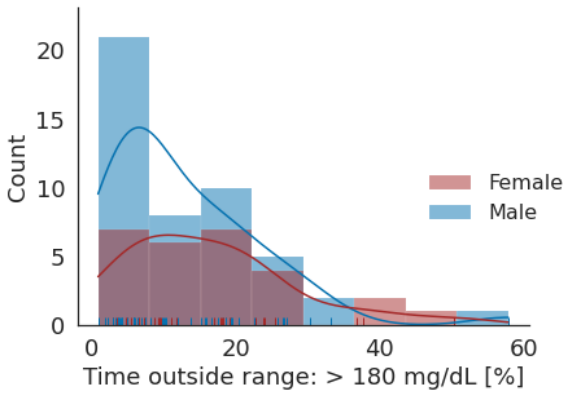
(F)


Count
Female
Male
Time outside range: < 70 mg/dL [%]

(G)

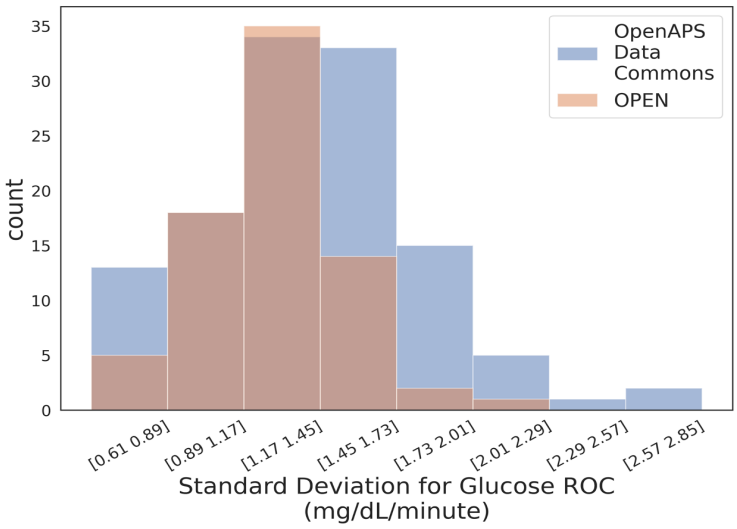

Count
Female
Male
Percentage of Time in range [%]

(H)



(I)

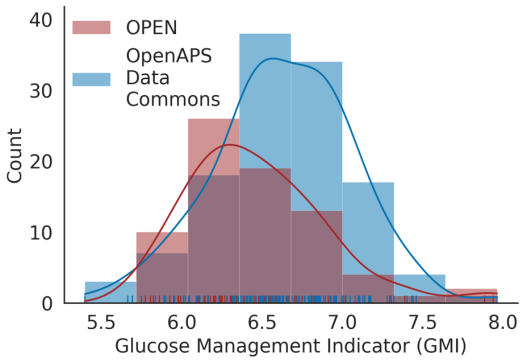
Glucose variability outcomes for individuals using open-source AID systems based on gender. Total number of males and females is 47 and 27, respectively. (A) GMI (B) CV. (C) SD. (D) J_index. (E) LBGI. (F) HBGI. (G) TOR<70. (H) TIR. (I) TOR>180.



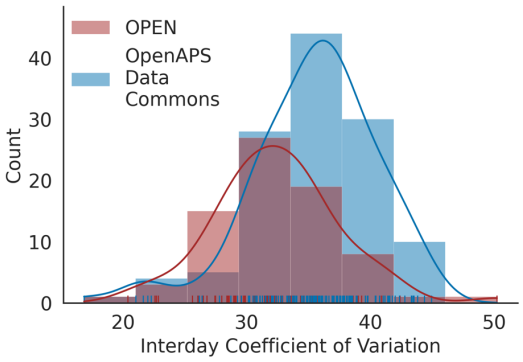
Standard deviation of glucose rate of change (SD ROC) for the OPEN dataset (n=75) and the OpenAPS Data Commons dataset (n=122).

Comparison of statistical measures of the OpenAPS Data Commons and OPEN datasets. Z-test determines whether the means of two distributions are significantly different, KS is the Kolmogorov-Smirnov test, MW the Mann-Whitney U test.

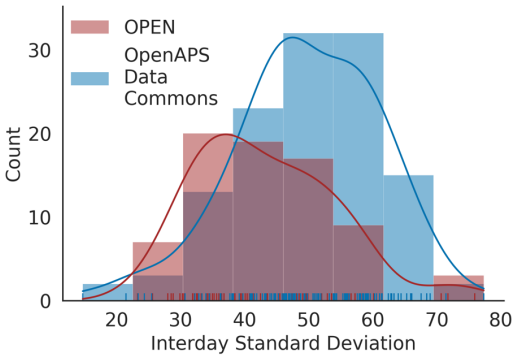
	Mean [OpenAPS]	Mean [OPEN]	SD [OpenAPS]	SD [OPEN]	Min [OpenAPS]	Min [OPEN]	Max [OpenAPS]	Max [OPEN]	Skewness [OpenAPS]	Skewness [OPEN]	p-value (z-test)	p-value (KS)	p-value (MW)
Interday SD (mg/dL)	49.75	43.34	11.22	10.93	14.71	23.27	77.33	75.95	-0.38	0.66	**<0.05**	**<0.05**	**<0.05**
Interday CV (%)	35.43	32.45	5.04	4.99	16.86	20.41	44.94	50.23	-0.84	0.43	**<0.05**	**<0.05**	**<0.05**
SD ROC (mg/dL/min)	1.42	1.29	0.39	0.27	0.61	0.76	2.69	2.29	0.48	0.54	**<0.05**	**<0.05**	**<0.05**
TOR<70 (%)	4.01	3.66	2.96	2.50	0.23	0.05	16.97	14.67	1.52	1.30	0.40	0.72	0.34
TIR (%)	77.26	82.08	8.95	10.35	49.75	42.07	98.45	96.90	-0.13	-1.39	**<0.05**	**<0.05**	**<0.05**
TOR>180 (%)	18.74	14.27	9.77	11.03	0.05	0.83	49.67	57.88	0.25	1.49	**<0.05**	**<0.05**	**<0.05**
J_index	36.42	31.60	10.48	10.49	10.39	15.95	73.93	70.37	0.26	1.22	**<0.05**	**<0.05**	**<0.05**
LBGI	1.09	1.07	0.65	0.57	0.13	0.06	3.82	3.26	1.57	0.82	0.84	0.87	0.36
HBGI	4.36	3.34	2.28	2.39	0.03	0.38	13.25	12.74	0.59	1.62	**<0.05**	**<0.05**	**<0.05**
GMI	6.63	6.47	0.43	0.43	5.40	5.77	7.96	7.94	-0.11	1.04	**<0.05**	**<0.05**	**<0.05**


OPEN
OpenAPS Data Commons
Count
Glucose Management Indicator (GMI)

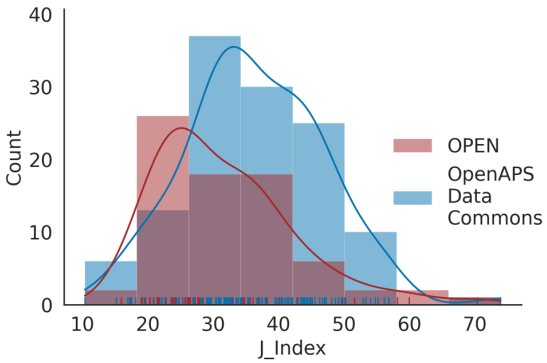
(A)


OPEN
OpenAPS Data Commons
Count
Interday Coefficient of Variation

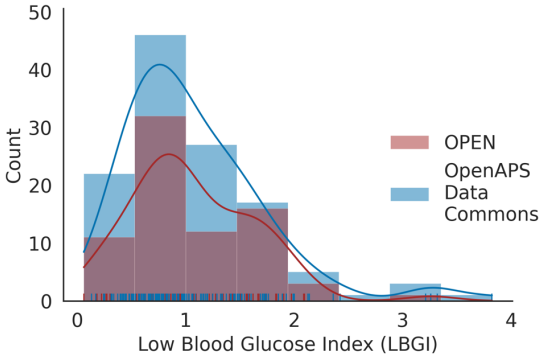
(B)


OPEN
OpenAPS Data Commons
Count
Interday Standard Deviation

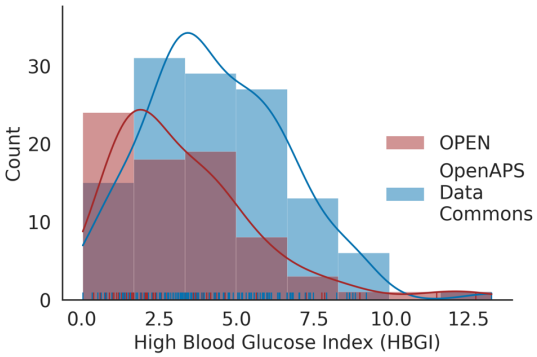
(C)


OPEN
OpenAPS Data Commons
Count
J_Index

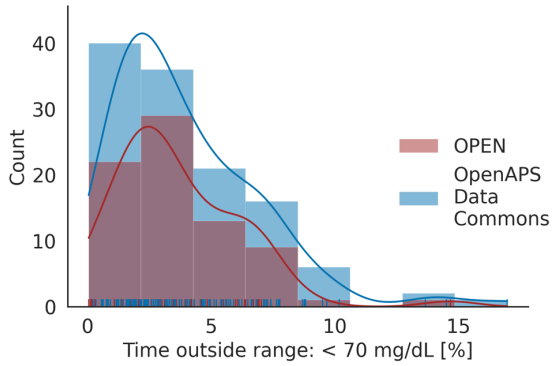
(D)


OPEN
OpenAPS Data Commons
Count
Low Blood Glucose Index (LBGI)

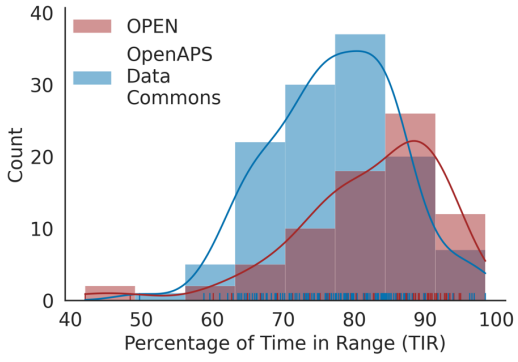
(E)


OPEN
OpenAPS Data Commons
Count
High Blood Glucose Index (HBGI)

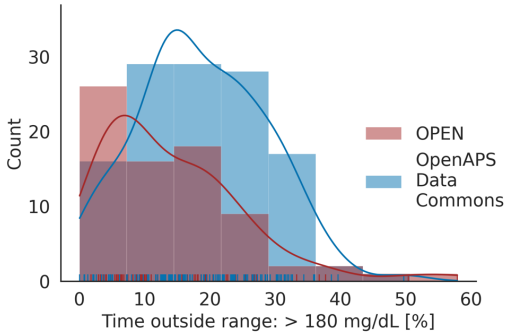
(F)



(G)



(H)



(I)

Glucose variability outcomes for individuals using open-source AID systems in each of the OPEN (n=75) and OpenAPS Data Commons (n=122) datasets. (A) GMI (B) Coefficient of Variation (CV). (C) Standard Deviation (SD). (D) J_index. (E) HBGI. (F) LBGI. (G) TOR<70. (H) TIR. (I) TOR>180