Dataset Integrity Check for The Environmental Determinants of Diabetes in the Young (TEDDY) M210 JKrischer

Prepared by NIDDK-CR
June 6, 2023

Contents

1 Standard Disclaimer

The intent of this DSIC is to provide confidence that the data distributed by the NIDDK repository is a true copy of the study data. Our intent is not to assess the integrity of the statistical analyses reported by study investigators. As with all statistical analyses of complex datasets, complete replication of a set of statistical results should not be expected in secondary analysis. This occurs for a number of reasons including differences in the handling of missing data, restrictions on cases included in samples for a particular analysis, software coding used to define complex variables, etc. Experience suggests that most discrepancies can ordinarily be resolved by consultation with the study data coordinating center (DCC), however this process is labor-intensive for both DCC and Repository staff. It is thus not our policy to resolve every discrepancy that is observed in an integrity check. Specifically, we do not attempt to resolve minor or inconsequential discrepancies with published results or discrepancies that involve complex analyses, unless NIDDK Repository staff suspect that the observed discrepancy suggests that the dataset may have been corrupted in storage, transmission, or processing by repository staff. We do, however, document in footnotes to the integrity check those instances in which our secondary analyses produced results that were not fully consistent with those reported in the target publication.

2 Study Background

The TEDDY study was designed to follow children with and without a family history of type 1 diabetes (T1D) to understand the environmental factors that contribute to the disease. Newborn children younger than 4 months were screened for high-risk HLA alleles, and those with qualifying haplotypes were eligible for follow-up. Information is collected on medical information (infections, medication, immunizations), exposure to dietary and other environmental factors, negative life events, family history, tap water, and measurements of psychological stress. Biospecimens, including blood, stool, urine, and nail clippings, are taken at baseline and follow-up study visits. The primary outcome measures include two endpoints—the first appearance of one or more islet cell autoantibodies (GADA, IAA, or IA-2A), confirmed at two consecutive visits, and development of T1D. The cohort will be followed for 15 years, or until the occurrence of one of the primary endpoints.

The M210 study sought to compare prognostic factors and characteristics of children diagnosed with T1D before 6 years of age with those diagnosed at 6-13 years of age in the TEDDY study.

3 Archived Datasets

A full listing of archived datasets included in the package can be found in the Roadmap document. All data files, as provided by the Data Coordinating Center (DCC), are located in TEDDY folder in the data package. For this replication, variables were taken from the "m_210_jkrischer_niddk_30nov2018.sas7bdat" dataset.

4 Statistical Methods

Analyses were performed to replicate results for the data in the publication by Krischer et al. [1]. To verify the integrity of the data, only descriptive statistics were computed.

5 Results

For Table 1 in the publication [1], Characteristics of TEDDY children, Table A lists the variables that were used in the replication, and Table B compares the results calculated from the archived data files to the results in Table 1. The results of the replication are an exact match to the published results.

6 Conclusions

The NIDDK Central Repository is confident that the TEDDY M210 data files to be distributed are a true copy of the study data.

7 References

[1] Krischer JP, Liu X, Lernmark Å, Hagopian WA, Rewers MJ, She JX, Toppari J, Ziegler AG, Akolkar B. Characteristics of Children Diagnosed with Type 1 Diabetes Before vs After 6 Years of Age in the TEDDY Cohort Study. Diabetologia, 64(10), 2247-2257, October 2021. doi: https://doi.org/10.1007/s00125-021-05514-3

Table A: Variables used to replicate Table 1 – Characteristics of TEDDY children

Table Variable	**dataset.variable**
Country	m_210_jkrischer_niddk_30nov2018.country
Family history	m_210_jkrischer_niddk_30nov2018.family
Sex	m_210_jkrischer_niddk_30nov2018.sex
HLA genotype	m_210_jkrischer_niddk_30nov2018.hla_5grps
Probiotics introduction age	m_210_jkrischer_niddk_30nov2018.prob_expose_bf4wk
Weight z-score at 12 months	m_210_jkrischer_niddk_30nov2018.waz
rs1004446_A (INS)	m_210_jkrischer_niddk_30nov2018.INS_yes_rs1004446_A
rs2476601_A (PTPN22)	m_210_jkrischer_niddk_30nov2018.PTPN22_yes_rs2476601_A
rs10517086_A	m_210_jkrischer_niddk_30nov2018.rs10517086_yes_A
rs2292239_T (ERBB3)	m_210_jkrischer_niddk_30nov2018.ERBB3_yes_rs2292239_T
rs3184504_T (SH2B3)	m_210_jkrischer_niddk_30nov2018.SH2B3_yes_rs3184504_T
rs12708716_G (CLEC16A)	m_210_jkrischer_niddk_30nov2018.CLEC16A_yes_rs12708716_G
rs3825932_T (CTSH)	m_210_jkrischer_niddk_30nov2018.CTSH_yes_rs3825932_T
rs7111341_T (INS)	m_210_jkrischer_niddk_30nov2018.INS_yes_rs7111341_T
rs11711054_G (CCR5)	m_210_jkrischer_niddk_30nov2018.CCR5_yes_rs11711054_G
rs428595_A (PPIL2)	m_210_jkrischer_niddk_30nov2018.PPIL2_yes_rs428595_A
rs113306148_T (PLEKHA1)	m_210_jkrischer_niddk_30nov2018.PLEKHA1_yes_rs113306148_A
rs73043122_C (RNASET2)	m_210_jkrischer_niddk_30nov2018.RNASET2_yes_rs73043122_C
Age at T1D diagnosis (years)	m_210_jkrischer_niddk_30nov2018.t1d_age_yrs
Age at persistent confirmed autoantibody (years)	m_210_jkrischer_niddk_30nov2018.ia_age_yrs
Duration of time between first-appearing autoantibody and diagnosis (years)	m_210_jkrischer_niddk_30nov2018.yrsia2t1d
Age at multiple persistent confirmed autoantibodies (years)	m_210_jkrischer_niddk_30nov2018.mia_age_yrs
Duration of time between multiple appearing autoantibodies and diagnosis (years)	m_210_jkrischer_niddk_30nov2018.yrsmia2t1d
Autoantibody status at seroconversion	m_210_jkrischer_niddk_30nov2018.persist_conf_first_combo
Persistent confirmed GADA before or at T1D diagnosis	m_210_jkrischer_niddk_30nov2018.persist_conf_gad
Persistent confirmed IAA before or at T1D diagnosis	m_210_jkrischer_niddk_30nov2018.persist_conf_miaa
Persistent confirmed IA2A before or at T1D diagnosis	m_210_jkrischer_niddk_30nov2018.persist_conf_ia2a
Persistent confirmed ZnT8A before or at T1D diagnosis	m_210_jkrischer_niddk_30nov2018.zinc_persist
DKA at T1D diagnosis	m_210_jkrischer_niddk_30nov2018.dka
Symptomatic at T1D diagnosis	m_210_jkrischer_niddk_30nov2018.symptomatic

Table B: Comparison of values computed in integrity check to reference article Table 1

Characteristic	**Pub: No T1D (n=8174)**	**DSIC: No T1D (n=8174)**	**Diff. (n=0)**	**Pub: T1D before 6 years of age (n=168)**	**DSIC: T1D before 6 years of age (n=168)**	**Diff. (n=0)**	**Pub: T1D ≥ 6 years of age (n=160)**	**DSIC: T1D ≥ 6 years of age (n=160)**	**Diff. (n=0)**
Country									
USA	3515 (43.0)	3515 (43.0)	0 (0)	47 (28.0)	47 (28.0)	0 (0)	65 (40.6)	65 (40.6)	0 (0)
Finland	1711 (20.9)	1711 (20.9)	0 (0)	54 (32.1)	54 (32.1)	0 (0)	38 (23.8)	38 (23.8)	0 (0)
Germany	542 (6.6)	542 (6.6)	0 (0)	25 (14.9)	25 (14.9)	0 (0)	7 (4.4)	7 (4.4)	0 (0)
Sweden	2406 (29.4)	2406 (29.4)	0 (0)	42 (25.0)	42 (25.0)	0 (0)	50 (31.3)	50 (31.3)	0 (0)
Family history									
FDR: Mother	315 (3.9)	315 (3.9)	0 (0)	10 (6.0)	10 (6.0)	0 (0)	13 (8.1)	13 (8.1)	0 (0)
FDR: Father	408 (5.0)	408 (5.0)	0 (0)	30 (17.9)	30 (17.9)	0 (0)	14 (8.8)	14 (8.8)	0 (0)
FDR: Sibling	123 (1.5)	123 (1.5)	0 (0)	11 (6.5)	11 (6.5)	0 (0)	12 (7.5)	12 (7.5)	0 (0)
General population	7328 (89.7)	7328 (89.7)	0 (0)	117 (69.6)	117 (69.6)	0 (0)	121 (75.6)	121 (75.6)	0 (0)
Sex									
Male	4142 (50.7)	4142 (50.7)	0 (0)	85 (50.6)	85 (50.6)	0 (0)	84 (52.5)	84 (52.5)	0 (0)
Female	4032 (49.3)	4032 (49.3)	0 (0)	83 (49.4)	83 (49.4)	0 (0)	76 (47.5)	76 (47.5)	0 (0)
HLA genotype									
DR3/4	3140 (38.4)	3140 (38.4)	0 (0)	96 (57.1)	96 (57.1)	0 (0)	82 (51.3)	82 (51.3)	0 (0)
DR4/4	1601 (19.6)	1601 (19.6)	0 (0)	20 (11.9)	20 (11.9)	0 (0)	40 (25.0)	40 (25.0)	0 (0)
DR4/8	1423 (17.4)	1423 (17.4)	0 (0)	21 (12.5)	21 (12.5)	0 (0)	24 (15.0)	24 (15.0)	0 (0)
DR3/3	1754 (21.5)	1754 (21.5)	0 (0)	18 (10.7)	18 (10.7)	0 (0)	10 (6.3)	10 (6.3)	0 (0)
FDR-specific	256 (3.1)	256 (3.1)	0 (0)	13 (7.7)	13 (7.7)	0 (0)	4 (2.5)	4 (2.5)	0 (0)
Probiotics introduction age									
≥ 28 days	7615 (93.2)	7615 (93.2)	0 (0)	153 (91.1)	153 (91.1)	0 (0)	151 (94.4)	151 (94.4)	0 (0)
< 28 days	559 (6.8)	559 (6.8)	0 (0)	15 (8.9)	15 (8.9)	0 (0)	9 (5.6)	9 (5.6)	0 (0)
Weight z-score at 12 months									
n	7460	7460	0	161	161	0	149	149	0
Mean (SD)	-0.1 (1.0)	-0.1 (1.0)	0 (0)	-0.0 (1.1)	-0.0 (1.1)	0 (0)	0.0 (1.0)	0.0 (1.0)	0 (0)
Median (IQR)	-0.1 (-0.8-0.6)	-0.1 (-0.8-0.6)	0 (0-0)	0.0 (-0.8-0.7)	0.0 (-0.8-0.7)	0 (0-0)	-0.0 (-0.6-0.7)	-0.0 (-0.6-0.7)	0 (0-0)
rs1004446_A (INS)									
No	2946 (39.5)	2946 (39.5)	0 (0)	84 (52.5)	84 (52.5)	0 (0)	73 (49.0)	73 (49.0)	0 (0)
Yes	4521 (60.5)	4521 (60.5)	0 (0)	76 (47.5)	76 (47.5)	0 (0)	76 (51.0)	76 (51.0)	0 (0)

Characteristic	Pub: No T1D (n=8174)	DSIC: No T1D (n=8174)	Diff. (n=0)	Pub: T1D before 6 years of age (n=168)	DSIC: T1D before 6 years of age (n=168)	Diff. (n=0)	Pub: T1D ≥ 6 years of age (n=160)	DSIC: T1D ≥ 6 years of age (n=160)	Diff. (n=0)
rs2476601_A (PTPN22)									
No	5979 (80.1)	5979 (80.1)	0 (0)	102 (63.8)	102 (63.8)	0 (0)	102 (68.5)	102 (68.5)	0 (0)
Yes	1488 (19.9)	1488 (19.9)	0 (0)	58 (36.3)	58 (36.3)	0 (0)	47 (31.5)	47 (31.5)	0 (0)
rs10517086_A									
No	3839 (51.4)	3839 (51.4)	0 (0)	62 (38.8)	62 (38.8)	0 (0)	73 (49.0)	73 (49.0)	0 (0)
Yes	3628 (48.6)	3628 (48.6)	0 (0)	98 (61.3)	98 (61.3)	0 (0)	76 (51.0)	76 (51.0)	0 (0)
rs2292239_T (ERBB3)									
No	3438 (46.0)	3438 (46.0)	0 (0)	52 (32.5)	52 (32.5)	0 (0)	67 (45.0)	67 (45.0)	0 (0)
Yes	4028 (54.0)	4028 (54.0)	0 (0)	108 (67.5)	108 (67.5)	0 (0)	82 (55.0)	82 (55.0)	0 (0)
rs3184504_T (SH2B3)									
No	2314 (31.0)	2314 (31.0)	0 (0)	41 (25.6)	41 (25.6)	0 (0)	43 (28.9)	43 (28.9)	0 (0)
Yes	5153 (69.0)	5153 (69.0)	0 (0)	119 (74.4)	119 (74.4)	0 (0)	106 (71.1)	106 (71.1)	0 (0)
rs12708716_G (CLEC16A)									
No	3278 (44.0)	3278 (44.0)	0 (0)	78 (48.8)	78 (48.8)	0 (0)	82 (55.0)	82 (55.0)	0 (0)
Yes	4170 (56.0)	4170 (56.0)	0 (0)	82 (51.3)	82 (51.3)	0 (0)	67 (45.0)	67 (45.0)	0 (0)
rs3825932_T (CTSH)									
No	3079 (41.2)	3079 (41.2)	0 (0)	80 (50.0)	80 (50.0)	0 (0)	75 (50.3)	75 (50.3)	0 (0)
Yes	4387 (58.8)	4387 (58.8)	0 (0)	80 (50.0)	80 (50.0)	0 (0)	74 (49.7)	74 (49.7)	0 (0)
rs7111341_T (INS)									
No	4031 (54.0)	4031 (54.0)	0 (0)	104 (65.0)	104 (65.0)	0 (0)	91 (61.1)	91 (61.1)	0 (0)
Yes	3436 (46.0)	3436 (46.0)	0 (0)	56 (35.0)	56 (35.0)	0 (0)	58 (38.9)	58 (38.9)	0 (0)
rs11711054_G (CCR5)									
No	3694 (49.5)	3694 (49.5)	0 (0)	65 (40.6)	65 (40.6)	0 (0)	69 (46.3)	69 (46.3)	0 (0)
Yes	3765 (50.5)	3765 (50.5)	0 (0)	95 (59.4)	95 (59.4)	0 (0)	80 (53.7)	80 (53.7)	0 (0)
rs428595_A (PPIL2)									
No	7134 (96.4)	7134 (96.4)	0 (0)	145 (91.8)	145 (91.8)	0 (0)	133 (92.4)	133 (92.4)	0 (0)
Yes	266 (3.6)	266 (3.6)	0 (0)	13 (8.2)	13 (8.2)	0 (0)	11 (7.6)	11 (7.6)	0 (0)
rs113306148_T (PLEKHA1)									
No	7277 (97.5)	7277 (97.5)	0 (0)	149 (93.1)	149 (93.1)	0 (0)	140 (94.0)	140 (94.0)	0 (0)
Yes	190 (2.5)	190 (2.5)	0 (0)	11 (6.9)	11 (6.9)	0 (0)	9 (6.0)	9 (6.0)	0 (0)

Characteristic	Pub: No T1D (n=8174)	DSIC: No T1D (n=8174)	Diff. (n=0)	Pub: T1D before 6 years of age (n=168)	DSIC: T1D before 6 years of age (n=168)	Diff. (n=0)	Pub: T1D ≥ 6 years of age (n=160)	DSIC: T1D ≥ 6 years of age (n=160)	Diff. (n=0)
rs73043122_C (RNASET2)									
No	7263 (97.3)	7263 (97.3)	0 (0)	151 (95.0)	151 (95.0)	0 (0)	139 (93.3)	139 (93.3)	0 (0)
Yes	202 (2.7)	202 (2.7)	0 (0)	8 (5.0)	8 (5.0)	0 (0)	10 (6.7)	10 (6.7)	0 (0)
Age at T1D diagnosis (years)									
n	-	-	-	168	168	0	160	160	0
Mean (SD)	-	-	-	3.3 (1.5)	3.3 (1.5)	0 (0)	8.9 (1.8)	8.9 (1.8)	0 (0)
Median (IQR)	-	-	-	3.1 (2.0-4.6)	3.1 (2.0-4.6)	0 (0-0)	8.7 (7.5-10.1)	8.7 (7.5-10.1)	0 (0-0)
Age at persistent confirmed autoantibody (years)									
n	499	499	0	154	154	0	138	138	0
Mean (SD)	5.1 (3.1)	5.1 (3.1)	0 (0)	1.5 (0.8)	1.5 (0.8)	0 (0)	3.5 (2.4)	3.5 (2.4)	0 (0)
Median (IQR)	4.6 (2.3-7.7)	4.6 (2.3-7.7)	0 (0-0)	1.2 (0.8-1.8)	1.2 (0.8-1.8)	0 (0-0)	2.6 (1.9-4.5)	2.6 (1.9-4.5)	0 (0-0)
Duration of time between first-appearing autoantibody and diagnosis (years)									
n	-	-	-	154	154	0	138	138	0
Mean (SD)	-	-	-	1.9 (1.4)	1.9 (1.4)	0 (0)	5.4 (2.5)	5.4 (2.5)	0 (0)
Median (IQR)	-	-	-	1.6 (0.6-2.9)	1.6 (0.6-2.9)	0 (0-0)	5.4 (3.9-6.8)	5.4 (3.9-6.8)	0 (0-0)
Age at multiple persistent confirmed autoantibodies (years)									
n	208	208	0	133	133	0	121	121	0
Mean (SD)	5.7 (3.0)	5.7 (3.0)	0 (0)	1.8 (0.9)	1.8 (0.9)	0 (0)	3.9 (2.1)	3.9 (2.1)	0 (0)
Median (IQR)	5.5 (3.1-8.4)	5.5 (3.1-8.4)	0 (0-0)	1.5 (1.1-2.2)	1.5 (1.1-2.2)	0 (0-0)	3.3 (2.3-5.1)	3.3 (2.3-5.1)	0 (0-0)
Duration of time between multiple appearing autoantibodies and diagnosis (years)									
n	-	-	-	133	133	0	121	121	0
Mean (SD)	-	-	-	1.6 (1.3)	1.6 (1.3)	0 (0)	4.9 (2.3)	4.9 (2.3)	0 (0)
Median (IQR)	-	-	-	1.3 (0.6-2.7)	1.3 (0.6-2.7)	0 (0-0)	5.1 (3.3-6.3)	5.1 (3.3-6.3)	0 (0-0)

Characteristic	Pub: No T1D (n=8174)	DSIC: No T1D (n=8174)	Diff. (n=0)	Pub: T1D before 6 years of age (n=168)	DSIC: T1D before 6 years of age (n=168)	Diff. (n=0)	Pub: T1D ≥ 6 years of age (n=160)	DSIC: T1D ≥ 6 years of age (n=160)	Diff. (n=0)
Autoantibody status at seroconversion									
None	7675 (93.9)	7675 (93.9)	0 (0)	14 (8.3)	14 (8.3)	0 (0)	22 (13.8)	22 (13.8)	0 (0)
GADA only	272 (3.3)	272 (3.3)	0 (0)	31 (18.5)	31 (18.5)	0 (0)	43 (26.9)	43 (26.9)	0 (0)
IA2A only	11 (0.1)	11 (0.1)	0 (0)	0 (0.0	0 (0.0)	0 (0)	10 (6.3)	10 (6.3)	0 (0)
IAA only	174 (2.1)	174 (2.1)	0 (0)	75 (44.6)	75 (44.6)	0 (0)	45 (28.1)	45 (28.1)	0 (0)
GADA, IA2A	5 (0.1)	5 (0.1)	0 (0)	1 (0.6)	1 (0.6)	0 (0)	3 (1.9)	3 (1.9)	0 (0)
GADA, IAA	29 (0.4)	29 (0.4)	0 (0)	36 (21.4)	36 (21.4)	0 (0)	29 (18.1)	29 (18.1)	0 (0)
IA2A, IAA	4 (0.0)	4 (0.0)	0 (0)	1 (0.6)	1 (0.6)	0 (0)	2 (1.3)	2 (1.3)	0 (0)
GADA, IA2A, IAA	4 (0.0)	4 (0.0)	0 (0)	10 (6.0)	10 (6.0)	0 (0)	6 (3.8)	6 (3.8)	0 (0)
Persistent confirmed GADA before or at T1D diagnosis									
No	-	-	-	50 (29.8)	50 (29.8)	0 (0)	45 (28.1)	45 (28.1)	0 (0)
Yes	-	-	-	118 (70.2)	118 (70.2)	0 (0)	115 (71.9)	115 (71.9)	0 (0)
Persistent confirmed IAA before or at T1D diagnosis									
No	-	-	-	22 (13.1)	22 (13.1)	0 (0)	46 (28.8)	46 (28.8)	0 (0)
Yes	-	-	-	146 (86.9)	146 (86.9)	0 (0)	114 (71.3)	114 (71.3)	0 (0)
Persistent confirmed IA2A before or at T1D diagnosis									
No	-	-	-	64 (38.1)	64 (38.1)	0 (0)	46 (28.8)	46 (28.8)	0 (0)
Yes	-	-	-	104 (61.9)	104 (61.9)	0 (0)	114 (71.3)	114 (71.3)	0 (0)
Persistent confirmed ZnT8A before or at T1D diagnosis									
No	-	-	-	104 (61.9)	104 (61.9)	0 (0)	55 (34.4)	55 (34.4)	0 (0)
Yes	-	-	-	64 (38.1)	64 (38.1)	0 (0)	105 (65.6)	105 (65.6)	0 (0)
DKA at T1D diagnosis									
No	-	-	-	151 (89.9)	151 (89.9)	0 (0)	153 (95.6)	153 (95.6)	0 (0)
Yes	-	-	-	17 (10.1)	17 (10.1)	0 (0)	7 (4.4)	7 (4.4)	0 (0)
Symptomatic at T1D diagnosis									
No	-	-	-	68 (40.5)	68 (40.5)	0 (0)	76 (47.5)	76 (47.5)	0 (0)
Yes	-	-	-	100 (59.5)	100 (59.5)	0 (0)	84 (52.5)	84 (52.5)	0 (0)

Attachment A: SAS Code

```
libname m210 "X:\NIDDK\niddk-dr_studies6\TEDDY\private_created_data\M210";

/********************/
/* TEDDY M210 DSIC */
/* Krischer et al. */
/********************/

*temp dataset;
data m210; set m210.m_210_jkrischer_niddk_30nov2018;
run;

proc contents data=m210;
run;

*Table 1;

*Country;
proc freq data=m210;
tables country*t1d_cat/norow nopercent;
run;

*family history;
proc freq data=m210;
tables family*t1d_cat/norow nopercent;
run;

*Sex;
proc freq data=m210;
tables Sex*t1d_cat/norow nopercent;
run;

*HLA genotype;
proc freq data=m210;
tables hla_5grps*t1d_cat/norow nopercent;
run;

*Probiotics introduction age;
proc freq data=m210;
tables prob_expose_bf4wk*t1d_cat/norow nopercent;
run;

*Weight z-score;
proc means data=m210 n mean std median q1 q3;
var waz;
class t1d_cat;
```

```
run;

*rs1004446_a (INS);
proc freq data=m210;
tables INS_yes_rs1004446_A*t1d_cat/norow nopercent;
run;

*PTPN22;
proc freq data=m210;
tables PTPN22_yes_rs2476601_A*t1d_cat/norow nopercent;
run;

*rs10517086_A;
proc freq data=m210;
tables rs10517086_yes_A*t1d_cat/norow nopercent;
run;

*rs2292239_T;
proc freq data=m210;
tables ERBB3_yes_rs2292239_T*t1d_cat/norow nopercent;
run;

**SH2B3;
proc freq data=m210;
tables SH2B3_yes_rs3184504_T*t1d_cat/norow nopercent;
run;

*CLEC16A;
proc freq data=m210;
tables CLEC16A_yes_rs12708716_G*t1d_cat/norow nopercent;
run;

*CTSH;
proc freq data=m210;
tables CTSH_yes_rs3825932_T*t1d_cat/norow nopercent;
run;

*INS;
proc freq data=m210;
tables INS_yes_rs7111341_T*t1d_cat/norow nopercent;
run;

*CCR5;
proc freq data=m210;
tables CCR5_yes_rs11711054_G*t1d_cat/norow nopercent;
run;

*PPIL2;
```

```
proc freq data=m210;
tables PPIL2_yes_rs428595_A*t1d_cat/norow nopercent;
run;

*PLEKHA1;
proc freq data=m210;
tables PLEKHA1_yes_rs113306148_A*t1d_cat/norow nopercent;
run;

*RNASET2;
proc freq data=m210;
tables RNASET2_yes_rs73043122_C*t1d_cat/norow nopercent;
run;

*Age at T1D diagnosis;
proc means data=m210 n mean std median q1 q3;
var t1d_age_yrs;
class t1d_cat;
run;

*Age at persistent confirmed autoantibody yrs;
proc means data=m210 n mean std median q1 q3;
var ia_age_yrs;
class t1d_cat;
run;

*duration of time between first-appearing autoantibody and diagnosis yrs;
proc means data=m210 n mean std median q1 q3;
var yrsia2t1d;
class t1d_cat;
run;

*age at mia;
proc means data=m210 n mean std median q1 q3;
var mia_age_yrs;
class t1d_cat;
run;

*duration of time between mia and diag yrs;
proc means data=m210 n mean std median q1 q3;
var yrsmia2t1d;
class t1d_cat;
run;

*Autoantibody status at seroconversion;
proc freq data=m210;
tables persist_conf_first_combo*t1d_cat/norow nopercent;
run;
```

```
*Persistent confirmed gada before or at t1d diag;
proc freq data=m210;
tables persist_conf_gad*t1d_cat/norow nopercent;
run;

*persistent confirmed IAA;
proc freq data=m210;
tables persist_conf_miaa*t1d_cat / norow nopercent;
run;

*persistent ia2a;
proc freq data=m210;
tables persist_conf_ia2a*t1d_cat/norow nopercent;
run;

*persistent znt8a;
proc freq data=m210;
tables zinc_persist*t1d_cat/norow nopercent;
run;

*DKA at t1d diag;
proc freq data=m210;
tables dka*t1d_cat/norow nopercent;
run;

*symptomatic at t1d;
proc freq data=m210;
tables symptomatic*t1d_cat/norow nopercent;
run;
```