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On Path to Informing Hierarchy of Eplet Mismatches as Determinants of Kidney Transplant Loss

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Introduction: To mitigate risks related to human leukocyte antigen (HLA) incompatibility, we assessed whether certain structurally defined HLA targets present in donors but absent from recipients, known as eplet mismatches (EMM), are associated with death-censored graft failure (DCGF).

Methods: We studied a cohort of 118,313 American 0% panel reactive antibodies (PRA) first kidney transplant recipients (2000 to 2015) from the Scientific Registry of Transplant Recipients. Imputed allele-level donor and recipient HLA-A, -B, -C, -DRB1, and -DQB1 genotypes were converted to the repertoire of EMM. We fit survival models for each EMM with significance thresholds corrected for false discovery rate and validated those in an independent PRA $>$ 0% cohort. We conducted network-based analyses to model relationships among EMM and developed models to select the subset of EMM most predictive of DCGF.

Results: Of 412 EMM observed, 119 class I and 118 class II EMM were associated with DCGF. Network analysis showed that although 210 eplets formed profiles of 2 to 12 simultaneously occurring EMMs, 202 were singleton EMMs that were not involved in any profile. A variable selection procedure identified 55 single HLA class I and II EMMs in 70% of the dataset; of those, 15 EMMs (9 singleton and 6 involved in profiles) were predictive of DCGF in the remaining dataset.

Conclusion: Our analysis distinguished increasingly smaller subsets of EMMs associated with increased risk of DCGF. Validation of these EMMs as important predictors of transplant outcomes (in contrast to acceptable EMMs) in datasets with measured allele-level genotypes will support their role as immunodominant EMMs worthy of consideration in organ allocation schemes.

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Rejection is the leading cause for premature graft loss.[1] Rejection occurs because of immune recognition of foreign targets on the donor kidney. Potent immunosuppression agents have contributed to decreased incidence of rejection. Yet, nonadherence or dose reduction of immunosuppression because of infections or cancer make patients more vulnerable to experience immune-mediated injuries.[2,3] The HLA gene complex has been established as a key component of the immune response to foreign antigens.[4] Thus, allocation schemes that optimize HLA compatibility have been promoted as a strategy to improve transplant outcomes.

HLA genes are highly polymorphic, with more than 27,000 alleles identified to date.[5] The diversity of HLA alleles enables the fine-tuning of an adaptive immune

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response; unfortunately this same diversity makes donor-recipient matching at the level of HLA alleles very challenging. While matching at the HLA allele level may not be feasible, matching at the level of HLA epitopes may be more feasible and clinically justifiable. Several algorithms have been developed to represent B-cell and T-cell epitopes on HLA. The most popular algorithm for B-cell epitopes is HLAMatchmaker.[6] HLAMatchmaker identifies polymorphic amino acid structurally defined HLA targets—eplets—located at accessible sites on HLA molecules that are recognizable by antibodies.[7] Higher EMM loads, defined as eplets included within the donor's repertoire but absent from that of the recipient, are associated with increased risk of donor-specific antibodies, rejection, and graft loss.[8–12]

We reported that antibody-verified (AbVer) eplet mismatch loads (i.e., eplets experimentally verified as targets for donor-specific antibodies) are associated with transplant glomerulopathy and graft loss.[13] At the time this article was conceived, only 83 of the HLA class II eplets were verified,[6] and we hypothesized that some HLA class II and class I eplets not yet verified by antibody reactivity may be independent predictors of graft failure. Further, we hypothesized that there may be a hierarchy across EMM in the tendency to induce immune-mediated injury and graft loss.

Studying individual EMMs as independent predictors of transplant outcomes requires careful consideration of many EMMs and the complex relatedness between them (resulting in high dimensionality). HLA genes are in linkage disequilibrium and certain eplets are shared by alleles within and across HLA loci.[14] Consequently, donor-recipient pairs may demonstrate a selection of potentially immunodominant EMMs (from hundreds of potential eplets) appearing at the population level either as singletons or as part of profiles consisting of several simultaneously occurring EMMs. To handle this high dimensionality and differentiate between specific EMMs as determinants of transplant outcomes, there is a need for large datasets with complete outcome data, allele-level donor and recipient genotyping, as well as longitudinal capture of pertinent confounders, and effect measure modifiers. In the absence of large-scale datasets with allele-level HLA genotypes, we outline a sequence of data-driven analyses to assess risk of DCGF related to singleton (single EMM) and profiles of EMM in this retrospective cohort study of the Scientific Registry of Transplant Recipients (SRTR). Such a large registry dataset, albeit necessarily reliant on imputed allele-level genotypes nonetheless provides long-term follow-up and rigorous collection of hard clinical endpoints with enough power to evaluate risk associated with hundreds of potential EMM.

METHODS

Study Design and Population

We conducted a retrospective cohort study of kidney transplant recipients (KTRs) without evidence of preformed anti-HLA antibodies (0% peak PRAs) who received primary deceased and living kidney allografts in the United States between January 1, 2000, and January 1, 2015. Multiorgan transplant recipients and KTRs with primary graft nonfunction were excluded. Frequencies of eplets were estimated in consecutive living and deceased kidney donors ($n = 169{,}416$) as well recipients ($n = 176{,}316$) included in the SRTR dataset during the same period and for whom allele-level genotypes could be imputed and eplet repertoires assigned. The McGill University Health Centre research ethics board approved this study.

Data Source

The SRTR includes data on all donors, wait-listed candidates, and transplant recipients in the United States, submitted by the members of the Organ Procurement and Transplantation Network. The Health Resources and Services Administration, U.S. Department of Health and Human Services, provides oversight to the activities of the Organ Procurement and Transplantation Network and SRTR contractors.

Allele-level HLA type imputation and EMM estimation

Allele-level donor-recipient HLA-A, -B, -C, -DRB1, and -DQB1 types were imputed from serologic HLA-A, -B, and -DRB1 types using an algorithm provided by the National Marrow Donor Program,[15,16] allele-level HLA haplotypes were imputed by maximum likelihood estimation independent of self-reported race. A Python program identified eplets included among the repertoire of donor eplets but missing from the recipient's repertoire of "self" eplets as mismatches. The entire genotype was considered when verifying eplet compatibility such that eplets shared by donor-recipient alleles of the same locus (e.g., HLA-A) or across loci (e.g., HLA-A, -B, -C) were excluded from the mismatch count. A total of 449 potential eplets (223 Class I: 72 AbVer, 151 non-AbVer; 226 Class II: 72 AbVer, 154 Non-AbVer) considered as per the HLA Epitope Registry (www.epregistry.com.br) accessed in September 2018.

Outcome Definition and Potential Confounding Variables

The primary endpoint was time to DCGF, defined as return to dialysis or re-transplantation. Baseline recipient, donor, and transplant characteristics were considered for inclusion in multivariable models.

Table 1. Baseline characteristics of 0% PRA first-time kidney transplant recipients from the U.S. Scientific Registry of Transplant Recipients

Variable		*n*	%
Recipient characteristics			
Age at transplantation (y)	0–14	4177	3.5
	15–24	6490	5.5
	25–44 (Ref)	30,478	25.8
	45–64	55,397	46.8
	≥65	21,771	18.4
Sex	Female	40,153	33.9
Self-reported race	Caucasian (Ref)	83,827	70.9
	African American	26,162	22.1
	Other	8324	7.0
Time on dialysis (mo)	*Mean, SD*	36.9	32.6
	Missing	23,288	19.7
Insurance type	None	269	0.2
	Private	49,439	41.8
	Public (Ref)	68,598	58.0
	Missing	7	0.0
Donor characteristics			
Age	36–45	27,419	23.2
	46–55	27,805	23.5
	55+	16,670	14.1
	<=35 (Ref)	46,419	39.2
Sex	Female	57,048	48.2
Self-reported race	Caucasian (Ref)	100,122	84.6
	African American	13,677	11.6
	Other	4514	3.8
Donor type	Deceased (SCD)	56,921	48.1
	Deceased (ECD)	12,750	10.8
	Living (Ref)	48,642	41.1
Transplant characteristics			
Donor-recipient weight ratio	DRWRc <0.9	45,651	38.6
	DRWRc >1	50,745	42.9
	DRWRc 0.9–1.0	14,380	12.1
	Missing	7537	6.4
Induction agent	Campath	9338	7.9
	IL2 Receptor Blocker	35,190	29.7
	Other	2435	2.1
	Thymoglobulin	41,350	35.0
	Missing	30,000	25.3
Calcineurin inhibitor	Cyclosporine	22,242	18.8
	Tacrolimus	87,924	74.3
	No CNI	8147	6.9
Steroid	Yes	110,346	93.3
Transplant era	2000–2004 (Ref)	46,061	38.9
	2005–2009	42,585	36.0
	2010–2014	29,667	25.1
Cold ischemia time (h)	*Mean, SD*	12.6	11.1
	Missing	20,232	17.1%

DRWRc, donor-recipient weight ratio; ECD, expanded criteria donor; PRA, panel reactive antibodies; Ref, references; SCD, standard criteria donor.

Recipient characteristics included age, sex, race, dialysis vintage, and insurance coverage. Donor characteristics included age, sex, race, and type. Transplant characteristics included era, induction agent, calcineurin inhibitor type, steroids (yes vs. no), and donor-recipient weight ratio (Table 1).

Statistical Analysis

Patients were followed until graft failure, death, or administratively censored on May 31, 2015. We fit Cox proportional hazards models to determine independent associations between single EMM and DCGF. Models were adjusted for recipient, donor, and transplant characteristics. To avoid bias related to exclusion of donor-recipient pairs with missing data, multiple imputation was performed using the Fully Conditional Specification method to impute missing covariate values.

Given the proportionality assumption was violated for some of the EMM models, we also fit Accelerated Failure Time (AFT) models. We compared residual plots of different distributions, calculated the Akaike Information Criterion, used log-likelihood ratios as estimators, and found that the Weibull distribution offered the best-fit to our dataset[17] in reference to 2 adjusted models: a model with covariates only (EMM excluded), and a second model including single EMM adjusted for the same covariates (Supplementary Material S1). When conducting multiple comparisons and estimating hazard ratio (HR) for DCGF from Cox and AFT models for hundreds of single EMM, we applied the Benjamini-Hochberg procedure[18] to control for false discovery rate. To ensure associations of particular EMM with risk of DCGF are not related to type 1 error, we pursued a permutation procedure,[19] showing that the *P* value estimates for the EMM associated with DCGF were, at minimum, smaller than the 99th percentile of a random distribution of *P* values estimated under the null hypothesis that the EMM have absolutely no effect on DCGF. To inform the role of eplet frequency on the observed associations with DCGF, we measured eplet distributions in donor and recipient populations.

To model the complex relatedness between HLA EMM, we applied weighted correlation network analysis.[20] We then evaluated profiles of EMM as risk factors for DCGF by fitting AFT models. A profile was deemed present only if all associated EMMs were observed in the donor-recipient pairs.

To identify a subset of EMM significantly associated with DCGF, we also applied Lasso penalized Cox regression[21–23] onto training (70%) and test (30%) datasets. This method enabled feature selection by shrinkage of the number of EMMs among several and potentially correlated EMMs. HRs of DCGF of selected EMMs were then estimated by multivariable Cox regression models while accounting for false discovery rate. A similar selection of EMMs associated with DCGF was identified when including cold ischemia time and donor type (living donor as well as standard criteria and expanded criteria deceased donor).

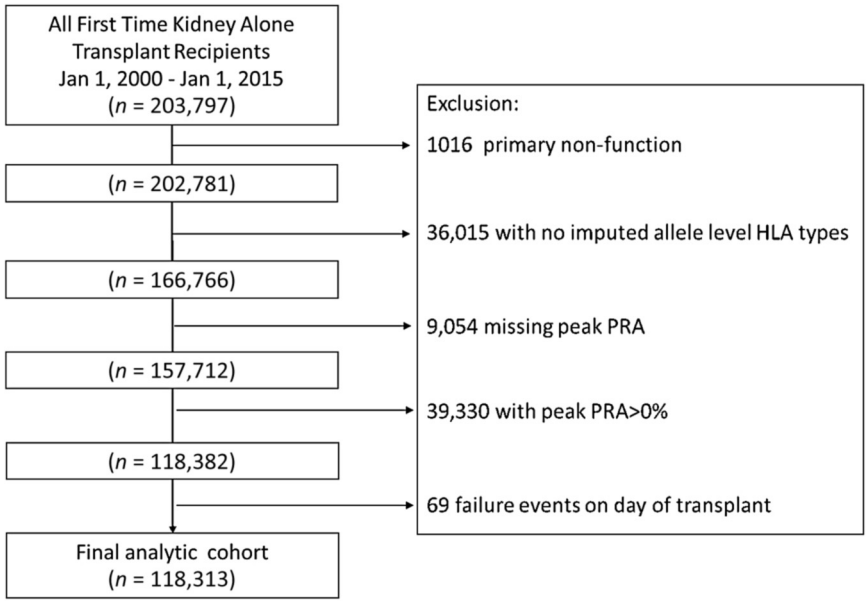


Figure 1. Study flow diagram.

Finally, we conducted sensitivity analysis to confirm the consistency of risk associated with singleton and profiles of EMM in an independent dataset of 48,384 pairs of PRA > 0% transplant recipients and their donors. In addition, given concerns that the genotype imputation may be less accurate in non-Caucasian populations,[24–26] we repeated our main analysis in a subgroup of self-reported Caucasian donor-recipient pairs. Statistical analyses were performed using the free statistical computing R software (https://www.r-project.org).

RESULTS

Following application of the exclusion criteria (Figure 1, Study Flow Diagram), a total of 118,313 first-time KTR- (January 1, 2000, and January 1, 2015) from the U.S. SRTR with peak PRA 0% were included in the cohort. Baseline characteristics of the cohort and missing covariate data are presented in Table 1. A total of 19,946 KTR experienced graft failure over a median follow-up of 6.39 (interquartile range 3.12–10.01) years.

DCGF Risk Associated With Single EMM

To evaluate whether AbVer and non-AbVer EMM was associated with DCGF we fit survival models. A total of 449 potential eplets for HLA-A, B, C, DRB1, and DQB1 appeared on the HLA Epitope Registry when accessed in September 2018. Of those, 412 EMMs were observed in the study cohort with 243 EMMs (121 class I: 46 AbVer and 75 non-AbVer, and 122 class II: 48 AbVer and 74 non-AbVer) statistically significantly associated with DCGF in Cox proportional hazards models that considered a single EMM at a time, adjusted for pertinent donor, recipient, and transplant characteristics, and controlled for false discovery rate. Given that the proportionality of hazards assumption was violated in many of the fitted Cox models for single EMM, we also fit AFT models (possible distributions of survival times can be found in Supplementary Material S1). Of the 412 EMMs observed in the study cohort, when adjusting for the same variables as the Cox models, the AFT model found 237 (119 class I [44 AbVer and 75 non-AbVer] and 118 class II [46 AbVer and 72 non-AbVer]) single EMMs that were associated with DCGF (Figure 2a and Figure 3a and b). All 237 EMMs identified by the AFT models were included within the 243 EMMs identified by the Cox model. Taken together, these survival analyses demonstrated that only half of the observed EMMs were associated with an increased risk for DCGF (Supplementary Material S2).

Frequencies of Eplets in Donor and Recipient Populations and Risk of DCGF

To assess whether DCGF risk is informed by a higher frequency of particular eplets among donors versus recipients, we assessed their frequencies in these populations. Intraclass Correlation Coefficients of 0.998 or higher were observed across eplet frequencies in the donor and recipient populations, suggesting the distribution of EMM associated with DCGF, as well as those that were not, did not segregate differently among donors and recipients (Figure 2a and Figure 3a and b).

Profiles of EMM and Risk for DCGF

Although AFT models showed that approximately half of the observed EMMs are associated with DCGF, it is

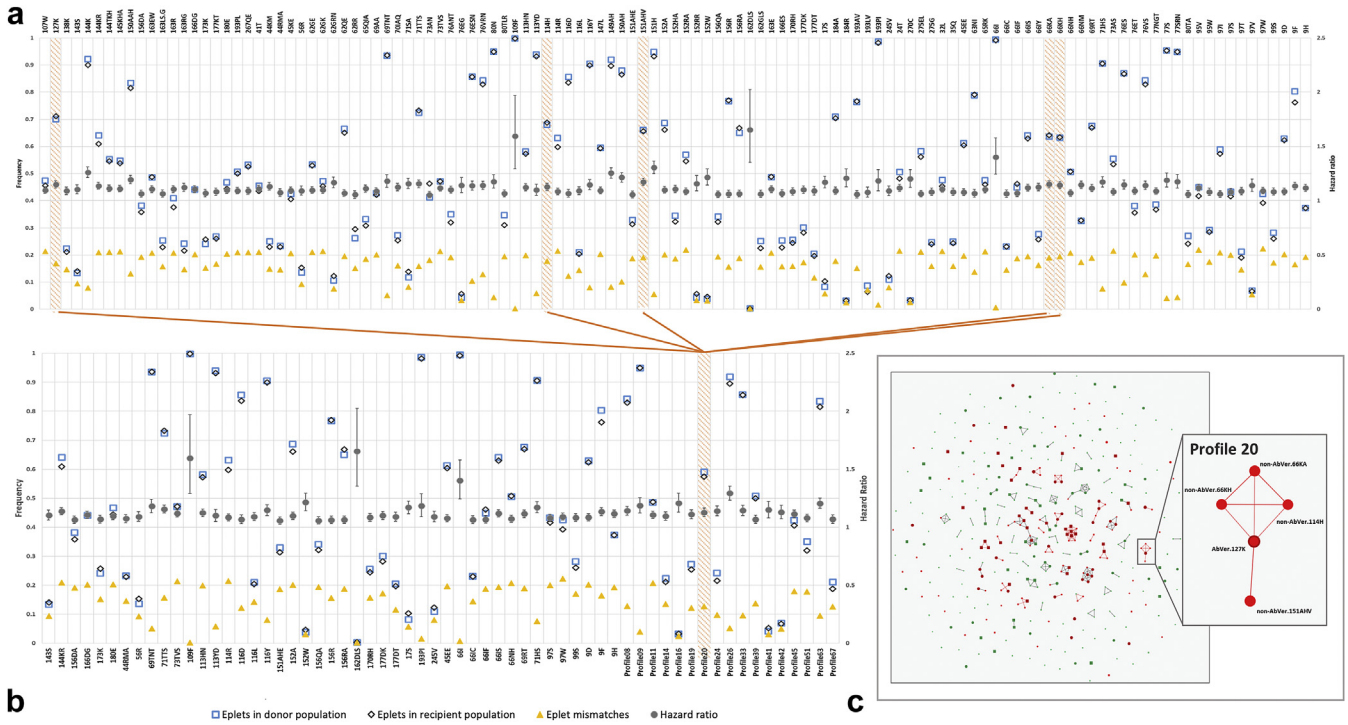


Figure 2. Human leukocyte antigen (HLA) Class I singleton and profiles of eplet mismatches associated with death-censored graft failure and their distribution in donor and recipient population. (a) Hazard ratios and 95% confidence intervals of HLA class I eplet mismatches associated with death-censored graft failure and their distribution in donor and recipient population. (b) HLA class I profiles and singleton eplet mismatches associated with death-censored graft failure and their distributions in donor and recipient populations. (c) Profile 20 associated with death-censored graft failure includes 5 antibody-verified (AbVer) and non-AbVer eplet mismatches that are also associated with graft loss. In the figure, *nodes* represent single eplet mismatches and *edges* pair together nodes of eplet mismatches that are co-represented in the studied population (Figure 5 provides detailed descriptions of profile visualization). * Models were adjusted for recipient characteristics: age, sex, time on dialysis, insurance, and cause of end-stage renal disease; donor characteristics: age, sex, and donor type; transplant characteristics: donor-recipient weight ratio, transplant era, induction agent, calcineurin inhibitor type, and steroids for maintenance immunosuppression.

possible that only a subset of these EMMs are in fact causally related to this outcome. Association of the noncausally related EMMs with DCGF may be explained by their simultaneous occurrence alongside causally related EMMs. To investigate the presence of profiles of highly correlated EMMs, we conducted weighted correlation network analysis and observed that although 202 eplets appeared as singleton mismatches, 210 appeared within a total of 67 profiles. Examples of EMM profiles are presented in Figure 2c and Figure 3d, respectively.

The observed profiles, each including 2 to 12 EMMs, segregated by HLA class such that only EMMs from the same class (I or II) formed a profile. Although some profiles included eplets from the same locus, other profiles included EMMs originating from different loci. Figure 4 shows 2 representative EMM profiles and a selection of the HLA alleles associated with them. Interestingly, only 33 of the 67 EMM profiles identified in the study cohort associated with DCGF in multivariable models adjusted for the same covariates as the models for single EMM (Supplementary Material S3). Profiles not associated with DCGF were often composed of non-AbVer EMMs that were also individually not associated with DCGF. The complete network of singleton and profiles of EMM identified across donor-recipient pairs in the SRTR cohort are presented in Figure 5.

Addressing Interrelatedness of EMMs as Determinants of DCGF

To assess whether there is a hierarchy of EMM predictive of DCGF, we applied a variable selection procedure capable of handling highly correlated variables. Using 70% of the 0% PRA cohort, the least absolute shrinkage and selection operator (Lasso) penalized Cox regression model identified a subset of 55 single EMMs, which were validated in the remaining dataset. Of those, 15 were also statistically significantly associated with DCGF in the remaining dataset when using Cox regression models adjusting for recipient, donor, and transplant characteristics and controlling for false discovery rate. These mismatches can be mapped to both HLA class I and II loci and include AbVer and previously non-AbVer EMMs (Table 2).

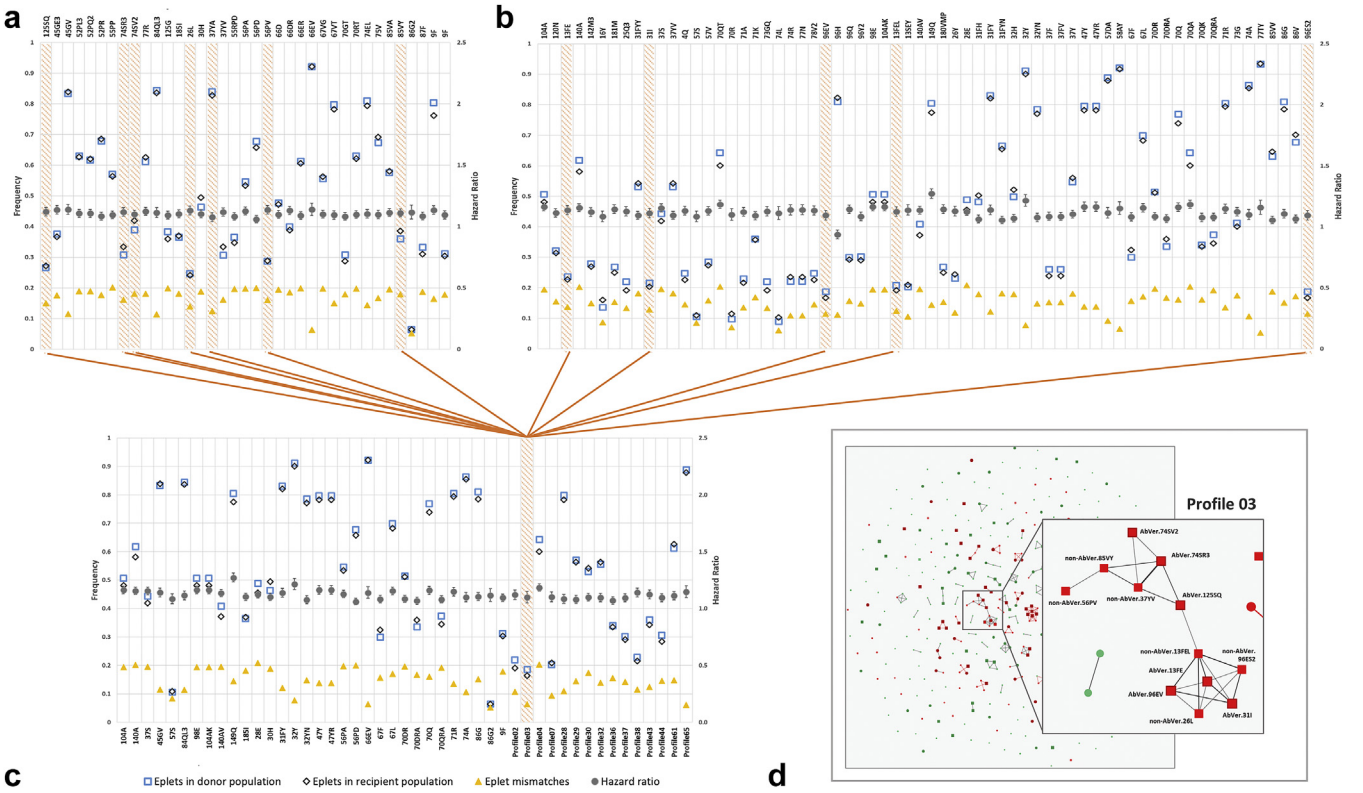


Figure 3. Selected human leukocyte antigen (HLA)-DQB1 and HLA-DRB1 singleton and profiles of eplet mismatches associated with death-censored graft failure (DCGF) and their distribution in donor and recipient populations. Hazard ratios and 95% confidence intervals of selected (a) HLA-DQB1 and (b) HLA-DRB1 eplet mismatches associated with DCGF and their distribution in donor and recipient populations. (c) HLA-DRB1/DQB1 profiles and singleton eplet mismatches associated with DCGF and their distribution in donor and recipient populations. Edges of eplet mismatch profiles also associated with DCGF are presented in red. (d) Profile 03, associated with DCGF, involves 12 antibody-verified (AbVer) and non-AbVer eplet mismatches that are also individually associated with death-censored graft failure. In the figure, *nodes* represent single eplet mismatches and *edges* pair together nodes of eplet mismatches that are significantly co-represented in the studied population (Figure 5 provides detailed descriptions of profile visualization).

* Models were adjusted for recipient characteristics: age, sex, time on dialysis, insurance, and cause of end-stage renal disease; donor characteristics: age, sex, and donor type; transplant characteristics: donor-recipient weight ratio, transplant era, induction agent, calcineurin inhibitor type, and steroids for maintenance immunosuppression.

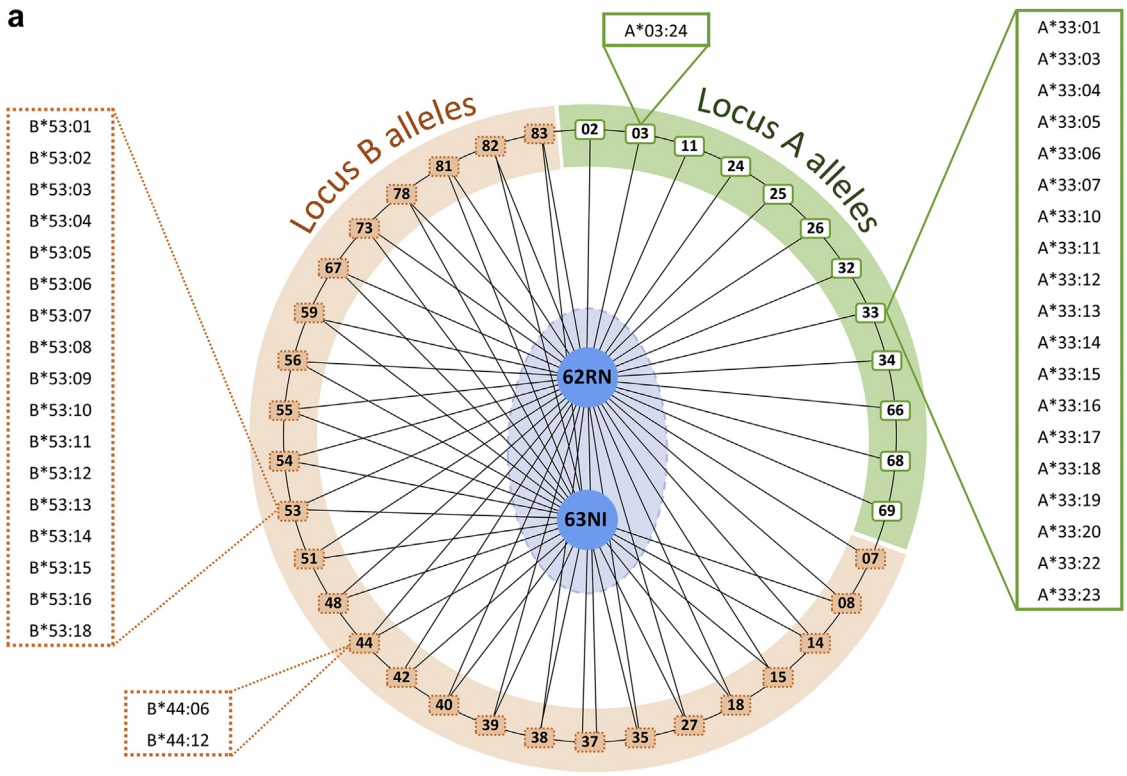
Sensitivity Analyses

To verify the robustness of our observations, we repeated the analysis in an independent cohort of KTR with PRA >0%. We found that 90% (144 of 161) of EMMs originally observed in the 0% PRA cohort were also predictive of DCGF in the PRA >0% cohort (Supplementary Material S4A). Similarly, profiles of EMM observed in the 0% PRA cohort were also observed in the PRA >0% cohort.

To address concerns of inaccurate HLA genotype assignment (and, consequently, EMM identity) when relying on imputation in multiethnic populations, we repeated the analysis in a subcohort of self-reported Caucasian KTR and donors in whom imputation is expected to predict allele-level types more accurately. Of 188 EMM associated with DCGF in the Caucasian subgroup, 165 (88%) were also associated with DCGF in the 0% PRA cohort independent of self-reported race and ethnicity (Supplementary Material S4B).

DISCUSSION

Our analysis of the SRTR data distinguished between single HLA class I and II EMM associated with an increased risk for DCGF and those that were not. Among these EMMs, in addition to the AbVer eplets, was a subset of EMMs that were not previously verified by antibodies. Frequency of EMMs associated with DCGF was not higher in donors versus recipients. Although a sizable proportion of EMMs conferred risk for DCGF as singleton mismatches, some EMMs appeared within profiles including several simultaneously occurring EMMs. Only half of these profiles were associated with an increased risk of DCGF and they were typically composed of EMMs that were also individually associated with DCGF in AFT models. Variable selection procedures informed ≥8-fold reduction in the number of EMMs (from a total of 412 EMMs observed in the study cohort to 55 EMMs identified by penalized Lasso regression of whom 49



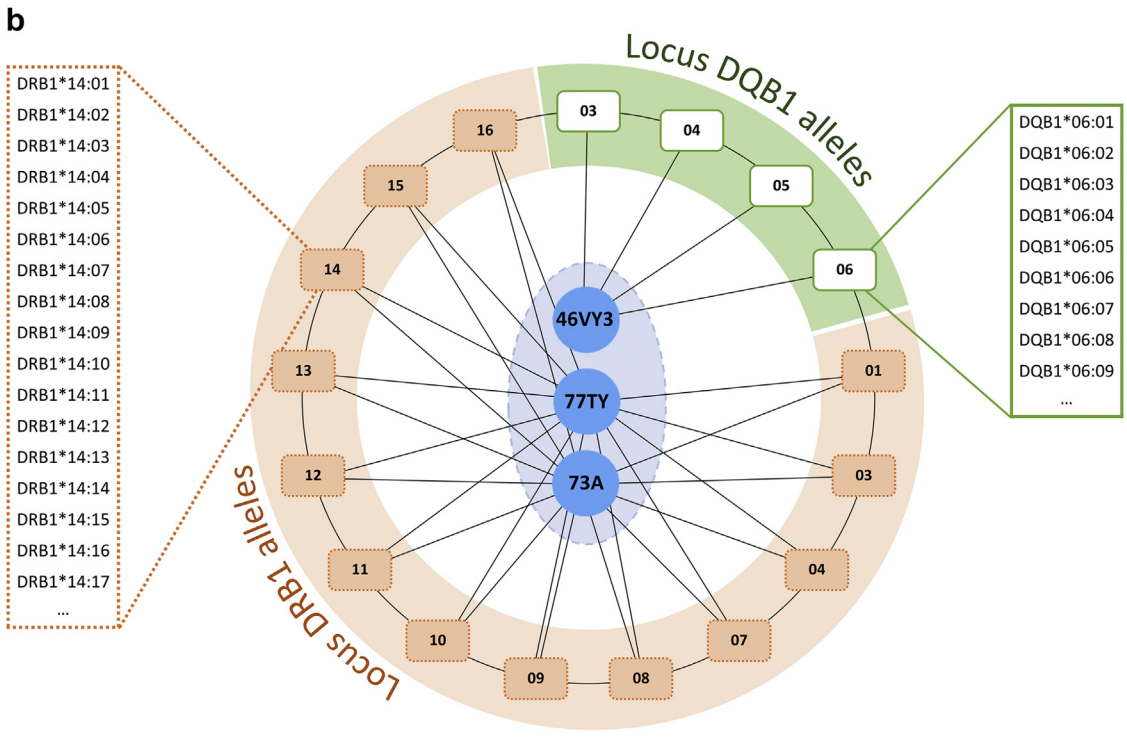


Figure 4. Examples of eplet mismatch profiles. Eplet mismatch profiles include simultaneously occurring eplet mismatches. These eplet mismatch profiles were segregated by class such that any given profile includes only eplets from human leukocyte antigen (HLA) class I or class II loci. (a) Profile 64 includes eplet mismatches non-AbVer.62RN and non-AbVer.63NI that are shared by HLA-A and HLA-B alleles. (b) Profile 46 includes the eplet mismatches AbVer.73A and non-AbVer.77TY that are shared by HLA-DRB1 alleles and AbVer.46VY3 that is shared by HLA-DQB1 alleles. AbVer, antibody verified.

* Given the large number of donor alleles that could code for each of the eplets represented in the profile, most HLA types found in association with the eplet on the HLA Epitope Registry are presented at the allele-group (first-field) level, with only a few examples of allele-level types represented in the green and orange boxes.

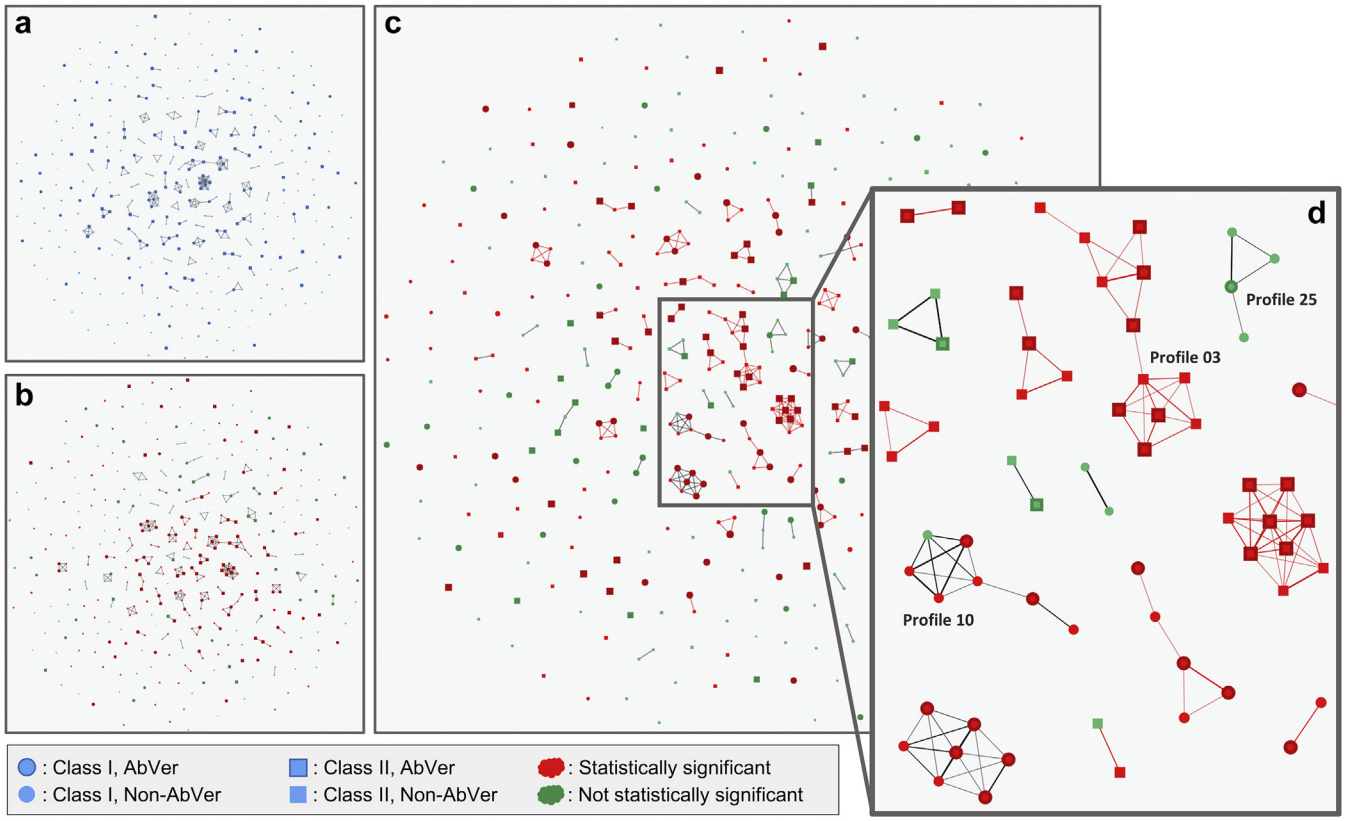


Figure 5. Profiles and singleton eplet mismatches. (a) Nodes represent single eplet mismatches. Class I and II eplet mismatches are represented by *circles* and *squares*, respectively. The *circumference* of circles and squares representing antibody-verified eplet mismatches is bolded. *Edges* pair together nodes (of eplet mismatches) that are significantly co-represented in the studied population. (b) Eplet mismatches statistically significantly associated with death-censored graft failure are represented in red. (c) Eplet mismatch profiles statistically significantly associated with death-censored graft failure have red edges connecting between nodes of eplet mismatches. (d) Eplet mismatch profiles statistically significantly associated with death-censored graft failure with eplet mismatches that have been antibody-verified are represented by bolded circumference.

were also associated with DCGF in AFT models); of those, 15 EMMs were also associated with DCGF in multivariable models corrected for false discovery rate in the remaining dataset. Our findings are expected to enable more targeted validation of high-risk EMMs as determinants of transplant outcomes. Identification of a smaller subset of EMMs that are more powerful predictors of DCGF can be studied using smaller datasets with allele-level genotypes; permit interrogation of physiochemical properties that could render them more immunogenic; and, thereafter, offer clinical justification as well as enhance feasibility of donor-recipient matching on HLA eplets.

Evidence to date has linked cumulative EMM loads with transplant outcomes.[8–13,27–32] It has been proposed that various thresholds of acceptable cumulative EMM loads could be deemed acceptable when making decisions on organ allocation. Opponents of this approach suggest that the composition of eplets giving rise to similar mismatch loads may include single EMMs of varying immunogenicity and antigenicity, rendering the risk profile insufficiently consistent to apply in clinical care.[33–37] Establishing the hierarchy of EMMs as determinants of transplant outcomes has been limited by insufficient power to study single EMMs in cohorts with allele-level HLA genotypes. This is a direct consequence of the high dimensionality and interrelatedness of EMMs. The high dimensionality results from a large number of potential EMMs. Interrelatedness of EMM stems from linkage disequilibrium between HLA loci and sharing of certain eplets by HLA of the same locus and/or across loci (e.g., HLA-A, -B, and -C). Our analysis of the SRTR data identified a subset of single AbVer and new non-AbVer EMMs associated with an increased risk of DCGF. This risk cannot be attributed to differential segregation of eplets in the donor versus recipient populations or the frequency of EMM in the analytical cohort (Figures 2 and 3) but is likely a consequence of the properties of the EMMs themselves. Although risk of DCGF is not informed by the frequency of eplets among donors versus transplant candidates, it is important to note the frequency of eplets (and profiles) when seeking to secure eplet compatibility at the time of organ allocation. Organs with higher-risk eplets that are

Table 2. Eplet mismatches identified by Lasso penalized Cox regression model, their association with death-censored graft failure and appearance as singletons or within profiles

			Selected EMM by Lasso				Selected EMM predictive of DCGF	Singleton EMM		
		EMM		Hazard Ratio		*P* value			Profiles of EMM	
Class I	AbVer	*138K*	1.016	1.061	1.108	6.92E-03			Profile 14 [a]	*Abv.138K, Abv.177KT, oth.275G, oth.35Q*
		144KR	1.030	1.072	1.116	7.21E-04	*	*		
		163R	0.981	1.021	1.064	3.04E-01			Profile 24 [a]	*Abv.163R, Abv.163RG, Abv.44KM, oth.152HA, oth.66NM*
		166DG	0.978	1.020	1.063	3.59E-01		*		
		62GRN	1.048	1.114	1.184	5.71E-04	*		Profile 42 [a]	*Abv.62GRN, Abv.71SA, oth.97V*
		69TNT	0.984	1.053	1.128	1.38E-01		*		
		71TTS	1.034	1.078	1.123	3.60E-04	*	*		
		90D	0.984	1.029	1.077	2.15E-01		*		
	Non-AbVer	*109F*	1.000	1.293	1.672	5.01E-02		*		
		113HN	1.011	1.050	1.091	1.11E-02		*		
		114Q	0.998	1.038	1.081	6.55E-02			Profile 59	oth.114Q, oth.245AS
		151AHV	1.033	1.079	1.127	6.38E-04	*		Profile 20 [a]	*Abv.127K, oth.114H, oth.151AHV, oth.66KA, oth.66KH*
		151H	1.047	1.114	1.186	6.42E-04	*		Profile 26 [a]	*Abv.144K, oth.149AH, oth.151H*
		152W	1.092	1.179	1.272	2.25E-05	*	*		
		162DLS	1.279	1.626	2.069	7.36E-05	*	*		
		170RH	0.968	1.011	1.055	6.25E-01		*		
		184R	1.020	1.112	1.212	1.58E-02			Profile 16 [a]	*oth.184R, oth.270C*
		186R	0.976	1.086	1.210	1.32E-01		*		
		193LV	0.987	1.044	1.105	1.31E-01		*		
		193PI	0.949	1.050	1.162	3.44E-01		*		
		245V	1.006	1.060	1.116	2.97E-02		*		
		66I	1.000	1.166	1.360	5.03E-02		*		
		66NM	1.007	1.058	1.113	2.64E-02			Profile 24 [a]	*Abv.163R, Abv.163RG, Abv.44KM, oth.152HA, oth.66NM*
		71HS	1.040	1.096	1.155	6.39E-04	*	*		
		76ET	1.006	1.045	1.085	2.23E-02			Profile 10	*Abv.163LS/G, Abv.80TLR, oth.162GLS, oth.166ES*, oth.199V, *oth.76ET, oth.80TA*
		76VS	1.036	1.079	1.124	2.36E-04	*		Profile 08 [a]	*Abv.76VRN, oth.76VS*
		95V	1.002	1.045	1.090	3.85E-02			Profile 13	*Abv.107W, Abv.144TKH, Abv.145KHA, Abv.62GE, Abv.62GK, oth.65RK, oth.95V*
		97T	0.992	1.037	1.085	1.11E-01			Profile 67 [a]	*oth.95W, oth.97T*
		97W	0.979	1.015	1.052	4.23E-01		*		
		9F (HLA-Class I)	0.998	1.039	1.082	6.15E-02		*		
		9H	1.017	1.054	1.093	3.98E-03		*		
Class II	AbVer	*104A* [b]	0.982	1.028	1.075	2.39E-01		*		
		40YD2	0.966	1.080	1.208	1.76E-01		*		
		45GE3	0.966	1.067	1.177	2.01E-01			Profile 43 [a]	*Abv.45GE3, oth.66D, oth.66DR, oth.73G*
		52PL3	0.990	1.030	1.071	1.42E-01			Profile 29 [a]	*Abv.52PL3,* ***Abv.55PP****, oth.66ER,* ***oth.70RT***
		57DE [b]	0.000	559.200	2.45E+84	9.47E-01		*		
		57V [b]	0.985	1.033	1.083	1.85E-01		*		
		70QT [b]	0.997	1.055	1.117	6.31E-02		*		
		70R [b]	0.984	1.047	1.113	1.45E-01			Profile 57	*Abv.70R* [b], Abv.70RE
		74L [b]	1.064	1.128	1.195	4.66E-05	*		Profile 66	*Abv.16Y, Abv.74L*, oth.189S
	Non-AbVer	*130R*	1.039	1.377	1.825	2.60E-02		*		
		149Q [b]	1.097	1.151	1.208	1.15E-08	*	*		
		26L [b] (HLA-DRB1)	1.027	1.073	1.121	1.68E-03	*	*	Profile 03	*Abv.125SQ, Abv.13FE, Abv.31I, Abv.74SR3, Abv.74SV2, Abv.96EV, oth.13FEL, oth.26L* [b] *(HLA-DRB1),* ***oth.37YV*** *(HLA-DQB1),* ***oth.56PV****,* ***oth.85VY****, oth.96ES2*
		28DHF	1.166	1.279	1.403	1.84E-07	*	*		
		28DY [b]	0.971	1.024	1.079	3.78E-01			Profile 48	oth.28D [b], oth.28DY [b]
		56PD	1.004	1.043	1.084	3.14E-02		*		
		58AY [b]	0.989	1.052	1.119	1.10E-01			Profile 65 [a]	*oth.57DA, oth.58AY* [b]
		58EEDP [b]	0.000	0.002	8.36E+78	9.48E-01		*		
		66DR	0.943	1.037	1.140	4.53E-01			Profile 43 [a]	*Abv.45GE3, oth.66D, oth.66DR, oth.73G* [b]
		66EV	0.985	1.045	1.109	1.41E-01		*		

(Continued on following page)

Table 2. (Continued)

EMM	Selected EMM by Lasso				Selected EMM predictive of DCGF	Singleton EMM	Profiles of EMM
	Hazard Ratio			*P* value			
67L[b]	1.011	1.057	1.106	1.54E-02		*	
70DK	1.066	1.169	1.281	8.56E-04	*	*	
70Q[b]	0.931	0.992	1.056	7.91E-01		*	
71R[b]	1.013	1.057	1.103	1.05E-02		*	
86G2	1.076	1.143	1.215	1.62E-05	*	*	

Abv/AbVer, antibody-verified eplet mismatches; DCGF, death-censored graft failure; EMM, eplet mismatch(es); Oth, Non-antibody-verified.
[a]Eplet mismatch profile associated with death-censored graft failure in Accelerated Failure Time models.
[b]Eplet also associated with HLA-DRB3/4/5.
Models were adjusted for recipient characteristics: age, sex, time on dialysis, insurance, and cause of end-stage renal disease; donor characteristics: age, sex, and donor type; transplant characteristics: donor-recipient weight ratio, transplant era, induction agent, calcineurin inhibitor type, and steroids for maintenance immunosuppression.
Eplet mismatches associated with death-censored graft failure in Accelerated Failure Time models accounting for false discovery rate are emphasized using *italics*.
HLA-DQB1 EMMs found to be reactive by Schawalder *et al.*[43] are **bolded**.
An asterisk (*) in the Selected EMM predictive of DCGF column highlights eplet mismatches predictive of DCGF by the least absolute shrinkage and selection operator (Lasso) penalized Cox regression model.
An asterisk (*) in the Singleton EMM column highlights eplet mismatches not involved in profiles pf eplet mismatches.

frequently observed in the population can be allocated regionally, whereas organs with higher-risk eplets that are less frequently observed in the population may benefit from coordinated national organ allocation efforts.

Only half of the EMMs observed in the analytical cohort conferred an increased risk for DCGF. These EMMs included both AbVer and previously non-AbVer EMMs. Recently, we found small effect sizes of DCGF risk by residual non-AbVer EMM loads, with most HR estimates not reaching statistical significance across the studied HLA loci excluding HLA-DRB1.[13] Indeed, our current findings suggest that more than 40 previously non-AbVer EMMs related to HLA-DRB1 locus are associated with DCGF in AFT models. Future research is needed to establish how they may contribute in detrimental humoral and/or cellular immune responses. Interestingly, some of the already AbVer EMMs did not appear to confer an increased risk for DCGF in our cohort. These findings may be explained by the level of experimental verification for each EMM recorded in the HLA Epitope Registry, which varied from verification by human monoclonal antibodies, elution/absorption, mouse monoclonal antibodies, to sera from multiparous women.[38,39] Alternatively, this discrepancy between antibody verification of EMM and association with DCGF may be related to interventions applied upon detection of donor-specific antibodies and rejection to prevent graft failure; none of which are longitudinally captured in the SRTR. Last, consistent with the hypothesis at the base of this analysis, these findings may also support the notion that not all eplets are created equal and this relates to their tendency to induce donor-specific antibodies, result in tissue injury, and/or respond to therapeutic interventions.

Importantly, association between any EMM and DCGF may be vulnerable to confounding related to other simultaneously occurring EMMs. To represent the interrelatedness between EMMs, we conducted a network-based analysis. This analysis revealed that half of the EMMs appeared as singletons, whereas half were included within profiles (Figures 2 to 5). Like EMM loads, profiles of EMM segregated by HLA class. However, distinct from traditional EMM loads, eplet profiles did not include all possible donor-recipient EMMs related to the HLA locus or class but were composed of only a subset of simultaneously occurring EMMs (informed by donor-recipient pairs in our cohort). Also, some profiles identified by the weighted correlation network analysis were composed of EMMs, all of which were individually associated with DCGF (Figure 2), but other profiles also included EMMs that were not individually associated with DCGF.

To establish which of the EMMs are most predictive of DCGF, we applied a variable selection procedure. Singleton EMMs selected by the Lasso likely represent higher-risk eplets. Consistently, most of the singleton EMMs selected by Lasso penalized regression, were also associated with DCGF in AFT models. These findings support the notion that immunodominant single EMMs may inform the risk of DCGF. In immunology, antigenic competition is observed to occur between epitopes that are either shared by the same molecule or appear on 2 different molecules. When considering T-cell responses, for example, evidence suggests that recipients recognize the dominant epitope of only one of the (mismatched) HLA-DR antigens of the donor at the time of a primary rejection episode. Competition between antigens has been observed, depending on the number of precursors available in the T-cell repertoire, the affinity of the T-cell receptor for the "immunodominant" epitope and the efficiency with which epitopes are processed and presented by host antigen-presenting cells. Immunodominance of B-cell epitopes has been observed primarily with immunity secondary

to antibody response to pathogens. Antibodies and the complexes they form with the antigen may have potent regulatory effects in quantitative and qualitative terms, with rejection subsequently resulting in a response that could spread to the other mismatched antigens.[40,41] Recognition of immunodominant epitopes, which could give rise to a primary host response, and avoidance of transplantation in this context, is expected to improve transplant outcomes.

Another important contribution of this work is the consideration of interrelatedness of EMMs. Although it is possible that EMMs selected by Lasso that are also included within profiles are themselves associated with DCGF, we cannot rule out that another eplet in the profile, or the complete EMM profile, inform risk for DCGF. Although further research is required to elucidate this point, pragmatically, our findings should allow more targeted validation of the identified subset of EMMs as important predictors of transplant outcomes using smaller cohorts of transplant recipients genotyped at the allele level. This work will also enable more detailed interrogation of the characteristics (e.g., physiochemical properties of the amino acid substitutions[42]) that may make certain EMMs more immunogenic than others. In addition, this work may prompt additional investigation into the interplay between EMMs and recipient HLA as well as the accompanying helper T-cell epitopes as determinants of immunogenicity.

Collectively, our analyses are the first to demonstrate that a subset of EMMs determines an increased risk of graft failure. Despite this novelty, it is important to acknowledge that our study relies on imputed allele-level HLA genotypes[32–34] and excludes HLA-DRB3/4/5, -DQA1, -DPA1, or -DPB1 loci.[13] Importantly, genotype assignment was done using the National Marrow Donor Program algorithm, which relies on haplotype frequencies from 21 U.S. populations.[15,16] Moreover, there is significant overlap and consistency between single EMMs associated with DCGF in self-reported Caucasian donor-recipient pairs, as well as in an independent PRA $>$ 0% cohort, lending support to the association between the observed subset of AbVer and non-AbVer EMMs with graft failure risk. Nevertheless, missing HLA types (e.g., HLA-DRB3/4/5) may result in under- or overestimation of EMMs. For example, should a subset of HLA-DRB3/4/5 donor eplets be missing from the repertoire of the recipient HLA-DRB1/3/4/5 eplets, the resultant EMMs may be underestimated. On the other hand, if by virtue of eplet sharing across HLA-DRB1/3/4/5 loci, recipient HLA-DRB3/4/5 may include some of the donor HLA-DRB1-associated eplets, resulting in overestimation of EMMs in our dataset. Finally, the repertoire of eplets, and particularly those of HLA-DQ, is in flux. Yet, several EMM identified by Lasso or AFT models were also found to be immunogenic in a cohort of 221 pregnancies with HLA-DQB1 listed EMMs. These EMMs (e.g., 55PP, 52PR, and 52PQ2 [52PQ+85VG]) are highlighted in Table 2 and Supplementary Material S2.[43] In addition, like our observation, some previously AbVer EMMs were found to be nonreactive (e.g., 28T, 46VY, and 52P), whereas other previously non-AbVer were found to be reactive (e.g., 85VA, 56PV). Validation of our observations in additional datasets from diverse populations with measured allele-level genotypes is required to support prioritizing donor-recipient matching on the higher-risk eplets identified by this study.

In conclusion, although evidence to date has linked cumulative EMM loads with transplant outcomes, eplet matching at the time of organ allocation requires a more refined appreciation of risk associated with specific EMMs. Our analysis of the SRTR is the first of this scale to distinguish between single EMMs associated with an increased risk of DCGF. Delineating the properties of single EMMs identified by these analyses that may render them more likely to result in graft failure could provide a breakthrough in efforts of the transplantation community to improve transplant outcomes by optimizing HLA compatibility. Simulations of how eplet matching could be implemented in organ allocation schemes while maximizing organ utilization and incorporating safeguards to avoid disparity in access to transplantation are needed.

DISCLOSURES

All the authors declared no competing interests.

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DISCLAIMER

The data reported here have been supplied by the Minneapolis Medical Research Foundation as the contractor for the Scientific Registry of Transplant Recipients (SRTR).

The interpretation and reporting of these data are the responsibility of the author(s) and in no way should be seen as an official policy of or interpretation by the SRTR or the U.S. government.

AUTHOR CONTRIBUTIONS

Study conception and design: HM, KO, RSP
Acquisition of data: RSP, BF
Analysis and interpretation of data: HM, KO, WZ, WK, AB, JL, YY, RSP
Drafting of manuscript: HM, RSP
Critical revision: HM, KO, WZ, WK, AB, JL, YY, BF, PK, HMG, FC, RSP

SUPPLEMENTARY MATERIAL

Supplementary File (PDF).

Material S1. Accelerated failure time models.

Material S2. Hazard ratios of death-censored graft failure by antibody-verified and non–antibody-verified eplet mismatches in the 0% PRA, PRA>0%, and Caucasian subcohorts by accelerated failure time models and connectivity scores of correlated eplet mismatches in profiles (A) and eplet mismatches appearing as singletons (B).

Material S3. Hazard ratios and confidence intervals of death-censored graft failure by observed eplet mismatch profiles.

Material S4. Relation between eplet mismatches associated with death-censored graft failure in the main analytical cohort and in sensitivity analyses.

Material S5. Members of Genome Canada Transplant Consortium.

STROBE Statement.

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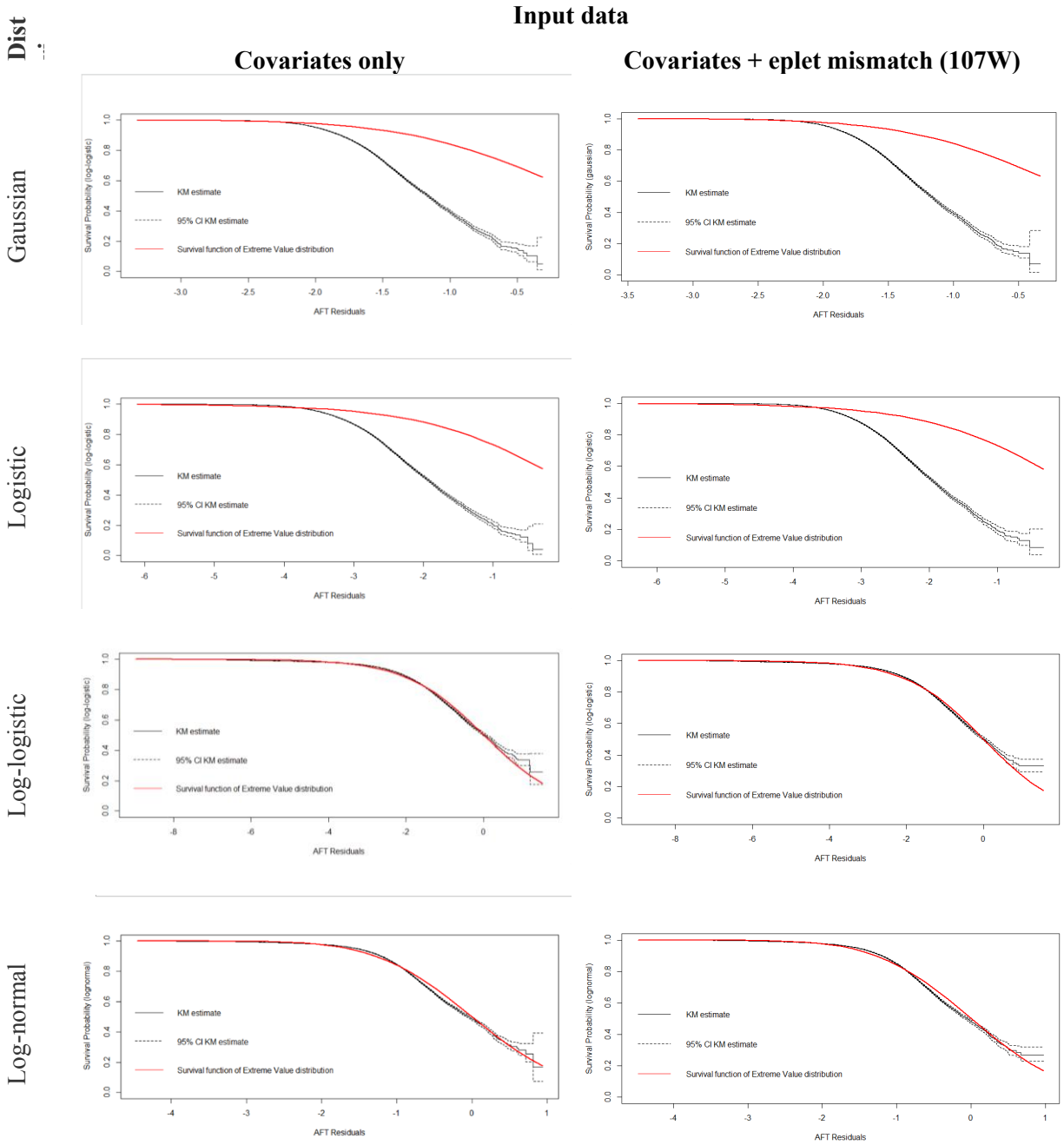
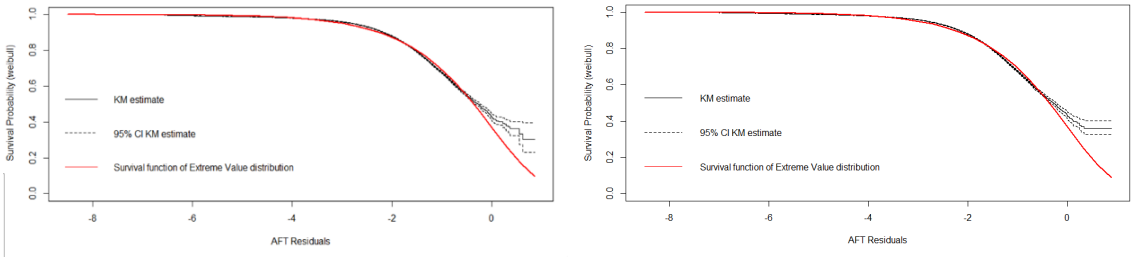
SUPPLEMENTARY MATERIAL S1: Accelerated Failure Time Models

Table a- Possible distributions of survival time. The residual plots show the assumed distributions log-logistic, log-normal, and Weibull fit the observed data.



Weibull



Abbreviations: AFT, accelerated failure time; Dist, distribution

Table b- The Weibull distribution has a slightly higher Akaike Information Criterion (AIC) socre, which makes it the best fit to the observed data.

Distribution	**Covariates only ($p = 13$)**		**Covariates + eplet mismatch (107W) ($p = 14$)**	
	Log-likelihood	**AIC**	**Log-likelihood**	**AIC**
Weibull	-89471.4	178968.8	-89457.1	178942.2
Log-normal	-90435.3	180896.6	-90423.4	180874.8
Log-logistic	-89538.9	179103.8	-89525.8	179079.6

SUPPLEMENTARY MATERIAL S2: Hazard Ratios of Death-Censored Graft Failure by Antibody-Verified and Non-Antibody Verified Eplet Mismatches in the 0% PRA, PRA>0%, and Caucasian subcohorts by Accelerated Failure Time Models and Connectivity Scores of Correlated Eplet Mismatches in Profiles (A) and Eplet Mismatches Appearing as Singletons (B).

(A)

HLA Class I eplets

EMM	AbVer	Profile	Hazard ratio			P-value	Sensitivity analysis: Meeting threshold for false discovery rate	Sensitivity analysis: PRA > 0%	Sensitivity analysis: Caucasian	Correlated EMM: EMM	Correlated EMM: AbVer	Connectivity Score
107W	*	Profile 13	1.066	1.096	1.127	6.71359E-08	*	*	*	144TKH	*	0.389
										145KHA	*	0.354
										62GE	*	0.463
										62GK	*	0.975
										65RK		0.931
										95V		0.695
127K	*	Profile 20	1.114	1.148	1.183	3.05731E-14	*	*	*	114H		0.419
										151AHV		0.500
										66KA		0.395
										66KH		0.395
138K	*	Profile 14	1.055	1.090	1.126	1.10584E-05	*	*	*	177KT	*	0.518
										275G		0.707

									35Q		0.684
144K	*	Profile 26	1.213	1.261	1.311	7.84627E-23	*	*	149AH		0.864
									151H		0.345
144TKH	*	Profile 13	1.082	1.112	1.144	3.71451E-10	*	*	*	107W	*	0.389
										145KHA	*	0.925
										62GK	*	0.381
										65RK		0.360
145KHA	*	Profile 13	1.080	1.110	1.142	6.89048E-10	*	*	*	107W	*	0.354
										144TKH	*	0.925
										62GK	*	0.347
										65RK		0.328
145RT	*	Profile 27	1.027	1.071	1.116	0.00669304				149TAH	*	0.840
149TAH	*	Profile 27	1.011	1.053	1.096	0.0381226				145RT	*	0.840
150AAH	*	Profile 63	1.157	1.195	1.234	1.84657E-19	*	*	*	150AH		0.411
163EW	*	Profile 11	1.076	1.107	1.138	3.39965E-09	*	*	*	163E		0.987
163LS.G	*	Profile 10	1.032	1.066	1.100	0.000976912	*	*	*	162GLS		0.963
										166ES		0.993
										199V		0.691
										80TA		0.378
163R	*	Profile 24	1.075	1.106	1.138	3.52383E-09	*	*	*	152HA		0.377
163RG	*	Profile 24	1.087	1.122	1.159	3.48322E-09	*	*	*	44KM	*	0.885
										66NM		0.318
177KT	*	Profile 14	1.050	1.082	1.116	2.23275E-05	*	*	*	138K	*	0.518
										275G		0.740
										35Q		0.717

193PL	*	Profile 39	1.061	1.091	1.123	2.85149E-07	*		*	267QE	*	0.750
										147L		0.348
										152RA		0.533
										73AS		0.614
193PV	*	Profile 62	0.988	1.037	1.089	0.214062794			*	184H		0.434
267QE	*	Profile 39	1.060	1.090	1.122	3.94841E-07	*	*	*	193PL	*	0.750
										147L		0.470
										152RA		0.404
										73AS		0.456
41T	*	Profile 45	1.079	1.109	1.141	1.21495E-09	*	*	*	45KE	*	0.716
										24T		0.591
										32L		0.413
44KM	*	Profile 24	1.095	1.131	1.167	2.17315E-10	*	*	*	163RG	*	0.885
										152HA		0.300
										66NM		0.354
45KE	*	Profile 45	1.064	1.095	1.126	1.42115E-07	*	*	*	41T	*	0.716
										24T		0.420
										32L		0.584
62EE	*	Profile 15	1.017	1.051	1.086	0.012866211				65GK	*	0.965
62GE	*	Profile 13	1.066	1.096	1.127	7.33881E-08	*	*	*	107W	*	0.463
										62GK	*	0.472
										65RK		0.448
										95V		0.321
62GK	*	Profile 13	1.067	1.098	1.129	4.11309E-08	*	*	*	107W	*	0.975
										144TKH	*	0.381

										145KHA	*	0.347
										62GE	*	0.472
										65RK		0.955
										95V		0.679
62GRN	*	Profile 42	1.120	1.168	1.218	1.38404E-09	*		*	71SA	*	0.749
										97V		0.363
62QE	*	Profile 23	1.039	1.070	1.101	0.000120607	*		*	275EL		0.362
										97I		0.318
65GK	*	Profile 15	1.016	1.050	1.085	0.01499784				62EE	*	0.965
65QIA	*	Profile 19	1.079	1.111	1.144	4.37766E-09	*		*	69AA	*	0.310
										70IAQ	*	0.472
										66IY		0.445
65RNA	*	Profile 56	0.942	0.979	1.017	0.354978489				66N		0.526
69AA	*	Profile 19	1.057	1.088	1.120	1.39848E-06	*		*	65QIA	*	0.310
70IAQ	*	Profile 19	1.090	1.125	1.160	4.46612E-10	*	*	*	65QIA	*	0.472
										66IY		0.947
71ATD	*	Profile 18	0.980	1.034	1.092	0.301381909				71KA		0.718
										76ED		0.429
										97N		0.708
71SA	*	Profile 42	1.112	1.158	1.206	3.20975E-09	*		*	62GRN	*	0.749
76ANT	*	Profile 51	1.069	1.101	1.133	5.39883E-08	*	*	*	77NGT		0.630
76EG	*	Profile 41	1.075	1.142	1.213	0.000322206	*	*		152RR		0.749
76ESN	*	Profile 33	1.097	1.138	1.180	5.49605E-09	*		*	76ES		0.792
76VRN	*	Profile 08	1.104	1.141	1.180	6.06197E-11	*	*		76VS		0.997
79GT	*	Profile 25	0.973	1.041	1.114	0.329601116				65RA		0.319

										80T		0.464
										80TL		0.865
80N	*	Profile 09	1.114	1.175	1.241	8.65756E-07	*			77S		0.830
										77SRN		0.996
80TLR	*	Profile 10	1.036	1.067	1.098	0.000270338	*		*	76ET		0.656
										80TA		0.394
82LR	*	Profile 52	0.979	1.011	1.044	0.5727466				81ALR		0.595
114H		Profile 20	1.094	1.127	1.161	2.55064E-11	*	*	*	127K	*	0.419
										66KA		0.524
										66KH		0.521
114Q		Profile 59	1.019	1.051	1.085	0.008821507				245AS		0.463
147L		Profile 39	1.063	1.093	1.125	2.24332E-07	*	*	*	193PL	*	0.348
										267QE	*	0.470
149AH		Profile 26	1.208	1.255	1.304	2.10905E-22	*	*		144K	*	0.864
										151H		0.358
14W		Profile 53	0.992	1.027	1.062	0.20697097				275K		0.580
150AH		Profile 63	1.172	1.215	1.259	4.73869E-19	*	*		150AAH	*	0.411
151AHV		Profile 20	1.140	1.173	1.207	2.64483E-20	*	*	*	127K	*	0.500
151H		Profile 26	1.249	1.306	1.365	4.91849E-23	*	*		144K	*	0.345
										149AH		0.358
152E		Profile 50	0.954	1.027	1.105	0.554865275				152RE		0.651
152HA		Profile 24	1.076	1.108	1.140	8.50259E-09	*	*	*	163R	*	0.377
										44KM	*	0.300
152RA		Profile 39	1.056	1.086	1.116	1.10603E-06	*		*	193PL	*	0.533
										267QE	*	0.404

									73AS		0.324
152RE	Profile 50	0.938	1.004	1.074	0.931147989				152E		0.651
152RR	Profile 41	1.090	1.158	1.230	6.53792E-05	*	*		76EG	*	0.749
162GLS	Profile 10	1.029	1.062	1.096	0.001800561	*	*	*	163LS.G	*	0.963
									166ES		0.969
									199V		0.716
									80TA		0.392
163E	Profile 11	1.075	1.106	1.137	4.69936E-09	*	*	*	163EW	*	0.987
163L	Profile 06	0.934	0.970	1.007	0.179055747				163LE		0.999
163LE	Profile 06	0.934	0.970	1.007	0.179470931				163L		0.999
166ES	Profile 10	1.034	1.067	1.101	0.000738781	*	*	*	163LS.G	*	0.993
									162GLS		0.969
									199V		0.696
									80TA		0.380
16S	Profile 22	1.003	1.049	1.097	0.080157868		*		211T		0.921
184A	Profile 12	1.059	1.091	1.124	1.48834E-06	*	*	*	193AV		0.441
									207S		0.432
184H	Profile 62	1.013	1.064	1.117	0.03621025			*	193PV	*	0.434
184R	Profile 16	1.128	1.208	1.293	5.54205E-06	*	*		270C		0.957
193AV	Profile 12	1.025	1.059	1.093	0.003654727	*	*	*	184A		0.441
									207S		0.979
199V	Profile 10	1.008	1.041	1.076	0.041870106		*		163LS.G	*	0.691
									162GLS		0.716
									166ES		0.696
									80TA		0.558

207S	Profile 12	1.020	1.053	1.088	0.008355982		*	*	184A		0.432
									193AV		0.979
211T	Profile 22	1.007	1.054	1.103	0.057096341		*		16S		0.921
245AS	Profile 59	1.005	1.036	1.067	0.053498525				114Q		0.463
24T	Profile 45	1.086	1.117	1.148	6.34543E-11	*	*	*	41T	*	0.591
									45KE	*	0.420
									32L		0.729
270C	Profile 16	1.123	1.202	1.286	8.06439E-06	*	*		184R		0.957
275EL	Profile 23	1.034	1.064	1.094	0.000292468	*	*		62QE	*	0.362
									97I		0.889
275G	Profile 14	1.048	1.081	1.115	4.46498E-05	*	*	*	138K	*	0.707
									177KT	*	0.740
									35Q		0.969
275K	Profile 53	0.996	1.030	1.064	0.147612621				14W		0.580
32L	Profile 45	1.077	1.107	1.139	2.00764E-09	*	*	*	41T	*	0.413
									45KE	*	0.584
									24T		0.729
35Q	Profile 14	1.047	1.081	1.115	4.64741E-05	*	*	*	138K	*	0.684
									177KT	*	0.717
									275G		0.969
44RM	Profile 54	0.966	1.078	1.202	0.258822784				44RME		0.561
44RME	Profile 54	0.931	1.027	1.133	0.654830868				44RM		0.561
62RN	Profile 64	1.006	1.045	1.085	0.055662732			*	63NI		0.390
63NI	Profile 64	1.032	1.067	1.104	0.001532587	*		*	62RN		0.390
65RA	Profile 25	0.961	1.047	1.141	0.376882615				79GT	*	0.319

65RK	Profile 13	1.073	1.104	1.135	6.49557E-09	*	*	*	107W	*	0.931
									144TKH	*	0.360
									145KHA	*	0.328
									62GE	*	0.448
									62GK	*	0.955
									95V		0.648
66IY	Profile 19	1.091	1.125	1.161	3.0548E-10	*	*	*	65QIA	*	0.445
									70IAQ	*	0.947
66KA	Profile 20	1.119	1.151	1.185	5.94685E-16	*	*	*	127K	*	0.395
									114H		0.524
									66KH		0.925
66KH	Profile 20	1.111	1.143	1.176	1.02833E-14	*	*	*	127K	*	0.395
									114H		0.521
									66KA		0.925
66N	Profile 56	0.923	0.962	1.003	0.123774355				65RNA	*	0.526
66NM	Profile 24	1.112	1.146	1.181	8.72481E-14	*	*	*	163RG	*	0.318
									44KM	*	0.354
71KA	Profile 18	0.981	1.032	1.086	0.310400435				71ATD	*	0.718
									76ED		0.305
									97N		0.953
73AS	Profile 39	1.052	1.082	1.112	3.37972E-06	*			193PL	*	0.614
									267QE	*	0.456
									152RA		0.324
76ED	Profile 18	0.988	1.034	1.083	0.229454032				71ATD	*	0.429
									71KA		0.305

									97N		0.300
76EN	Profile 52	0.954	0.985	1.016	0.418936703				81ALR		0.495
76ES	Profile 33	1.106	1.148	1.191	1.26771E-09	*			76ESN	*	0.792
76ET	Profile 10	1.059	1.090	1.121	7.71744E-07	*	*	*	80TLR	*	0.656
76VDT	Profile 34	1.014	1.052	1.091	0.024684723		*		77D		0.786
76VS	Profile 08	1.105	1.142	1.181	4.43275E-11	*	*		76VRN	*	0.997
77D	Profile 34	1.019	1.058	1.099	0.014280004		*		76VDT		0.786
77NGT	Profile 51	1.058	1.089	1.121	9.78427E-07	*	*	*	76ANT	*	0.630
77S	Profile 09	1.124	1.188	1.256	3.07869E-07	*			80N	*	0.830
									77SRN		0.832
77SRN	Profile 09	1.115	1.177	1.242	7.26093E-07	*			80N	*	0.996
									77S		0.832
80T	Profile 25	0.974	1.054	1.140	0.275438512				79GT	*	0.464
									80TL		0.536
80TA	Profile 10	1.027	1.059	1.093	0.002329643	*	*	*	163LS.G	*	0.378
									80TLR	*	0.394
									162GLS		0.392
									166ES		0.380
									199V		0.558
80TL	Profile 25	0.971	1.041	1.117	0.338481192				79GT	*	0.865
									80T		0.536
81ALR	Profile 52	0.960	0.991	1.023	0.635531321				82LR	*	0.595
									76EN		0.495
95V	Profile 13	1.090	1.120	1.151	1.2871E-11	*	*	*	107W	*	0.695
									62GE	*	0.321

									62GK	*	0.679
									65RK		0.648
95W	Profile 67	1.049	1.081	1.114	2.32536E-05	*		*	97T		0.312
97I	Profile 23	1.031	1.061	1.091	0.000616772	*	*		62QE	*	0.318
									275EL		0.889
97N	Profile 18	0.981	1.032	1.087	0.310287764				71ATD	*	0.708
									71KA		0.953
									76ED		0.300
97T	Profile 67	1.053	1.087	1.123	1.92025E-05	*		*	95W		0.312
97V	Profile 42	1.087	1.142	1.200	1.05835E-05	*			62GRN	*	0.363
99F	Profile 60	0.987	1.018	1.049	0.347590191				9S		0.462
9S	Profile 60	0.979	1.010	1.041	0.606054439				99F		0.462

HLA Class II eplets

EMM	AbVer	Profile	Hazard ratio			P-value	Meeting threshold for false discovery rate	Sensitivity Analysis PRA > 0%	Sensitivity Analysis Caucasian	Correlated EMM	AbVer	Connectivity Score
26L (HLA-DQB1)		Profile 58	1.019	1.053	1.088	0.008955403			*	13GM		0.466
112Y	*	Profile 49	0.955	1.021	1.092	0.610372143				57A		0.666
120N	*	Profile 37	1.079	1.113	1.149	2.18636E-08	*	*	*	96Y2	*	0.755
125SQ	*	Profile 03	1.087	1.122	1.158	1.83611E-09	*		*	74SR3	*	0.542
										13FEL		0.360
										37YV (HLA-DQB1)		0.543

13FE	*	Profile 03	1.100	1.136	1.174	1.33302E-10	*	*	*	31I	*	0.720
										96EV	*	0.445
										13FEL		0.640
										26L (HLA-DRB1)		0.355
										96ES2		0.445
142M3	*	Profile 38	1.085	1.120	1.156	5.12606E-09	*	*	*	71A	*	0.430
										96Q	*	0.754
16Y	*	Profile 66	1.042	1.085	1.130	0.000826667	*	*		74L	*	0.305
181M	*	Profile 02	1.108	1.144	1.180	1.73961E-12	*	*	*	25Q3	*	0.483
										4Q	*	0.735
										57V	*	0.426
										73GQ	*	0.483
										78V2	*	0.734
25Q3	*	Profile 02	1.090	1.127	1.165	3.61918E-09	*	*	*	181M	*	0.483
										4Q	*	0.656
										57V	*	0.389
										73GQ	*	1.000
										78V2	*	0.657
										180VMP		0.483
										37F		0.535
										37FV		0.535
25R	*	Profile 40	0.959	1.075	1.204	0.297854162				4R	*	0.388
										78Y		0.518
31FYY	*	Profile 30	1.061	1.093	1.126	7.40587E-07	*	*	*	37Y		0.818
31I	*	Profile 03	1.075	1.112	1.150	2.62437E-07	*		*	13FE	*	0.720

										96EV	*	0.615
										13FEL		0.424
										96ES2		0.615
37L	*	Profile 05	1.003	1.069	1.140	0.084354071				28EH		0.999
										38L		0.998
37YV (HLA-DRB1)	*	Profile 30	1.061	1.093	1.126	7.40587E-07	*	*	*	37Y		0.818
45EV	*	Profile 35	1.009	1.039	1.069	0.033025082		*		167H2		0.766
										55PPD		0.514
45GE3	*	Profile 43	1.104	1.137	1.172	1.20721E-12	*	*	*	66DR		0.742
										73G		0.371
46VY3	*	Profile 46	1.063	1.125	1.190	0.000579501	*			73A	*	0.307
4Q	*	Profile 02	1.096	1.132	1.169	2.15286E-10	*	*	*	181M	*	0.735
										25Q3	*	0.656
										57V	*	0.584
										73GQ	*	0.656
										78V2	*	0.997
										180VMP		0.735
										37F		0.346
										37FV		0.346
4R	*	Profile 40	1.018	1.112	1.216	0.048902754				25R	*	0.388
										181T		0.482
										78Y		0.749
52PL3	*	Profile 29	1.076	1.107	1.140	7.18169E-09	*	*		**55PP**	*	0.483
52PQ2	*	Profile 32	1.076	1.107	1.140	8.60398E-09	*		*	**52PR**	*	0.450
										67VG		0.492

										85VA		0.619
52PR	*	Profile 32	1.052	1.084	1.117	9.81873E-06	*			**52PQ2**	*	0.450
55PP	*	Profile 29	1.064	1.094	1.126	1.65412E-07	*	*		52PL3	*	0.483
										66ER		0.614
										70RT		0.503
57DE	*	Profile 01	1.025	1.064	1.104	0.005996576				58EEDP		1.000
57DEDP	*	Profile 01	1.025	1.064	1.104	0.005996576				58EEDP		1.000
57V	*	Profile 02	1.097	1.131	1.167	6.6516E-11	*	*	*	181M	*	0.426
										25Q3	*	0.389
										4Q	*	0.584
										73GQ	*	0.389
										78V2	*	0.586
										180VMP		0.426
70QT	*	Profile 04	1.151	1.184	1.217	1.69088E-23	*	*	*	70QA		1.000
70R	*	Profile 57	1.052	1.100	1.149	0.00039533	*			70RE	*	0.516
70RE	*		1.011	1.062	1.117	0.04463533				70R	*	0.516
71A	*	Profile 38	1.085	1.122	1.159	9.79302E-09	*		*	142M3	*	0.430
										96Q	*	0.320
71K	*	Profile 36	1.057	1.090	1.124	3.66987E-06	*	*	*	70QK		0.758
73A	*	Profile 46	1.088	1.147	1.210	2.05905E-05	*		*	46VY3	*	0.307
										77TY		0.707
73GQ	*	Profile 02	1.090	1.127	1.165	3.15715E-09	*	*	*	181M	*	0.483
										25Q3	*	1.000
										4Q	*	0.656
										57V	*	0.389

										78V2	*	0.657
										180VMP		0.483
										37F		0.535
										37FV		0.535
74L	*	Profile 66	1.060	1.111	1.165	0.000224722	*	*		16Y	*	0.305
										189S		0.326
74R	*	Profile 07	1.098	1.139	1.181	5.9373E-09	*	*	*	77N	*	0.999
										13SEY		0.697
										26Y		0.425
74SR3	*	Profile 03	1.085	1.119	1.153	1.89451E-09	*		*	125SQ	*	0.542
										74SV2	*	0.358
										37YV (HLA-DQB1)		1.000
										85VY		0.520
74SV2	*	Profile 03	1.070	1.102	1.135	6.59896E-08	*		*	74SR3	*	0.358
										37YV (HLA-DQB1)		0.358
77N	*	Profile 07	1.098	1.139	1.182	5.62197E-09	*	*	*	74R	*	0.999
										13SEY		0.697
										26Y		0.425
77R	*	Profile 61	1.092	1.125	1.159	4.61474E-11	*		*	75V		0.448
78V2	*	Profile 02	1.097	1.133	1.170	1.43914E-10	*	*	*	181M	*	0.734
										25Q3	*	0.657
										4Q	*	0.997
										57V	*	0.586
										73GQ	*	0.657
										180VMP		0.734

										37F		0.346
										37FV		0.346
96EV	*	Profile 03	1.055	1.093	1.133	4.08632E-05	*		*	13FE	*	0.445
										31I	*	0.615
										13FEL		0.696
										26L (HLA-DRB1)		0.383
96Q	*	Profile 38	1.108	1.143	1.179	1.60578E-12	*	*	*	142M3	*	0.754
										71A	*	0.320
96Y2	*	Profile 37	1.050	1.085	1.120	3.56953E-05	*	*	*	120N	*	0.755
104S		Profile 17	1.002	1.051	1.102	0.084244139			*	180VTP		0.802
										98K		0.955
										98KS		0.802
120S		Profile 21	0.852	0.914	0.980	0.034138283				180V		0.748
										33N		0.689
125G		Profile 44	1.063	1.094	1.125	2.66552E-07	*	*	*	55RPD		0.333
										70GT		0.367
										87F		0.513
13FEL		Profile 03	1.086	1.124	1.163	1.72818E-08	*		*	125SQ	*	0.360
										13FE	*	0.640
										31I	*	0.424
										96EV	*	0.696
										26L (HLA-DRB1)		0.550
										96ES2		0.696
13GM		Profile 58	0.998	1.034	1.071	0.124731474			*	26L (HLA-DQB1)		0.466
13SEY		Profile 07	1.096	1.137	1.180	1.09934E-08	*	*	*	74R	*	0.697

									77N	*	0.697
									26Y		0.612
167H2	Profile 35	1.008	1.037	1.068	0.037196244		*		**45EV**	*	0.766
									55PPD		0.394
167R	Profile 47	1.022	1.082	1.145	0.022450448			*	45G		0.687
180V	Profile 21	0.881	0.947	1.019	0.221282712				120S		0.748
									33N		0.922
180VMP	Profile 02	1.108	1.144	1.180	1.73961E-12	*	*	*	25Q3	*	0.483
									4Q	*	0.735
									57V	*	0.426
									73GQ	*	0.483
									78V2	*	0.734
180VTP	Profile 17	0.990	1.036	1.085	0.203545164				104S		0.802
									98K		0.765
181T	Profile 40	1.033	1.122	1.217	0.021073286		*		4R	*	0.482
									78Y		0.521
189S	Profile 66	1.013	1.069	1.128	0.040708618				74L	*	0.326
26L (HLA-DRB1)	Profile 03	1.094	1.130	1.168	4.73747E-10	*	*	*	13FE	*	0.355
									96EV	*	0.383
									13FEL		0.550
									96ES2		0.383
26Y	Profile 07	1.090	1.129	1.169	1.4857E-08	*	*	*	74R	*	0.425
									77N	*	0.425
									13SEY		0.612
28D	Profile 48	0.982	1.028	1.077	0.32102668				28DY		0.681

28DY		1.024	1.068	1.114	0.009698859		*		28D		0.681
28EH	Profile 05	1.003	1.069	1.140	0.08347733				37L	*	0.999
									38L		0.999
31FH	Profile 31	1.031	1.063	1.096	0.00091624	*	*	*	32H		0.818
									37N		0.300
32H	Profile 31	1.037	1.069	1.102	0.000293256	*	*	*	31FH		0.818
33N	Profile 21	0.880	0.948	1.021	0.238089519				120S		0.689
									180V		0.922
37F	Profile 02	1.051	1.085	1.120	2.34725E-05	*	*	*	25Q3	*	0.535
									4Q	*	0.346
									73GQ	*	0.535
									78V2	*	0.346
									37FV		1.000
37FV	Profile 02	1.051	1.085	1.120	2.4727E-05	*	*	*	25Q3	*	0.535
									4Q	*	0.346
									73GQ	*	0.535
									78V2	*	0.346
									37F		1.000
37N	Profile 31	1.009	1.040	1.072	0.034005107			*	31FH		0.300
37Y	Profile 30	1.071	1.103	1.136	5.61122E-08	*	*	*	31FYY	*	0.818
									37YV (HLA-DRB1)	*	0.818
37YA	Profile 28	1.041	1.077	1.114	0.000358565	*	*		67VT		0.481
									74EL		0.392
37YV (HLA-DQB1)	Profile 03	1.085	1.118	1.153	2.03759E-09	*		*	125SQ	*	0.543
									74SR3	*	1.000

									74SV2	*	0.358
									85VY		0.520
38L	Profile 05	1.005	1.071	1.142	0.075545483				37L	*	0.998
									28EH		0.999
45G	Profile 47	1.062	1.128	1.198	0.000977291	*		*	167R		0.687
55PPD	Profile 35	1.015	1.044	1.074	0.011341715		*		**45EV**	*	0.514
									167H2		0.394
55RPD	Profile 44	1.051	1.082	1.113	7.14191E-06	*		*	125G		0.333
									70GT		0.457
									87F		0.630
56PV	Profile 03	1.102	1.137	1.172	6.84255E-12	*		*	**85VY**		0.351
57A	Profile 49	0.948	1.010	1.075	0.799643384				112Y	*	0.666
57DA	Profile 65	1.072	1.114	1.158	4.30517E-06	*	*	*	58AY		0.376
58AY	Profile 65	1.102	1.152	1.204	1.83829E-07	*		*	57DA		0.376
58EEDP	Profile 01	1.025	1.064	1.104	0.006016435				57DE	*	1.000
									57DEDP	*	1.000
66D	Profile 43	1.067	1.099	1.131	8.94055E-08	*	*	*	66DR		0.392
66DR	Profile 43	1.099	1.131	1.165	4.08779E-12	*	*	*	45GE3	*	0.742
									66D		0.392
66ER	Profile 29	1.060	1.091	1.122	5.23614E-07	*	*		**55PP**	*	0.614
									70RT		0.828
67VG	Profile 32	1.070	1.101	1.133	3.34421E-08	*		*	**52PQ2**	*	0.492
									85VA		0.801
67VT	Profile 28	1.061	1.094	1.130	2.42542E-06	*	*		**37YA**		0.481
									74EL		0.830

70GT	Profile 44	1.051	1.082	1.115	1.24527E-05	*		*	125G		0.367
									55RPD		0.457
									87F		0.730
70QA	Profile 04	1.151	1.184	1.217	1.94259E-23	*	*	*	70QT	*	1.000
70QK	Profile 36	1.043	1.076	1.111	0.000120001	*	*		71K	*	0.758
70RT	Profile 29	1.067	1.098	1.129	8.28323E-08	*	*		**55PP**	*	0.503
									66ER		0.828
73G	Profile 43	1.090	1.123	1.157	2.21762E-10	*	*	*	45GE3	*	0.371
74EL	Profile 28	1.069	1.103	1.139	4.28655E-07	*	*		**37YA**		0.392
									67VT		0.830
75V	Profile 61	1.065	1.099	1.133	4.57064E-07	*		*	**77R**	*	0.448
77TY	Profile 46	1.102	1.158	1.217	1.19804E-06	*	*		73A	*	0.707
78Y	Profile 40	1.021	1.123	1.235	0.044770806				25R	*	0.518
									4R	*	0.749
									181T		0.521
85VA	Profile 32	1.082	1.114	1.146	6.68548E-10	*		*	**52PQ2**	*	0.619
									67VG		0.801
85VV	Profile 55	1.024	1.055	1.086	0.002983736	*		*	86V		0.534
85VY	Profile 03	1.079	1.111	1.145	4.56868E-09	*		*	74SR3	*	0.520
									37YV (HLA-DQB1)		0.520
									56PV		0.351
86V	Profile 55	1.032	1.064	1.097	0.000811866	*		*	85VV		0.534
87F	Profile 44	1.055	1.086	1.118	3.51168E-06	*	*	*	125G		0.513
									55RPD		0.630
									70GT		0.730

96ES2	Profile 03	1.055	1.093	1.133	4.08632E-05	*	*	13FE	*	0.445
								31I	*	0.615
								13FEL		0.696
								26L (HLA-DRB1)		0.383
98K	Profile 17	1.008	1.057	1.108	0.05706412		*	104S		0.955
								180VTP		0.765
								98KS		0.765
98KS	Profile 17	0.990	1.036	1.085	0.203545164			104S		0.802
								98K		0.765

^Note that eplet 52PQ2 includes former eplets 52PQ+85GV

HLA-DQB1 EMMs found to be reactive by Schawalder, L. et al. *HLA* (2020) are **bolded and underlined**.

(B)

HLA Class I eplets

EMM	AbVer	Hazard ratio			P-value	Meeting threshold for false discovery rate	Sensitivity analysis	
							PRA > 0%	Caucasian
131S	*	0.961	1.009	1.06	0.76178881			
138MI	*	0.951	0.992	1.035	0.75301287			
143S	*	1.062	1.104	1.148	2.64E-05	*	*	*
144KR	*	1.106	1.137	1.169	2.81E-14	*	*	
144QL	*	1.003	1.07	1.14	0.08463811			*
151AHA	*	0.937	0.978	1.021	0.394921			
156DA	*	1.034	1.065	1.096	0.00045936	*	*	*
158T	*	0.924	0.972	1.022	0.34838561			

161D	*	1.018	1.052	1.087	0.01139314				
163LW	*	0.974	1.007	1.04	0.74358434				
163RW	*	0.976	1.009	1.044	0.65019694				
166DG	*	1.075	1.106	1.138	4.51E-09	*	*	*	
173K	*	1.035	1.069	1.104	0.00058507	*			
180E	*	1.065	1.096	1.128	1.19E-07	*	*	*	
219W	*	1.014	1.045	1.076	0.01673449		*		
21H	*	1.015	1.045	1.076	0.01386559		*	*	
248M	*	0.975	1.024	1.076	0.41775863			*	
253Q	*	0.999	1.044	1.09	0.10943252				
44RMA	*	1.039	1.074	1.109	0.00033909	*		*	
44RT	*	1.008	1.039	1.071	0.03908603				
56R	*	1.05	1.092	1.135	0.00019629	*	*		
62LQ	*	0.973	1.023	1.077	0.45716388				
62RR	*	1.022	1.055	1.09	0.00568087	*			
65QKR	*	0.949	1.023	1.103	0.61454364				
69TNT	*	1.124	1.181	1.241	3.46E-08	*			
71TTS	*	1.121	1.156	1.192	7.63E-15	*	*	*	
73AN	*	1.023	1.055	1.087	0.00372281	*		*	
73TVS	*	1.088	1.119	1.15	3.14E-11	*		*	
76ESI	*	0.958	1.002	1.049	0.92891415				
80I	*	0.974	1.004	1.035	0.83732814			*	
80K	*	0.968	0.998	1.029	0.90963298			*	
90D	*	1.025	1.063	1.102	0.0058605				
102H		0.86	1.015	1.198	0.88079344				
103L		0.784	0.897	1.026	0.18359864				
103M		0.565	0.909	1.463	0.74218053				
105S		0.98	1.025	1.072	0.36761869			*	
109F		1.291	1.595	1.969	0.00027606	*			
113H		0.953	1.006	1.062	0.85700536				
113HD		0.984	1.014	1.045	0.44687355			*	

113HN	1.091	1.123	1.156	2.72E-11	*	*	*
113YD	1.05	1.1	1.153	0.00082619	*		
113YN	0.993	1.023	1.054	0.21655468			*
114R	1.055	1.085	1.115	1.67E-06	*	*	
116D	1.031	1.068	1.105	0.0018425	*		
116F	1.003	1.034	1.065	0.0716404			
116L	1.056	1.091	1.128	9.82E-06	*		*
116S	0.983	1.025	1.07	0.3298979			*
116Y	1.101	1.147	1.195	3.31E-08	*	*	
11AV	0.962	1.027	1.095	0.5026752			
12M	0.933	0.978	1.025	0.43267576			
145HT	0.737	0.856	0.994	0.08734305			
151AHE	1.025	1.056	1.087	0.00255844	*		
151ARV	0.939	0.987	1.038	0.67867882			
152A	1.068	1.099	1.131	4.31E-08	*	*	*
152T	0.865	0.939	1.019	0.20631016			
152V	1.023	1.124	1.236	0.04090923			
152W	1.143	1.216	1.292	1.57E-07	*		*
156L	0.583	0.811	1.127	0.29488628			
156QA	1.028	1.058	1.089	0.00141609	*		
156R	1.03	1.062	1.096	0.00142896	*		
156RA	1.034	1.065	1.097	0.00043083	*		*
156WA	0.987	1.016	1.046	0.36196767			
162DLS	1.353	1.654	2.024	3.94E-05	*		
163LG	0.45	0.88	1.723	0.75495561			
163T	0.608	1.089	1.948	0.81035652			
170RH	1.052	1.085	1.119	1.85E-05	*		*
177DK	1.068	1.101	1.135	1.78E-07	*	*	*
177DT	1.052	1.09	1.13	7.92E-05	*	*	*
17S	1.118	1.171	1.227	2.57E-08	*	*	
186R	1.049	1.143	1.245	0.01005889			

193LV	1.032	1.078	1.126	0.00453249	*			
193PI	1.09	1.185	1.288	0.00083442	*			
194V	0.935	1.012	1.095	0.80484374				
1C	1.022	1.067	1.114	0.0130848				
245TA	0.965	1.058	1.16	0.31266487				
245V	1.046	1.09	1.136	0.00063595	*			
24S	0.978	1.011	1.046	0.57945335				*
43R	0.973	1.046	1.125	0.30815206				
45EE	1.047	1.078	1.109	2.18E-05	*			*
56E	0.928	1.174	1.486	0.26147452				
59H	0.769	0.998	1.295	0.98935712				
66I	1.244	1.402	1.58	3.28E-06	*			
66IC	1.03	1.064	1.099	0.00184847	*			
66IF	1.037	1.068	1.101	0.00024444	*	*		
66IS	1.087	1.119	1.152	1.21E-10	*	*		*
66K	0.913	1.014	1.125	0.83181084				
66NH	1.042	1.072	1.103	6.01E-05	*	*		*
66NV	0.952	0.983	1.015	0.38628856				
69RA	0.985	1.021	1.057	0.34388519				
69RT	1.083	1.115	1.148	6.59E-10	*	*		*
71HS	1.125	1.172	1.222	2.40E-10	*			*
71QS	1.009	1.038	1.068	0.0303377				
71TD	0.917	0.992	1.072	0.86250871				
71TN	1.013	1.043	1.074	0.01637452				
73ID	1.009	1.053	1.099	0.04622399		*		
74Y	0.992	1.037	1.085	0.17622271				
77N	0.888	0.931	0.977	0.01488239				
91R	0.972	1.019	1.069	0.50454543				
94I	0.998	1.029	1.06	0.1204981				
95F	0.938	1.013	1.094	0.78658176				
95I	0.882	0.939	1	0.10224501				

95L		0.624	0.847	1.15	0.37252227			
97M		0.983	1.012	1.043	0.49380375			
97R		0.772	0.954	1.181	0.71841127			
97S		1.05	1.08	1.112	1.09E-05	*	*	*
97W		1.062	1.091	1.122	1.67E-07	*		*
99S		1.05	1.083	1.116	1.71E-05	*		*
9D		1.054	1.085	1.116	2.56E-06	*		*
9H		1.085	1.116	1.149	3.55E-10	*	*	*
9T		1.006	1.043	1.081	0.05649226			

HLA Class II eplets

EMM	AbVer	Hazard ratio			P-value	Meeting threshold for false discovery rate	Sensitivity analysis	
							PRA > 0%	Caucasian
30G		1.006	1.056	1.108	0.062398307		*	
9F		1.101	1.135	1.169	5.06632E-12	*		*
9Y		1.071	1.140	1.213	0.000550239	*		
104A	*	1.130	1.163	1.197	3.20651E-18	*	*	*
11STS	*	0.991	1.022	1.055	0.243722611			
13FEY	*	1.052	1.131	1.216	0.005269009	*		
140A	*	1.123	1.155	1.188	2.8886E-17	*	*	*
140A2	*	1.022	1.059	1.097	0.007381652			*
140TV	*	0.975	1.016	1.058	0.52642469		*	
149H	*	0.980	1.014	1.048	0.504175308			
28H	*	1.052	1.131	1.216	0.005269009	*		
37S	*	1.122	1.154	1.188	1.16718E-16	*	*	*
40YD2	*	1.121	1.213	1.312	5.40626E-05	*		
45GV	*	1.101	1.140	1.181	7.99269E-10	*		*
47F	*	0.977	1.009	1.041	0.646934043			
55RL3	*	1.021	1.065	1.112	0.01554278			

57S	*	1.041	1.084	1.129	0.001009198	*			
70D	*	0.936	0.966	0.997	0.070550158				
70DA	*	0.969	0.999	1.030	0.941763837				
77T	*	0.930	1.022	1.124	0.701362992				
84QL3	*	1.076	1.114	1.155	4.86127E-07	*	*		
85A	*	1.027	1.079	1.134	0.011164776				
96H	*	0.900	0.936	0.972	0.004581586	*			
96HK	*	0.980	1.014	1.048	0.504175308				
96QK2	*	1.121	1.213	1.312	5.40626E-05	*			
98E	*	1.130	1.163	1.197	3.20651E-18	*	*	*	
104AK		1.130	1.163	1.197	3.20651E-18	*	*	*	
108P		0.278	1.439	7.459	0.715687846				
112H		0.767	1.074	1.503	0.726649073				
116V		0.975	1.036	1.101	0.332445988				
130R		1.402	1.770	2.235	5.55111E-05	*			
135D		3.668	11.749	37.629	0.000498637	*		Not observed	
13SE		0.991	1.022	1.055	0.243722611				
13SEF		0.993	1.024	1.055	0.206265415				
140AV		1.104	1.136	1.169	1.67922E-13	*	*	*	
149Q		1.233	1.271	1.311	2.18248E-37	*	*	*	
16H		0.906	1.017	1.142	0.808546013				
185I		1.071	1.103	1.137	4.69998E-08	*	*	*	
185T		0.954	1.010	1.069	0.768856995				
189R		0.964	1.115	1.288	0.217612779				
23L		0.820	0.901	0.990	0.06997654				
23R		0.326	0.681	1.421	0.38983362				
25RF		0.971	1.011	1.052	0.661800987				
26F		0.913	0.960	1.010	0.186905677				
28DHF		1.226	1.323	1.426	1.19036E-09	*	*		
28E		1.093	1.124	1.156	5.35187E-12	*	*	*	
28EY		1.000	1.051	1.105	0.098008997				

30G	1.052	1.131	1.216	0.005269009	*		
30H	1.071	1.103	1.136	3.34054E-08	*		*
30Y	0.956	1.017	1.082	0.656346448			
31F	0.792	0.875	0.967	0.027354577			
31FY	1.099	1.138	1.177	5.50326E-10	*	*	*
31FYN	1.024	1.055	1.087	0.003354475	*	*	*
32Y	1.167	1.215	1.266	1.79143E-15	*	*	*
32YN	1.043	1.077	1.112	0.00016325	*		*
37D2	2.586	13.411	69.544	0.009472021		Not observed	Not observed
38A	1.121	1.213	1.312	5.40626E-05	*		
38V	0.705	0.859	1.046	0.204957242			
3P4	0.948	1.020	1.097	0.653238022			
3S	0.377	0.607	0.976	0.083607473			
40F	0.317	0.621	1.215	0.242797035			
47Y	1.127	1.164	1.202	9.71022E-15	*	*	*
47YR	1.127	1.164	1.202	9.71022E-15	*	*	*
55PPA	1.003	1.039	1.076	0.070414478			*
56P	0.951	1.114	1.304	0.262393604			
56PA	1.096	1.127	1.160	5.29432E-12	*	*	*
56PD	1.030	1.060	1.091	0.000803132	*	*	
56PS	0.994	1.056	1.121	0.137375193			
57D	0.967	1.019	1.074	0.549243228			
58A	1.122	1.240	1.370	0.000400846	*		
60Y	0.978	1.046	1.119	0.272625239			
66EV	1.090	1.139	1.192	1.61372E-06	*	*	*
67F	1.048	1.081	1.116	4.17586E-05	*	*	
67I	1.007	1.037	1.067	0.041533836			*
67L	1.121	1.155	1.190	2.44849E-15	*	*	*
70DK	1.130	1.217	1.310	1.23328E-05	*		
70DR	1.054	1.085	1.116	3.42681E-06	*		*
70DRA	1.034	1.067	1.100	0.000577209	*	*	

70Q	1.125	1.160	1.195	9.75845E-16	*	*	*
70QE	0.910	0.957	1.005	0.141683442			
70QKA	0.969	1.009	1.050	0.710822676			
70QRA	1.049	1.080	1.112	1.60125E-05	*		*
71E	1.012	1.048	1.085	0.026992114			
71R	1.111	1.148	1.187	3.6218E-12	*	*	*
74A	1.060	1.100	1.141	1.85491E-05	*	*	*
74E	0.993	1.032	1.071	0.174101721			
85V	0.812	0.975	1.169	0.817170221			
86G	1.071	1.105	1.141	1.83609E-07	*	*	*
86G2	1.062	1.117	1.174	0.000290078	*		
98KN	1.121	1.213	1.312	5.40626E-05	*		
9F	1.063	1.095	1.128	5.25288E-07	*		*

^Note that eplet 52PQ2 includes former eplets 52PQ+85GV
HLA-DQB1 EMMs found to be reactive by Schawalder, L. et al. *HLA* (2020) are **bolded and underlined**.

SUPPLEMENTARY MATERIAL S3: Hazard Ratios and Confidence Intervals of Death-Censored Graft Failure by Observed Eplet Mismatch Profiles

HLA Class I Eplet Mismatch Profiles

EMM Profile	Class	EMM	Hazard ratio	Meeting threshold for false discovery rate	P-value	Examples of donor alleles informing eplet combinations that could give rise to the EMM profiles (when not present in recipient)
Profile 06	Class I	oth.163L, oth.163LE	$^{0.934}$ 0.970 $^{1.007}$	No	0.179321	B*07:20, B*15:14, B*35:45, B*35:71, B*44:02, B*44:03, B*44:05, B*44:06, B*44:07, B*44:08, B*44:09, B*44:10, B*44:11, B*44:12, B*44:13, B*44:14, B*44:15, B*44:17, B*44:18, B*44:20, B*44:22, B*44:24, B*44:25, B*44:26, B*44:27, B*44:28, B*44:29, B*44:30, B*44:32, B*44:33, B*44:34, B*44:35, B*44:36, B*44:38, B*44:39, B*44:40, B*44:41, B*44:43, B*44:44, B*44:45, B*44:46, B*44:47, B*44:48, B*44:49, B*44:50, B*44:51, B*44:53, B*44:54, B*44:55, B*44:57, B*44:59, B*44:60, B*44:62, B*44:63, B*44:65, B*44:66, B*44:67, B*44:69, B*45:01, B*45:02, B*45:03, B*45:05, B*45:06, B*45:07, B*45:09, B*46:17, B*50:02, B*51:03, B*51:23, B*51:42, B*57:07, B*58:07, B*82:01, B*82:02, B*83:01
Profile 08	Class I	Abv.76VRN, oth.76VS	$^{1.104}$ 1.142 $^{1.180}$	Yes	5.21E-11	B*07:13, B*07:15, B*08:15, B*18:06, B*35:74, B*39:27, B*40:73, B*46:01, B*46:02, B*46:03, B*46:04, B*46:05, B*46:06, B*46:08, B*46:09, B*46:10, B*46:11, B*46:12, B*46:13, B*46:14, B*46:16, B*46:17, B*46:18, B*55:03, B*67:02, C*01:02, C*01:03, C*01:04, C*01:05, C*01:06, C*01:07, C*01:08, C*01:09, C*01:10, C*01:11, C*01:12, C*01:13, C*01:15, C*01:16, C*01:17, C*01:18, C*01:20, C*01:21, C*01:22, C*01:23, C*01:24, C*01:25, C*01:26, C*01:27, C*02:27, C*03:02, C*03:03, C*03:04, C*03:05, C*03:06, C*03:08, C*03:09, C*03:11, C*03:12, C*03:13, C*03:14, C*03:16, C*03:17, C*03:18, C*03:19, C*03:21, C*03:22, C*03:23, C*03:24, C*03:25, C*03:26, C*03:27, C*03:28, C*03:30, C*03:31, C*03:32, C*03:33, C*03:34, C*03:35, C*03:36, C*03:37, C*03:38, C*03:39, C*03:40, C*03:41, C*03:42, C*03:43, C*03:44, C*03:46, C*03:47, C*03:48, C*03:49, C*03:50, C*03:57, C*03:58, C*04:11, C*04:29, C*04:36, C*06:11, C*07:01, C*07:02, C*07:03, C*07:04, C*07:05, C*07:06, C*07:08, C*07:10, C*07:11, C*07:12, C*07:13, C*07:14, C*07:15, C*07:16, C*07:17, C*07:18, C*07:19, C*07:20, C*07:21, C*07:22, C*07:23, C*07:24, C*07:25, C*07:26, C*07:27, C*07:28, C*07:29, C*07:30, C*07:31, C*07:35, C*07:36, C*07:37, C*07:38, C*07:39, C*07:40, C*07:41, C*07:42, C*07:43, C*07:44, C*07:45, C*07:46, C*07:47, C*07:48, C*07:50, C*07:51, C*07:52, C*07:53, C*07:54, C*07:56, C*07:57, C*07:58, C*07:59, C*07:60,

							C*07:62, C*07:63, C*07:64, C*07:66, C*07:67, C*07:68, C*07:69, C*07:70, C*07:71, C*07:72, C*08:01, C*08:02, C*08:03, C*08:04, C*08:05, C*08:06, C*08:07, C*08:08, C*08:09, C*08:11, C*08:12, C*08:13, C*08:14, C*08:15, C*08:16, C*08:17, C*08:18, C*08:19, C*08:20, C*08:21, C*08:22, C*08:23, C*12:02, C*12:03, C*12:06, C*12:08, C*12:10, C*12:11, C*12:13, C*12:14, C*12:15, C*12:16, C*12:17, C*12:18, C*12:19, C*12:20, C*14:02, C*14:03, C*14:05, C*14:06, C*14:08, C*14:09, C*14:10, C*14:11, C*15:07, C*16:01, C*16:04, C*16:06, C*16:07, C*16:08, C*16:10, C*16:11
Profile 09 Class I	Abv.80N, oth.77S, oth.77SRN	1.122	1.187	1.255	Yes	4.32E-07	B*07:02, B*07:03, B*07:04, B*07:05, B*07:06, B*07:07, B*07:08, B*07:09, B*07:10, B*07:12, B*07:13, B*07:14, B*07:15, B*07:16, B*07:17, B*07:18, B*07:19, B*07:20, B*07:21, B*07:22, B*07:23, B*07:24, B*07:25, B*07:26, B*07:28, B*07:29, B*07:30, B*07:31, B*07:32, B*07:33, B*07:34, B*07:35, B*07:37, B*07:39, B*07:40, B*07:41, B*07:42, B*07:43, B*07:44, B*07:45, B*07:46, B*07:47, B*07:48, B*07:50, B*07:51, B*07:52, B*07:53, B*07:54, B*07:55, B*07:56, B*07:58, B*07:59, B*07:60, B*07:61, B*07:62, B*07:63, B*07:64, B*07:65, B*07:66, B*07:68, B*07:69, B*07:70, B*07:71, B*07:72, B*07:76, B*08:01, B*08:04, B*08:05, B*08:07, B*08:09, B*08:10, B*08:11, B*08:12, B*08:13, B*08:14, B*08:15, B*08:16, B*08:18, B*08:20, B*08:21, B*08:22, B*08:23, B*08:24, B*08:25, B*08:26, B*08:27, B*08:28, B*08:29, B*08:31, B*08:32, B*08:33, B*08:34, B*08:35, B*08:37, B*08:38, B*08:40, B*13:09, B*14:01, B*14:02, B*14:03, B*14:04, B*14:05, B*14:06, B*14:08, B*14:09, B*14:10, B*15:01, B*15:02, B*15:03, B*15:04, B*15:05, B*15:06, B*15:07, B*15:08, B*15:09, B*15:10, B*15:101, B*15:102, B*15:103, B*15:104, B*15:105, B*15:106, B*15:107, B*15:108, B*15:109, B*15:11, B*15:110, B*15:112, B*15:113, B*15:114, B*15:116, B*15:117, B*15:118, B*15:119, B*15:12, B*15:120, B*15:121, B*15:122, B*15:123, B*15:124, B*15:125, B*15:126, B*15:127, B*15:128, B*15:129, B*15:131, B*15:132, B*15:133, B*15:134, B*15:136, B*15:137, B*15:138, B*15:139, B*15:14, B*15:140, B*15:141, B*15:142, B*15:143, B*15:144, B*15:145, B*15:146, B*15:147, B*15:148, B*15:15, B*15:150, B*15:151, B*15:152, B*15:153, B*15:154, B*15:155, B*15:156, B*15:158, B*15:159, B*15:160, B*15:18, B*15:19, B*15:20, B*15:21, B*15:25, B*15:27, B*15:28, B*15:29, B*15:30, B*15:31, B*15:32, B*15:33, B*15:34, B*15:35, B*15:37, B*15:38, B*15:39, B*15:40, B*15:42, B*15:44, B*15:45, B*15:46, B*15:47, B*15:48, B*15:49, B*15:50, B*15:51, B*15:52, B*15:53, B*15:54, B*15:55, B*15:56, B*15:58, B*15:60, B*15:61, B*15:62, B*15:63, B*15:64, B*15:65, B*15:66, B*15:68, B*15:69, B*15:70, B*15:71, B*15:72, B*15:73, B*15:74, B*15:75, B*15:76, B*15:77, B*15:78, B*15:80, B*15:81, B*15:82, B*15:83, B*15:84, B*15:85, B*15:86, B*15:88, B*15:90, B*15:91, B*15:92, B*15:93, B*15:96, B*15:97, B*15:98, B*15:99, B*18:01, B*18:02, B*18:03, B*18:04, B*18:05, B*18:06,

	B*18:07, B*18:08, B*18:10, B*18:11, B*18:12, B*18:13, B*18:14, B*18:15, B*18:18, B*18:19, B*18:20, B*18:21, B*18:22, B*18:24, B*18:25, B*18:26, B*18:27, B*18:28, B*18:29, B*18:30, B*18:31, B*18:32, B*18:33, B*27:08, B*27:12, B*27:18, B*27:26, B*27:33, B*27:40, B*27:44, B*35:01, B*35:02, B*35:03, B*35:04, B*35:05, B*35:06, B*35:07, B*35:08, B*35:09, B*35:10, B*35:11, B*35:12, B*35:13, B*35:14, B*35:15, B*35:16, B*35:17, B*35:18, B*35:19, B*35:20, B*35:21, B*35:22, B*35:23, B*35:24, B*35:25, B*35:26, B*35:28, B*35:29, B*35:30, B*35:31, B*35:32, B*35:33, B*35:34, B*35:35, B*35:36, B*35:37, B*35:38, B*35:39, B*35:41, B*35:42, B*35:43, B*35:44, B*35:45, B*35:46, B*35:47, B*35:48, B*35:49, B*35:50, B*35:51, B*35:54, B*35:55, B*35:57, B*35:58, B*35:59, B*35:60, B*35:61, B*35:62, B*35:63, B*35:64, B*35:65, B*35:66, B*35:67, B*35:68, B*35:69, B*35:70, B*35:71, B*35:72, B*35:74, B*35:75, B*35:76, B*35:77, B*35:78, B*35:79, B*35:80, B*35:81, B*35:82, B*35:83, B*35:84, B*35:85, B*35:86, B*35:87, B*35:88, B*35:89, B*35:90, B*35:91, B*35:92, B*35:93, B*35:94, B*35:95, B*35:97, B*35:99, B*37:11, B*37:14, B*39:01, B*39:02, B*39:03, B*39:04, B*39:05, B*39:06, B*39:07, B*39:08, B*39:09, B*39:10, B*39:11, B*39:12, B*39:13, B*39:14, B*39:15, B*39:16, B*39:17, B*39:18, B*39:19, B*39:22, B*39:23, B*39:24, B*39:26, B*39:27, B*39:28, B*39:29, B*39:30, B*39:31, B*39:32, B*39:33, B*39:34, B*39:35, B*39:36, B*39:37, B*39:38, B*39:39, B*39:41, B*39:42, B*39:43, B*39:44, B*39:45, B*39:46, B*39:47, B*39:48, B*40:01, B*40:02, B*40:03, B*40:04, B*40:05, B*40:06, B*40:07, B*40:08, B*40:09, B*40:10, B*40:11, B*40:12, B*40:14, B*40:15, B*40:16, B*40:18, B*40:20, B*40:21, B*40:23, B*40:24, B*40:25, B*40:26, B*40:27, B*40:28, B*40:29, B*40:30, B*40:31, B*40:32, B*40:33, B*40:34, B*40:35, B*40:36, B*40:38, B*40:39, B*40:40, B*40:42, B*40:43, B*40:44, B*40:45, B*40:46, B*40:48, B*40:49, B*40:50, B*40:51, B*40:52, B*40:53, B*40:54, B*40:55, B*40:56, B*40:57, B*40:58, B*40:59, B*40:60, B*40:61, B*40:62, B*40:63, B*40:64, B*40:65, B*40:66, B*40:67, B*40:68, B*40:69, B*40:70, B*40:71, B*40:72, B*40:73, B*40:74, B*40:75, B*40:77, B*40:78, B*40:79, B*40:80, B*40:81, B*40:82, B*40:83, B*40:84, B*40:85, B*40:86, B*40:87, B*40:88, B*40:89, B*40:90, B*40:91, B*40:92, B*40:93, B*40:94, B*40:95, B*41:01, B*41:02, B*41:03, B*41:04, B*41:06, B*41:07, B*41:08, B*42:01, B*42:02, B*42:04, B*42:05, B*42:06, B*42:07, B*42:08, B*42:09, B*42:10, B*44:09, B*44:46, B*45:01, B*45:02, B*45:03, B*45:04, B*45:05, B*45:06, B*45:07, B*45:08, B*45:09, B*46:01, B*46:02, B*46:03, B*46:04, B*46:05, B*46:06, B*46:08, B*46:09, B*46:10, B*46:11, B*46:12, B*46:13, B*46:14, B*46:16, B*46:17, B*46:18, B*47:02, B*47:03, B*48:01, B*48:02, B*48:03, B*48:04, B*48:05, B*48:06, B*48:07, B*48:08, B*48:09, B*48:10, B*48:11, B*48:12, B*48:13, B*48:14, B*48:15, B*48:16, B*48:17, B*48:19, B*50:01, B*50:02, B*50:04,

						B*54:01, B*54:02, B*54:03, B*54:04, B*54:06, B*54:07, B*54:09, B*54:10, B*54:11, B*54:13, B*54:14, B*54:15, B*54:16, B*54:17, B*55:01, B*55:02, B*55:03, B*55:04, B*55:05, B*55:07, B*55:08, B*55:09, B*55:10, B*55:11, B*55:13, B*55:14, B*55:15, B*55:16, B*55:17, B*55:18, B*55:19, B*55:20, B*55:21, B*55:22, B*55:23, B*55:24, B*55:25, B*55:26, B*55:27, B*55:28, B*55:29, B*55:30, B*55:31, B*55:32, B*55:33, B*55:34, B*56:01, B*56:02, B*56:03, B*56:04, B*56:05, B*56:06, B*56:08, B*56:09, B*56:10, B*56:11, B*56:12, B*56:13, B*56:14, B*56:15, B*56:16, B*56:17, B*56:18, B*56:20, B*56:22, B*56:23, B*56:24, B*57:12, B*67:01, B*67:02, B*78:01, B*78:02, B*78:03, B*78:04, B*78:05, B*81:01, B*81:02, B*81:03, B*82:01, B*82:02, B*83:01, C*01:02, C*01:03, C*01:04, C*01:05, C*01:06, C*01:07, C*01:08, C*01:09, C*01:10, C*01:11, C*01:12, C*01:13, C*01:15, C*01:16, C*01:17, C*01:18, C*01:20, C*01:21, C*01:22, C*01:23, C*01:24, C*01:25, C*01:26, C*01:27, C*02:27, C*03:02, C*03:03, C*03:04, C*03:05, C*03:06, C*03:08, C*03:09, C*03:11, C*03:12, C*03:13, C*03:14, C*03:16, C*03:17, C*03:18, C*03:19, C*03:21, C*03:22, C*03:23, C*03:24, C*03:25, C*03:26, C*03:27, C*03:28, C*03:30, C*03:31, C*03:32, C*03:33, C*03:34, C*03:35, C*03:36, C*03:37, C*03:38, C*03:39, C*03:40, C*03:41, C*03:42, C*03:43, C*03:44, C*03:46, C*03:47, C*03:48, C*03:49, C*03:50, C*03:57, C*03:58, C*04:11, C*04:29, C*04:36, C*06:11, C*07:01, C*07:02, C*07:03, C*07:04, C*07:05, C*07:06, C*07:08, C*07:10, C*07:11, C*07:12, C*07:13, C*07:14, C*07:15, C*07:16, C*07:17, C*07:18, C*07:19, C*07:20, C*07:21, C*07:22, C*07:23, C*07:24, C*07:25, C*07:26, C*07:27, C*07:28, C*07:29, C*07:30, C*07:31, C*07:35, C*07:36, C*07:37, C*07:38, C*07:39, C*07:40, C*07:41, C*07:42, C*07:43, C*07:44, C*07:45, C*07:46, C*07:47, C*07:48, C*07:50, C*07:51, C*07:52, C*07:53, C*07:54, C*07:56, C*07:57, C*07:58, C*07:59, C*07:60, C*07:62, C*07:63, C*07:64, C*07:66, C*07:67, C*07:68, C*07:69, C*07:70, C*07:71, C*07:72, C*08:01, C*08:02, C*08:03, C*08:04, C*08:05, C*08:06, C*08:07, C*08:08, C*08:09, C*08:11, C*08:12, C*08:13, C*08:14, C*08:15, C*08:16, C*08:17, C*08:18, C*08:19, C*08:20, C*08:21, C*08:22, C*08:23, C*12:02, C*12:03, C*12:06, C*12:08, C*12:10, C*12:11, C*12:12, C*12:13, C*12:14, C*12:15, C*12:16, C*12:17, C*12:18, C*12:19, C*12:20, C*14:02, C*14:03, C*14:05, C*14:06, C*14:08, C*14:09, C*14:10, C*14:11, C*15:07, C*16:01, C*16:04, C*16:06, C*16:07, C*16:08, C*16:10, C*16:11
Profile 10 Class I	Abv.163LS/G, Abv.80TLR, oth.162GLS, oth.166ES, oth.199V,	$^{1.007}$ 1.044 $^{1.084}$	No	0.052228	B*44:02, B*44:03, B*44:05, B*44:07, B*44:08, B*44:10, B*44:12, B*44:13, B*44:14, B*44:17, B*44:20, B*44:22, B*44:24, B*44:26, B*44:28, B*44:29, B*44:30, B*44:32, B*44:33, B*44:34, B*44:35, B*44:36, B*44:38, B*44:39, B*44:40, B*44:41, B*44:43, B*44:44, B*44:45, B*44:47, B*44:48, B*44:49, B*44:51, B*44:53, B*44:54, B*44:55, B*44:57, B*44:59, B*44:60, B*44:62, B*44:63, B*44:65, B*44:66, B*44:67, B*44:69

	oth.76ET, oth.80TA					
Profile 11 Class I	Abv.163EW, oth.163E	1.076	1.106	1.138	Yes	3.75E-09	A*02:131, A*02:16, A*32:11, A*66:02, A*66:03, B*07:02, B*07:03, B*07:04, B*07:05, B*07:06, B*07:07, B*07:08, B*07:09, B*07:10, B*07:11, B*07:12, B*07:13, B*07:14, B*07:15, B*07:16, B*07:17, B*07:18, B*07:21, B*07:22, B*07:23, B*07:25, B*07:26, B*07:27, B*07:28, B*07:29, B*07:30, B*07:32, B*07:33, B*07:35, B*07:36, B*07:37, B*07:38, B*07:39, B*07:40, B*07:41, B*07:42, B*07:44, B*07:45, B*07:46, B*07:47, B*07:48, B*07:50, B*07:51, B*07:52, B*07:53, B*07:54, B*07:55, B*07:56, B*07:57, B*07:58, B*07:59, B*07:61, B*07:62, B*07:63, B*07:65, B*07:66, B*07:68, B*07:69, B*07:70, B*07:71, B*07:72, B*07:75, B*07:76, B*08:40, B*13:01, B*13:02, B*13:08, B*13:09, B*13:10, B*13:11, B*13:13, B*13:14, B*13:15, B*13:16, B*13:17, B*13:18, B*13:19, B*13:20, B*13:21, B*13:22, B*13:23, B*15:114, B*15:117, B*15:124, B*15:138, B*15:40, B*15:47, B*15:49, B*15:52, B*18:10, B*18:21, B*27:01, B*27:02, B*27:03, B*27:04, B*27:05, B*27:06, B*27:07, B*27:08, B*27:09, B*27:10, B*27:11, B*27:12, B*27:13, B*27:14, B*27:16, B*27:17, B*27:18, B*27:19, B*27:20, B*27:21, B*27:23, B*27:24, B*27:26, B*27:27, B*27:29, B*27:30, B*27:31, B*27:32, B*27:33, B*27:34, B*27:35, B*27:36, B*27:37, B*27:39, B*27:40, B*27:41, B*27:42, B*27:43, B*27:44, B*27:45, B*27:46, B*35:15, B*35:31, B*35:33, B*35:66, B*35:86, B*35:88, B*37:02, B*37:07, B*39:47, B*40:01, B*40:02, B*40:03, B*40:04, B*40:06, B*40:07, B*40:08, B*40:09, B*40:10, B*40:11, B*40:12, B*40:13, B*40:14, B*40:15, B*40:16, B*40:18, B*40:19, B*40:20, B*40:21, B*40:23, B*40:24, B*40:25, B*40:27, B*40:29, B*40:30, B*40:31, B*40:32, B*40:33, B*40:34, B*40:35, B*40:36, B*40:37, B*40:38, B*40:40, B*40:42, B*40:43, B*40:44, B*40:45, B*40:46, B*40:47, B*40:48, B*40:49, B*40:50, B*40:52, B*40:53, B*40:54, B*40:55, B*40:56, B*40:57, B*40:58, B*40:59, B*40:60, B*40:61, B*40:62, B*40:64, B*40:65, B*40:66, B*40:67, B*40:68, B*40:69, B*40:70, B*40:72, B*40:73, B*40:74, B*40:75, B*40:76, B*40:77, B*40:78, B*40:79, B*40:80, B*40:81, B*40:82, B*40:83, B*40:84, B*40:85, B*40:86, B*40:87, B*40:88, B*40:89, B*40:90, B*40:91, B*40:93, B*40:94, B*40:95, B*40:96, B*44:16, B*44:64, B*46:06, B*47:01, B*47:02, B*47:03, B*47:04, B*47:05, B*48:01, B*48:03, B*48:04, B*48:05, B*48:06, B*48:07, B*48:08, B*48:09, B*48:10, B*48:12, B*48:13, B*48:14, B*48:15, B*48:16, B*48:17, B*48:18, B*48:19, B*51:10, B*51:16, B*51:31, B*51:34, B*52:08, B*55:09, B*55:22, B*55:24, B*57:13, B*73:01, B*81:01, B*81:02, B*81:03, C*01:10, C*02:02, C*02:03, C*02:04, C*02:05, C*02:06, C*02:07, C*02:08, C*02:09, C*02:10, C*02:11, C*02:12, C*02:13, C*02:14, C*02:15, C*02:16, C*02:17, C*02:18, C*02:19, C*02:20, C*02:21, C*02:22, C*02:23, C*02:26, C*02:27, C*03:34, C*04:32, C*06:08, C*07:15, C*17:01, C*17:02, C*17:03, C*17:04, C*17:05, C*18:03

Profile 12 Class I	oth.184A, oth.193AV, oth.207S	$^{1.023}$	1.058	$^{1.094}$	No	0.005577	A*02:01, A*02:02, A*02:03, A*02:04, A*02:05, A*02:06, A*02:07, A*02:08, A*02:09, A*02:10, A*02:101, A*02:102, A*02:103, A*02:104, A*02:105, A*02:106, A*02:107, A*02:108, A*02:109, A*02:11, A*02:110, A*02:111, A*02:112, A*02:114, A*02:115, A*02:116, A*02:117, A*02:118, A*02:119, A*02:12, A*02:120, A*02:121, A*02:122, A*02:123, A*02:127, A*02:128, A*02:129, A*02:13, A*02:130, A*02:134, A*02:135, A*02:136, A*02:137, A*02:138, A*02:139, A*02:14, A*02:140, A*02:141, A*02:143, A*02:145, A*02:146, A*02:147, A*02:148, A*02:149, A*02:151, A*02:152, A*02:153, A*02:154, A*02:155, A*02:156, A*02:16, A*02:17, A*02:18, A*02:19, A*02:20, A*02:21, A*02:22, A*02:24, A*02:25, A*02:26, A*02:27, A*02:28, A*02:29, A*02:30, A*02:31, A*02:33, A*02:34, A*02:35, A*02:36, A*02:37, A*02:38, A*02:39, A*02:40, A*02:41, A*02:42, A*02:44, A*02:45, A*02:46, A*02:47, A*02:48, A*02:49, A*02:50, A*02:51, A*02:52, A*02:54, A*02:55, A*02:56, A*02:57, A*02:58, A*02:59, A*02:60, A*02:61, A*02:62, A*02:63, A*02:64, A*02:65, A*02:66, A*02:67, A*02:68, A*02:69, A*02:70, A*02:71, A*02:72, A*02:73, A*02:74, A*02:76, A*02:77, A*02:78, A*02:79, A*02:80, A*02:81, A*02:84, A*02:85, A*02:86, A*02:87, A*02:89, A*02:90, A*02:91, A*02:92, A*02:93, A*02:95, A*02:96, A*02:97, A*02:99, A*24:33, A*25:01, A*25:02, A*25:03, A*25:04, A*25:05, A*25:06, A*25:08, A*26:01, A*26:02, A*26:03, A*26:04, A*26:05, A*26:06, A*26:07, A*26:08, A*26:09, A*26:10, A*26:12, A*26:13, A*26:14, A*26:15, A*26:16, A*26:17, A*26:18, A*26:19, A*26:20, A*26:21, A*26:22, A*26:23, A*26:24, A*26:26, A*26:27, A*26:28, A*26:29, A*26:30, A*26:31, A*26:32, A*26:33, A*26:34, A*26:35, A*26:36, A*26:37, A*26:38, A*29:01, A*29:02, A*29:03, A*29:04, A*29:05, A*29:06, A*29:07, A*29:09, A*29:10, A*29:11, A*29:12, A*29:13, A*29:14, A*29:15, A*29:16, A*29:17, A*29:18, A*29:19, A*32:01, A*32:02, A*32:03, A*32:04, A*32:05, A*32:06, A*32:07, A*32:08, A*32:09, A*32:10, A*32:11, A*32:12, A*32:13, A*32:14, A*32:15, A*32:16, A*32:17, A*32:18, A*34:01, A*34:02, A*34:03, A*34:04, A*34:05, A*34:06, A*34:07, A*34:08, A*43:01, A*66:01, A*66:02, A*66:03, A*66:04, A*66:05, A*66:06, A*66:07, A*66:08, A*66:09, A*68:01, A*68:02, A*68:03, A*68:04, A*68:05, A*68:06, A*68:07, A*68:08, A*68:09, A*68:10, A*68:12, A*68:13, A*68:14, A*68:15, A*68:16, A*68:17, A*68:19, A*68:20, A*68:21, A*68:22, A*68:23, A*68:24, A*68:25, A*68:26, A*68:27, A*68:28, A*68:29, A*68:30, A*68:31, A*68:32, A*68:33, A*68:34, A*68:35, A*68:36, A*68:37, A*68:38, A*68:39, A*68:40, A*68:41, A*68:42, A*68:43, A*68:44, A*68:45, A*68:46, A*68:47, A*69:01, A*74:01, A*74:02, A*74:03, A*74:04, A*74:05, A*74:06, A*74:07, A*74:08, A*74:09, A*74:10, A*74:11, A*74:13
Profile 13 Class I	Abv.107W, Abv.144TKH,	$^{1.015}$	1.049	$^{1.084}$	No	0.01717	A*02:01, A*02:04, A*02:06, A*02:07, A*02:09, A*02:101, A*02:104, A*02:105, A*02:106, A*02:107, A*02:109, A*02:11, A*02:111, A*02:112,

		Abv.145KHA, Abv.62GE, Abv.62GK, oth.65RK, oth.95V					A*02:116, A*02:119, A*02:12, A*02:120, A*02:123, A*02:124, A*02:126, A*02:127, A*02:13, A*02:130, A*02:131, A*02:132, A*02:133, A*02:134, A*02:136, A*02:137, A*02:138, A*02:139, A*02:140, A*02:141, A*02:142, A*02:145, A*02:146, A*02:147, A*02:150, A*02:151, A*02:153, A*02:157, A*02:16, A*02:18, A*02:21, A*02:22, A*02:24, A*02:26, A*02:27, A*02:28, A*02:30, A*02:31, A*02:33, A*02:34, A*02:35, A*02:36, A*02:37, A*02:40, A*02:41, A*02:42, A*02:49, A*02:51, A*02:54, A*02:59, A*02:60, A*02:61, A*02:64, A*02:66, A*02:67, A*02:68, A*02:69, A*02:71, A*02:72, A*02:74, A*02:75, A*02:76, A*02:77, A*02:80, A*02:81, A*02:87, A*02:89, A*02:90, A*02:91, A*02:96, A*02:97, A*02:99
Profile 14 Class I		Abv.138K, Abv.177KT, oth.275G, oth.35Q	1.059	1.095	1.132	Yes	7.26E-06	C*05:01, C*05:03, C*05:04, C*05:05, C*05:06, C*05:08, C*05:10, C*05:11, C*05:13, C*05:14, C*05:15, C*05:16, C*05:19, C*05:20, C*05:21, C*05:22, C*05:23, C*05:24, C*05:25, C*08:02, C*08:04, C*08:05, C*08:07, C*08:12, C*08:17, C*08:18, C*08:19, C*08:23
Profile 15 Class I		Abv.62EE, Abv.65GK	1.016	1.050	1.086	No	0.014629	A*02:129, A*02:48, A*03:30, A*23:01, A*23:02, A*23:03, A*23:04, A*23:05, A*23:06, A*23:10, A*23:12, A*23:13, A*23:14, A*23:15, A*23:16, A*23:17, A*23:18, A*23:19, A*23:20, A*23:21, A*24:02, A*24:03, A*24:04, A*24:05, A*24:06, A*24:07, A*24:10, A*24:13, A*24:14, A*24:15, A*24:17, A*24:18, A*24:19, A*24:20, A*24:21, A*24:22, A*24:23, A*24:25, A*24:26, A*24:27, A*24:28, A*24:30, A*24:32, A*24:33, A*24:34, A*24:35, A*24:37, A*24:38, A*24:39, A*24:41, A*24:43, A*24:44, A*24:46, A*24:47, A*24:49, A*24:50, A*24:51, A*24:52, A*24:53, A*24:54, A*24:55, A*24:56, A*24:57, A*24:58, A*24:59, A*24:61, A*24:62, A*24:63, A*24:64, A*24:66, A*24:68, A*24:69, A*24:70, A*24:71, A*24:72, A*24:73, A*24:74, A*24:75, A*24:76, A*24:78, A*24:79, A*24:80, A*24:81, A*24:82, A*24:85, A*24:87, A*24:88, A*24:91, A*24:92, A*24:93, A*24:94, A*24:95, A*24:96, A*24:97, A*24:98, A*24:99, A*30:07, A*31:08
Profile 16 Class I		oth.184R, oth.270C	1.128	1.208	1.294	Yes	5.32E-06	C*17:01, C*17:02, C*17:03, C*17:04, C*17:05
Profile 18 Class I		Abv.71ATD, oth.71KA, oth.76ED, oth.97N	0.994	1.050	1.109	No	0.144423	B*27:03, B*27:05, B*27:09, B*27:10, B*27:13, B*27:17, B*27:27, B*27:28, B*27:35, B*27:37, B*27:38, B*27:39, B*27:41, B*27:42, B*27:45, B*27:46, B*27:50
Profile 19 Class I		Abv.65QIA, Abv.69AA, Abv.70IAQ, oth.66IY	1.073	1.111	1.150	Yes	6.45E-07	B*07:02, B*07:04, B*07:05, B*07:06, B*07:07, B*07:09, B*07:11, B*07:12, B*07:14, B*07:15, B*07:17, B*07:18, B*07:19, B*07:20, B*07:21, B*07:22, B*07:23, B*07:24, B*07:25, B*07:26, B*07:28, B*07:29, B*07:30, B*07:31, B*07:33, B*07:34, B*07:35, B*07:36, B*07:39, B*07:40, B*07:41, B*07:42, B*07:43, B*07:44, B*07:45, B*07:46, B*07:47, B*07:48, B*07:51, B*07:52,

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Profile 20 Class I	Abv.127K, oth.114H, oth.151AHV, oth.66KA, oth.66KH	1.090	1.127	1.166	Yes	5.34E-09	A*02:01, A*02:02, A*02:04, A*02:05, A*02:06, A*02:07, A*02:09, A*02:10, A*02:101, A*02:102, A*02:104, A*02:106, A*02:107, A*02:108, A*02:109, A*02:11, A*02:110, A*02:111, A*02:112, A*02:115, A*02:116, A*02:118, A*02:119, A*02:12, A*02:120, A*02:121, A*02:122, A*02:123, A*02:124, A*02:126, A*02:127, A*02:129, A*02:131, A*02:132, A*02:133, A*02:134, A*02:136, A*02:138, A*02:139, A*02:14, A*02:140, A*02:141, A*02:142, A*02:143, A*02:144, A*02:145, A*02:146, A*02:149, A*02:150, A*02:153, A*02:154, A*02:155, A*02:156, A*02:157, A*02:16, A*02:17, A*02:18, A*02:19, A*02:21, A*02:22, A*02:25, A*02:28, A*02:30, A*02:31, A*02:33, A*02:36, A*02:37, A*02:39, A*02:42, A*02:44, A*02:45, A*02:46, A*02:47, A*02:48, A*02:49, A*02:50, A*02:54, A*02:57, A*02:58, A*02:59, A*02:60, A*02:61, A*02:63, A*02:64, A*02:66, A*02:67, A*02:68, A*02:69, A*02:70, A*02:71, A*02:72, A*02:73, A*02:74, A*02:75, A*02:76, A*02:77, A*02:79, A*02:81, A*02:84, A*02:85, A*02:86, A*02:87, A*02:89, A*02:90, A*02:91, A*02:92, A*02:93, A*02:95, A*02:96, A*02:97, A*24:02, A*24:03, A*24:04, A*24:05, A*24:06, A*24:08, A*24:10, A*24:13, A*24:14, A*24:15, A*24:20, A*24:22, A*24:23, A*24:25, A*24:26, A*24:28, A*24:30, A*24:32, A*24:33, A*24:53
Profile 22 Class I	oth.16S, oth.211T	1.007	1.054	1.103	No	0.056152	C*02:02, C*02:03, C*02:04, C*02:05, C*02:06, C*02:07, C*02:08, C*02:09, C*02:10, C*02:11, C*02:12, C*02:13, C*02:14, C*02:15, C*02:16, C*02:17, C*02:18, C*02:19, C*02:20, C*02:21, C*02:22, C*02:23, C*02:27
Profile 23 Class I	Abv.62QE, oth.275EL, oth.97I	1.022	1.054	1.088	No	0.005028	A*01:01, A*01:02, A*01:06, A*01:07, A*01:08, A*01:09, A*01:10, A*01:12, A*01:13, A*01:14, A*01:17, A*01:19, A*01:21, A*01:23, A*01:24, A*01:25, A*01:26, A*01:28, A*01:29, A*01:30, A*01:32, A*01:33, A*01:35, A*03:01, A*03:02, A*03:04, A*03:05, A*03:06, A*03:07, A*03:08, A*03:09, A*03:10, A*03:12, A*03:13, A*03:14, A*03:15, A*03:16, A*03:17, A*03:18, A*03:19,

							A*03:20, A*03:22, A*03:25, A*03:26, A*03:27, A*03:28, A*03:29, A*03:31, A*03:32, A*03:33, A*03:34, A*03:35, A*03:37, A*03:38, A*03:39, A*03:40, A*03:41, A*03:42, A*03:43, A*03:44, A*03:45, A*03:46, A*03:47, A*03:50, A*03:51, A*11:01, A*11:02, A*11:03, A*11:04, A*11:05, A*11:06, A*11:07, A*11:08, A*11:09, A*11:12, A*11:13, A*11:14, A*11:15, A*11:16, A*11:17, A*11:18, A*11:19, A*11:20, A*11:22, A*11:23, A*11:24, A*11:25, A*11:27, A*11:29, A*11:30, A*11:31, A*11:32, A*11:33, A*11:34, A*11:35, A*11:36, A*11:37, A*11:38, A*11:39, A*11:40, A*11:41, A*11:42, A*30:01, A*30:02, A*30:03, A*30:04, A*30:06, A*30:08, A*30:09, A*30:10, A*30:11, A*30:12, A*30:13, A*30:14, A*30:15, A*30:16, A*30:17, A*30:18, A*30:19, A*30:20, A*30:23, A*30:24, A*30:25, A*30:26, A*36:01, A*36:02, A*36:04
Profile 24 Class I	Abv.163R, Abv.163RG, Abv.44KM, oth.152HA, oth.66NM	1.098	1.140	1.184	Yes	1.27E-08	A*01:01, A*01:02, A*01:03, A*01:06, A*01:09, A*01:13, A*01:17, A*01:20, A*01:24, A*01:25, A*01:26, A*01:28, A*01:29, A*01:30, A*01:32, A*01:33, A*01:35
Profile 25 Class I	Abv.79GT, oth.65RA, oth.80T, oth.80TL	0.961	1.062	1.174	No	0.319927	A*01:01, A*01:02, A*01:03, A*01:06, A*01:09, A*01:13, A*01:17, A*01:20, A*01:24, A*01:25, A*01:26, A*01:28, A*01:29, A*01:30, A*01:32, A*01:33, A*01:35
Profile 26 Class I	Abv.144K, oth.149AH, oth.151H	1.234	1.293	1.354	Yes	5.21E-20	A*01:01, A*01:02, A*01:03, A*01:06, A*01:07, A*01:08, A*01:09, A*01:12, A*01:13, A*01:14, A*01:17, A*01:19, A*01:20, A*01:21, A*01:23, A*01:24, A*01:25, A*01:26, A*01:28, A*01:29, A*01:30, A*01:32, A*01:33, A*01:35, A*02:01, A*02:02, A*02:04, A*02:05, A*02:06, A*02:07, A*02:08, A*02:09, A*02:10, A*02:101, A*02:102, A*02:103, A*02:104, A*02:105, A*02:106, A*02:107, A*02:108, A*02:109, A*02:11, A*02:110, A*02:111, A*02:112, A*02:114, A*02:115, A*02:116, A*02:118, A*02:119, A*02:12, A*02:120, A*02:121, A*02:122, A*02:123, A*02:124, A*02:126, A*02:127, A*02:128, A*02:129, A*02:13, A*02:131, A*02:132, A*02:133, A*02:134, A*02:136, A*02:137, A*02:138, A*02:139, A*02:14, A*02:140, A*02:141, A*02:142, A*02:143, A*02:144, A*02:145, A*02:146, A*02:147, A*02:150, A*02:151, A*02:153, A*02:154, A*02:155, A*02:156, A*02:157, A*02:16, A*02:17, A*02:18, A*02:19, A*02:20, A*02:21, A*02:22, A*02:24, A*02:26, A*02:27, A*02:28, A*02:29, A*02:30, A*02:31, A*02:33, A*02:34, A*02:35, A*02:36, A*02:37, A*02:39, A*02:41, A*02:42, A*02:44, A*02:45, A*02:46, A*02:47, A*02:48, A*02:49, A*02:50, A*02:52, A*02:54, A*02:55, A*02:56, A*02:57, A*02:58, A*02:59, A*02:60, A*02:61, A*02:62, A*02:63, A*02:64, A*02:66, A*02:67, A*02:68, A*02:69, A*02:70, A*02:71, A*02:72, A*02:73, A*02:74, A*02:75, A*02:76, A*02:77, A*02:78, A*02:79, A*02:80, A*02:81, A*02:84, A*02:86, A*02:87, A*02:89, A*02:90, A*02:91, A*02:92, A*02:93, A*02:95,

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Profile 27 Class I	Abv.145RT, Abv.149TAH	1.030	1.073	1.119	No	0.005169	A*24:99, A*25:01, A*25:02, A*25:03, A*25:04, A*25:06, A*25:07, A*26:01, A*26:02, A*26:03, A*26:04, A*26:05, A*26:06, A*26:07, A*26:08, A*26:09, A*26:10, A*26:12, A*26:13, A*26:15, A*26:16, A*26:17, A*26:19, A*26:20, A*26:21, A*26:22, A*26:23, A*26:24, A*26:26, A*26:27, A*26:29, A*26:30, A*26:31, A*26:32, A*26:33, A*26:34, A*26:35, A*26:36, A*26:37, A*26:38, A*34:01, A*34:02, A*34:04, A*34:05, A*34:07, A*34:08, A*43:01, A*66:01, A*66:02, A*66:03, A*66:04, A*66:05, A*66:06, A*66:07, A*66:08, A*66:09
Profile 33 Class I	Abv.76ESN, oth.76ES	1.102	1.145	1.189	Yes	3.8E-09	B*07:02, B*07:03, B*07:04, B*07:05, B*07:06, B*07:07, B*07:08, B*07:09, B*07:10, B*07:12, B*07:14, B*07:16, B*07:17, B*07:18, B*07:19, B*07:20, B*07:21, B*07:22, B*07:23, B*07:24, B*07:25, B*07:26, B*07:28, B*07:29, B*07:30, B*07:31, B*07:32, B*07:33, B*07:34, B*07:35, B*07:37, B*07:39, B*07:40, B*07:41, B*07:42, B*07:43, B*07:44, B*07:45, B*07:46, B*07:47, B*07:48, B*07:50, B*07:51, B*07:52, B*07:53, B*07:54, B*07:55, B*07:56,

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Profile 34 Class I	oth.76VDT, oth.77D	$^{1.013}$ 1.052 $^{1.093}$	No	0.029274	A*01:13, A*01:28, A*02:01, A*02:02, A*02:03, A*02:04, A*02:05, A*02:06, A*02:07, A*02:08, A*02:09, A*02:10, A*02:101, A*02:102, A*02:103, A*02:104, A*02:105, A*02:106, A*02:107, A*02:108, A*02:109, A*02:11, A*02:110, A*02:111, A*02:114, A*02:115, A*02:117, A*02:118, A*02:119, A*02:12, A*02:120, A*02:121, A*02:122, A*02:123, A*02:126, A*02:127, A*02:128, A*02:13, A*02:130, A*02:131, A*02:132, A*02:133, A*02:134,

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Profile 39	Class I	Abv.193PL, Abv.267QE, oth.147L, oth.152RA, oth.73AS	1.033	1.068	1.105	Yes	0.001222	C*07:01, C*07:02, C*07:04, C*07:05, C*07:06, C*07:08, C*07:10, C*07:11, C*07:13, C*07:14, C*07:15, C*07:16, C*07:18, C*07:19, C*07:20, C*07:21, C*07:22, C*07:23, C*07:24, C*07:26, C*07:27, C*07:28, C*07:29, C*07:31, C*07:35, C*07:36, C*07:37, C*07:38, C*07:42, C*07:43, C*07:44, C*07:45, C*07:46, C*07:47, C*07:48, C*07:50, C*07:51, C*07:52, C*07:53, C*07:54, C*07:56, C*07:57, C*07:59, C*07:60, C*07:62, C*07:63, C*07:64, C*07:66, C*07:67, C*07:68, C*07:69, C*07:70, C*07:71, C*07:72
Profile 41	Class I	Abv.76EG, oth.152RR	1.080	1.150	1.225	Yes	0.000248	A*30:02, A*30:03, A*30:07, A*30:10, A*30:12, A*30:22, A*30:25, A*30:28
Profile 42	Class I	Abv.62GRN, Abv.71SA, oth.97V	1.072	1.130	1.190	Yes	0.000119	B*57:01, B*57:02, B*57:03, B*57:04, B*57:06, B*57:07, B*57:08, B*57:09, B*57:10, B*57:12, B*57:13, B*57:14, B*57:15, B*57:16, B*57:17, B*57:18, B*57:19, B*58:14
Profile 45	Class I	Abv.41T, Abv.45KE, oth.24T, oth.32L	1.081	1.113	1.147	Yes	2.69E-09	B*15:53, B*35:63, B*40:01, B*40:02, B*40:03, B*40:04, B*40:05, B*40:06, B*40:07, B*40:08, B*40:09, B*40:11, B*40:13, B*40:14, B*40:15, B*40:16, B*40:18, B*40:19, B*40:20, B*40:23, B*40:24, B*40:25, B*40:26, B*40:27, B*40:28, B*40:29, B*40:30, B*40:31, B*40:32, B*40:33, B*40:34, B*40:35, B*40:36, B*40:37, B*40:38, B*40:39, B*40:40, B*40:42, B*40:43, B*40:44, B*40:45, B*40:47, B*40:48, B*40:49, B*40:50, B*40:51, B*40:52, B*40:53, B*40:54, B*40:55, B*40:56, B*40:57, B*40:59, B*40:60, B*40:61, B*40:62, B*40:63, B*40:64, B*40:65, B*40:66, B*40:67, B*40:68, B*40:69, B*40:70, B*40:71, B*40:72, B*40:73, B*40:74, B*40:75, B*40:76, B*40:77, B*40:78, B*40:79, B*40:80, B*40:81, B*40:82, B*40:84, B*40:85, B*40:86, B*40:87, B*40:88, B*40:89, B*40:90, B*40:91, B*40:92, B*40:95, B*40:96, B*41:01, B*41:02, B*41:03, B*41:04, B*41:05, B*41:06, B*41:07, B*41:08, B*44:02, B*44:03, B*44:04, B*44:05, B*44:09, B*44:10, B*44:11, B*44:12, B*44:13, B*44:14, B*44:15, B*44:16, B*44:17, B*44:18, B*44:20, B*44:21, B*44:22, B*44:24, B*44:25, B*44:26, B*44:27, B*44:28, B*44:29, B*44:30, B*44:31, B*44:32, B*44:33, B*44:35, B*44:36, B*44:37, B*44:38, B*44:41, B*44:42, B*44:43, B*44:45, B*44:46, B*44:47, B*44:48, B*44:49, B*44:50, B*44:51, B*44:53, B*44:54, B*44:55, B*44:59, B*44:62, B*44:63, B*44:64, B*44:65, B*44:66, B*44:67, B*44:69, B*45:01, B*45:02, B*45:03, B*45:04, B*45:05, B*45:06, B*45:07, B*45:08, B*45:09, B*47:01, B*47:02, B*47:03, B*47:04, B*47:05, B*49:01, B*49:02, B*49:04, B*49:05, B*50:01, B*50:02, B*50:04
Profile 50	Class I	oth.152E, oth.152RE	0.953	1.026	1.104	No	0.571867	A*11:03, A*26:28, B*07:02, B*07:03, B*07:04, B*07:05, B*07:06, B*07:07, B*07:08, B*07:09, B*07:10, B*07:11, B*07:12, B*07:13, B*07:14, B*07:15, B*07:16, B*07:17, B*07:18, B*07:19, B*07:20, B*07:21, B*07:22, B*07:23, B*07:24, B*07:26, B*07:27, B*07:28, B*07:29, B*07:30, B*07:31, B*07:32, B*07:33, B*07:34, B*07:35, B*07:36, B*07:37, B*07:38, B*07:39, B*07:40, B*07:41, B*07:42, B*07:43, B*07:44, B*07:45, B*07:46, B*07:47, B*07:50,

B*07:52, B*07:53, B*07:54, B*07:55, B*07:56, B*07:57, B*07:58, B*07:59, B*07:60, B*07:61, B*07:62, B*07:63, B*07:64, B*07:65, B*07:66, B*07:68, B*07:69, B*07:70, B*07:71, B*07:72, B*07:75, B*07:76, B*08:20, B*13:16, B*13:20, B*14:01, B*14:02, B*14:03, B*14:04, B*14:05, B*14:06, B*14:08, B*14:09, B*14:10, B*15:01, B*15:02, B*15:03, B*15:04, B*15:06, B*15:07, B*15:08, B*15:09, B*15:10, B*15:101, B*15:102, B*15:103, B*15:104, B*15:106, B*15:108, B*15:109, B*15:11, B*15:110, B*15:112, B*15:113, B*15:115, B*15:116, B*15:117, B*15:118, B*15:119, B*15:12, B*15:120, B*15:121, B*15:122, B*15:125, B*15:126, B*15:127, B*15:128, B*15:129, B*15:13, B*15:131, B*15:132, B*15:133, B*15:134, B*15:135, B*15:137, B*15:138, B*15:139, B*15:14, B*15:140, B*15:141, B*15:142, B*15:143, B*15:144, B*15:146, B*15:147, B*15:148, B*15:15, B*15:150, B*15:152, B*15:153, B*15:154, B*15:156, B*15:157, B*15:158, B*15:159, B*15:16, B*15:160, B*15:17, B*15:18, B*15:19, B*15:21, B*15:23, B*15:24, B*15:25, B*15:27, B*15:28, B*15:29, B*15:30, B*15:32, B*15:33, B*15:34, B*15:35, B*15:36, B*15:37, B*15:38, B*15:39, B*15:40, B*15:42, B*15:43, B*15:44, B*15:45, B*15:46, B*15:47, B*15:49, B*15:50, B*15:53, B*15:54, B*15:56, B*15:57, B*15:58, B*15:60, B*15:61, B*15:62, B*15:63, B*15:64, B*15:65, B*15:66, B*15:67, B*15:68, B*15:69, B*15:70, B*15:71, B*15:72, B*15:73, B*15:74, B*15:76, B*15:77, B*15:78, B*15:80, B*15:81, B*15:82, B*15:85, B*15:87, B*15:89, B*15:90, B*15:92, B*15:93, B*15:95, B*15:96, B*15:97, B*15:98, B*15:99, B*18:15, B*18:19, B*18:21, B*18:30, B*27:04, B*27:06, B*27:10, B*27:15, B*27:18, B*27:20, B*27:21, B*27:24, B*27:25, B*27:40, B*35:11, B*35:14, B*35:21, B*35:43, B*35:44, B*35:58, B*35:67, B*35:79, B*35:86, B*35:99, B*37:07, B*37:13, B*38:10, B*39:18, B*39:35, B*39:36, B*40:05, B*40:15, B*40:16, B*40:23, B*40:26, B*40:28, B*40:32, B*40:51, B*40:95, B*46:01, B*46:02, B*46:03, B*46:04, B*46:05, B*46:08, B*46:10, B*46:12, B*46:14, B*46:16, B*46:17, B*48:05, B*48:08, B*48:15, B*49:01, B*49:02, B*49:03, B*49:04, B*49:05, B*50:01, B*50:02, B*50:04, B*51:01, B*51:02, B*51:03, B*51:04, B*51:06, B*51:07, B*51:12, B*51:13, B*51:14, B*51:16, B*51:17, B*51:18, B*51:21, B*51:22, B*51:23, B*51:24, B*51:26, B*51:28, B*51:29, B*51:30, B*51:32, B*51:33, B*51:34, B*51:35, B*51:36, B*51:37, B*51:38, B*51:39, B*51:43, B*51:45, B*51:46, B*51:48, B*51:49, B*51:50, B*51:51, B*51:52, B*51:55, B*51:56, B*51:57, B*51:58, B*51:59, B*51:60, B*51:61, B*51:62, B*51:63, B*51:64, B*51:65, B*52:01, B*52:02, B*52:04, B*52:05, B*52:06, B*52:07, B*52:08, B*52:09, B*52:11, B*52:12, B*52:13, B*52:14, B*53:06, B*53:08, B*54:06, B*55:01, B*55:03, B*55:05, B*55:09, B*55:11, B*55:14, B*55:15, B*55:17, B*55:21, B*55:24, B*55:25, B*55:28, B*55:29, B*55:31, B*55:33, B*56:03, B*56:05, B*56:06, B*56:21, B*57:09, B*57:13, B*58:06, B*58:08, B*58:19, B*78:01, B*78:02, B*78:03,

						B*78:05, B*78:06, C*01:02, C*01:03, C*01:04, C*01:05, C*01:07, C*01:09, C*01:10, C*01:11, C*01:12, C*01:13, C*01:14, C*01:15, C*01:16, C*01:17, C*01:18, C*01:19, C*01:20, C*01:21, C*01:22, C*01:23, C*01:24, C*01:25, C*01:26, C*01:27, C*02:02, C*02:04, C*02:05, C*02:06, C*02:07, C*02:08, C*02:09, C*02:10, C*02:11, C*02:12, C*02:14, C*02:15, C*02:16, C*02:17, C*02:19, C*02:20, C*02:21, C*02:22, C*02:23, C*02:26, C*02:27, C*03:02, C*03:03, C*03:04, C*03:05, C*03:06, C*03:07, C*03:08, C*03:09, C*03:10, C*03:11, C*03:12, C*03:13, C*03:15, C*03:16, C*03:17, C*03:18, C*03:19, C*03:21, C*03:22, C*03:23, C*03:24, C*03:25, C*03:26, C*03:27, C*03:28, C*03:29, C*03:30, C*03:31, C*03:32, C*03:33, C*03:34, C*03:35, C*03:37, C*03:38, C*03:39, C*03:40, C*03:41, C*03:42, C*03:43, C*03:44, C*03:45, C*03:46, C*03:47, C*03:48, C*03:49, C*03:50, C*03:57, C*03:58, C*04:01, C*04:03, C*04:04, C*04:05, C*04:06, C*04:07, C*04:08, C*04:10, C*04:11, C*04:12, C*04:14, C*04:15, C*04:16, C*04:17, C*04:18, C*04:19, C*04:20, C*04:23, C*04:24, C*04:25, C*04:26, C*04:27, C*04:28, C*04:29, C*04:30, C*04:31, C*04:32, C*04:33, C*04:35, C*04:36, C*04:37, C*04:38, C*04:40, C*05:01, C*05:03, C*05:04, C*05:05, C*05:06, C*05:08, C*05:09, C*05:10, C*05:11, C*05:13, C*05:14, C*05:15, C*05:16, C*05:18, C*05:19, C*05:20, C*05:21, C*05:22, C*05:23, C*05:24, C*05:25, C*06:02, C*06:03, C*06:04, C*06:05, C*06:06, C*06:07, C*06:08, C*06:09, C*06:10, C*06:11, C*06:12, C*06:13, C*06:14, C*06:15, C*06:17, C*06:18, C*06:19, C*06:20, C*06:22, C*06:23, C*07:41, C*08:02, C*08:04, C*08:05, C*08:07, C*08:12, C*08:13, C*08:15, C*08:17, C*08:18, C*08:19, C*08:23, C*12:02, C*12:03, C*12:04, C*12:05, C*12:06, C*12:07, C*12:08, C*12:09, C*12:10, C*12:11, C*12:12, C*12:13, C*12:15, C*12:16, C*12:17, C*12:18, C*12:19, C*12:20, C*12:21, C*14:02, C*14:03, C*14:04, C*14:05, C*14:06, C*14:08, C*14:09, C*14:10, C*14:11, C*15:02, C*15:03, C*15:04, C*15:05, C*15:06, C*15:07, C*15:08, C*15:09, C*15:10, C*15:11, C*15:12, C*15:13, C*15:15, C*15:16, C*15:17, C*15:18, C*15:19, C*15:21, C*17:01, C*17:02, C*17:03, C*17:04, C*17:05, C*18:01, C*18:02, C*18:03
Profile 51 Class I	Abv.76ANT, oth.77NGT	[1.047] 1.079 [1.112]	Yes	3.12E-05	A*01:01, A*01:02, A*01:03, A*01:06, A*01:08, A*01:09, A*01:10, A*01:12, A*01:14, A*01:17, A*01:19, A*01:20, A*01:21, A*01:23, A*01:24, A*01:25, A*01:26, A*01:29, A*01:30, A*01:32, A*01:33, A*01:35, A*02:149, A*03:41, A*11:17, A*11:40, A*24:04, A*26:01, A*26:02, A*26:04, A*26:07, A*26:08, A*26:09, A*26:10, A*26:12, A*26:13, A*26:14, A*26:15, A*26:16, A*26:17, A*26:18, A*26:19, A*26:20, A*26:22, A*26:23, A*26:24, A*26:26, A*26:27, A*26:28, A*26:29, A*26:31, A*26:32, A*26:33, A*26:34, A*26:35, A*26:36, A*26:37, A*26:38, A*29:01, A*29:02, A*29:03, A*29:04, A*29:05, A*29:06, A*29:07, A*29:09, A*29:10, A*29:11, A*29:12, A*29:14, A*29:15, A*29:16,

						A*29:17, A*29:18, A*33:13, A*36:01, A*36:02, A*36:03, A*36:04, A*43:01, A*74:10, A*80:01
Profile 52 Class I	Abv.82LR, oth.76EN, oth.81ALR	$^{0.969}$	1.004	$^{1.040}$	No	0.842401	A*02:112, A*02:129, A*02:136, A*02:87, A*23:01, A*23:02, A*23:03, A*23:04, A*23:05, A*23:06, A*23:09, A*23:10, A*23:12, A*23:13, A*23:14, A*23:15, A*23:16, A*23:17, A*23:18, A*23:19, A*23:20, A*23:21, A*24:02, A*24:03, A*24:05, A*24:06, A*24:07, A*24:08, A*24:10, A*24:13, A*24:14, A*24:15, A*24:17, A*24:18, A*24:20, A*24:21, A*24:22, A*24:23, A*24:24, A*24:25, A*24:26, A*24:27, A*24:29, A*24:30, A*24:31, A*24:33, A*24:34, A*24:35, A*24:37, A*24:38, A*24:39, A*24:41, A*24:42, A*24:43, A*24:46, A*24:47, A*24:49, A*24:50, A*24:51, A*24:52, A*24:53, A*24:54, A*24:55, A*24:56, A*24:57, A*24:58, A*24:59, A*24:62, A*24:63, A*24:64, A*24:66, A*24:67, A*24:68, A*24:69, A*24:70, A*24:71, A*24:72, A*24:73, A*24:74, A*24:75, A*24:76, A*24:77, A*24:78, A*24:79, A*24:80, A*24:81, A*24:82, A*24:85, A*24:87, A*24:88, A*24:91, A*24:92, A*24:93, A*24:94, A*24:95, A*24:96, A*24:97, A*24:98, A*24:99, A*31:07, A*31:08, A*31:10, A*32:03, A*68:36, B*07:36, B*07:38, B*08:02, B*08:03, B*13:01, B*13:02, B*13:03, B*13:04, B*13:06, B*13:08, B*13:10, B*13:11, B*13:12, B*13:13, B*13:14, B*13:15, B*13:16, B*13:17, B*13:18, B*13:19, B*13:20, B*13:21, B*13:22, B*13:23, B*15:13, B*15:157, B*15:16, B*15:17, B*15:23, B*15:24, B*15:36, B*15:67, B*15:89, B*15:95, B*18:09, B*27:01, B*27:02, B*27:30, B*37:10, B*38:01, B*38:02, B*38:04, B*38:05, B*38:06, B*38:07, B*38:08, B*38:09, B*38:10, B*38:11, B*38:12, B*38:13, B*38:14, B*38:15, B*38:16, B*38:18, B*38:19, B*40:13, B*40:19, B*40:47, B*40:96, B*44:02, B*44:03, B*44:04, B*44:05, B*44:06, B*44:07, B*44:08, B*44:10, B*44:12, B*44:13, B*44:14, B*44:16, B*44:17, B*44:18, B*44:20, B*44:21, B*44:22, B*44:24, B*44:25, B*44:26, B*44:27, B*44:28, B*44:29, B*44:30, B*44:31, B*44:32, B*44:33, B*44:34, B*44:35, B*44:36, B*44:37, B*44:38, B*44:39, B*44:40, B*44:41, B*44:42, B*44:43, B*44:44, B*44:45, B*44:47, B*44:48, B*44:49, B*44:50, B*44:51, B*44:53, B*44:54, B*44:55, B*44:57, B*44:59, B*44:60, B*44:62, B*44:63, B*44:64, B*44:65, B*44:66, B*44:67, B*44:69, B*49:01, B*49:02, B*49:03, B*49:04, B*49:05, B*51:01, B*51:02, B*51:03, B*51:04, B*51:05, B*51:06, B*51:07, B*51:08, B*51:09, B*51:10, B*51:12, B*51:13, B*51:14, B*51:15, B*51:16, B*51:17, B*51:18, B*51:19, B*51:20, B*51:21, B*51:22, B*51:23, B*51:24, B*51:26, B*51:28, B*51:29, B*51:30, B*51:31, B*51:32, B*51:33, B*51:34, B*51:35, B*51:36, B*51:37, B*51:38, B*51:39, B*51:40, B*51:42, B*51:43, B*51:45, B*51:46, B*51:48, B*51:49, B*51:51, B*51:52, B*51:53, B*51:54, B*51:55, B*51:56, B*51:57, B*51:58, B*51:59, B*51:60, B*51:61, B*51:62, B*51:63, B*51:64, B*51:65, B*52:01, B*52:02, B*52:03, B*52:04, B*52:05, B*52:06, B*52:07, B*52:08, B*52:10, B*52:11, B*52:12, B*52:13, B*52:14, B*53:01, B*53:02, B*53:04, B*53:06, B*53:07, B*53:08,

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Profile 53 Class I	oth.14W, oth.275K	0.964	0.999	1.036	No	0.970483	C*04:01, C*04:04, C*04:05, C*04:07, C*04:08, C*04:10, C*04:11, C*04:12, C*04:13, C*04:14, C*04:15, C*04:17, C*04:18, C*04:19, C*04:20, C*04:23, C*04:24, C*04:25, C*04:26, C*04:27, C*04:28, C*04:29, C*04:30, C*04:31, C*04:32, C*04:33, C*04:34, C*04:35, C*04:36, C*04:37, C*04:38, C*04:40
Profile 54 Class I	oth.44RM, oth.44RME	0.967	1.079	1.204	No	0.253577	A*02:01, A*02:02, A*02:03, A*02:04, A*02:05, A*02:06, A*02:07, A*02:08, A*02:09, A*02:10, A*02:101, A*02:102, A*02:103, A*02:104, A*02:105, A*02:106, A*02:107, A*02:108, A*02:109, A*02:11, A*02:110, A*02:111, A*02:112, A*02:114, A*02:115, A*02:116, A*02:117, A*02:118, A*02:119, A*02:12, A*02:120, A*02:121, A*02:122, A*02:123, A*02:124, A*02:126, A*02:127, A*02:128, A*02:129, A*02:13, A*02:130, A*02:131, A*02:132, A*02:133, A*02:134, A*02:135, A*02:136, A*02:137, A*02:138, A*02:139, A*02:14, A*02:140, A*02:141, A*02:142, A*02:143, A*02:144, A*02:145, A*02:146, A*02:147, A*02:148, A*02:149, A*02:150, A*02:151, A*02:152, A*02:153, A*02:154, A*02:155, A*02:156, A*02:157, A*02:16, A*02:17, A*02:18, A*02:19, A*02:20, A*02:21, A*02:22, A*02:24, A*02:25, A*02:26, A*02:27, A*02:28, A*02:29, A*02:30, A*02:31, A*02:33, A*02:34, A*02:35, A*02:36, A*02:37, A*02:38, A*02:39, A*02:40, A*02:41, A*02:42, A*02:44, A*02:45, A*02:46, A*02:47, A*02:48, A*02:49, A*02:50, A*02:51, A*02:52, A*02:54, A*02:55, A*02:56, A*02:57, A*02:58, A*02:59, A*02:60, A*02:61, A*02:62, A*02:64, A*02:65, A*02:66, A*02:67, A*02:68, A*02:69, A*02:70, A*02:71, A*02:72, A*02:73, A*02:74, A*02:75, A*02:76, A*02:77, A*02:78, A*02:79, A*02:80, A*02:81, A*02:84, A*02:85, A*02:86, A*02:87, A*02:89, A*02:90, A*02:91, A*02:92, A*02:93, A*02:95, A*02:96, A*02:97, A*02:99, A*03:01, A*03:02, A*03:04, A*03:05, A*03:06, A*03:07, A*03:08, A*03:09, A*03:10, A*03:12, A*03:13, A*03:14, A*03:15, A*03:16, A*03:17, A*03:18, A*03:19, A*03:20, A*03:22, A*03:23, A*03:24, A*03:25, A*03:26, A*03:27, A*03:28, A*03:29, A*03:30, A*03:31, A*03:32, A*03:33, A*03:34, A*03:35, A*03:37, A*03:38, A*03:39, A*03:40, A*03:41, A*03:42, A*03:43, A*03:44, A*03:45, A*03:46, A*03:47, A*03:50, A*03:51, A*11:01, A*11:02, A*11:03, A*11:04, A*11:05, A*11:06, A*11:07, A*11:08, A*11:09, A*11:10, A*11:11, A*11:12, A*11:13, A*11:14, A*11:15, A*11:16, A*11:17, A*11:18, A*11:19, A*11:20, A*11:22, A*11:23, A*11:24, A*11:25, A*11:26, A*11:27, A*11:29, A*11:30, A*11:31, A*11:32, A*11:33, A*11:34, A*11:35, A*11:36, A*11:37,

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Profile 56 Class I	Abv.65RNA, oth.66N	0.922	0.962	1.003	No	0.131187	A*01:01, A*01:02, A*01:03, A*01:06, A*01:07, A*01:08, A*01:09, A*01:10, A*01:12, A*01:13, A*01:14, A*01:17, A*01:19, A*01:20, A*01:21, A*01:23, A*01:24, A*01:25, A*01:26, A*01:28, A*01:29, A*01:30, A*01:32, A*01:33, A*01:35, A*02:08, A*02:103, A*02:128, A*02:20, A*02:55, A*02:56, A*02:62, A*02:78, A*03:01, A*03:02, A*03:04, A*03:05, A*03:06, A*03:07, A*03:08, A*03:09, A*03:10, A*03:12, A*03:13, A*03:14, A*03:15, A*03:16, A*03:17, A*03:18, A*03:19, A*03:20, A*03:22, A*03:24, A*03:25, A*03:26, A*03:27, A*03:28, A*03:29, A*03:31, A*03:32, A*03:33, A*03:34, A*03:35, A*03:37, A*03:38, A*03:39, A*03:40, A*03:41, A*03:42, A*03:43, A*03:44, A*03:45, A*03:46, A*03:47, A*03:50, A*03:51, A*11:01, A*11:02, A*11:03, A*11:04, A*11:05, A*11:06, A*11:07, A*11:08, A*11:09, A*11:10, A*11:11, A*11:12, A*11:13, A*11:14, A*11:15, A*11:16, A*11:17, A*11:18, A*11:19, A*11:20, A*11:22, A*11:23, A*11:24, A*11:25, A*11:26, A*11:27, A*11:29, A*11:30, A*11:31, A*11:32, A*11:33, A*11:34, A*11:35, A*11:36, A*11:37, A*11:38, A*11:39, A*11:40, A*11:41, A*11:42, A*23:09, A*24:24, A*24:67, A*25:01, A*25:02, A*25:03, A*25:04, A*25:05, A*25:06, A*25:07, A*25:08, A*26:01, A*26:02, A*26:03, A*26:04, A*26:05, A*26:06, A*26:08, A*26:09, A*26:10, A*26:12, A*26:13, A*26:14, A*26:15, A*26:16, A*26:17, A*26:18, A*26:19, A*26:20, A*26:21, A*26:22, A*26:23, A*26:24, A*26:26, A*26:27, A*26:28, A*26:29, A*26:30, A*26:31, A*26:32, A*26:33, A*26:34, A*26:35, A*26:36, A*26:37, A*26:38, A*29:01, A*29:02, A*29:03, A*29:05, A*29:06, A*29:07, A*29:09, A*29:10, A*29:11, A*29:12, A*29:13, A*29:14, A*29:15, A*29:16, A*29:17, A*29:18, A*29:19, A*30:01, A*30:02, A*30:03, A*30:04, A*30:06, A*30:08, A*30:09, A*30:10, A*30:11, A*30:12, A*30:13, A*30:14, A*30:15, A*30:16, A*30:17, A*30:18, A*30:19, A*30:20, A*30:23, A*30:24, A*30:25, A*30:26, A*30:28, A*31:01, A*31:03, A*31:04, A*31:05, A*31:06, A*31:09, A*31:10, A*31:11, A*31:12, A*31:13, A*31:15, A*31:16, A*31:17, A*31:18, A*31:19, A*31:20, A*31:21, A*31:22, A*31:23, A*31:24, A*32:01, A*32:02, A*32:03, A*32:04, A*32:06, A*32:07, A*32:08, A*32:09, A*32:10, A*32:11, A*32:12, A*32:13, A*32:14, A*32:15, A*32:16, A*32:17, A*32:18, A*33:01, A*33:03, A*33:04, A*33:05, A*33:06, A*33:07, A*33:09, A*33:10, A*33:11, A*33:12, A*33:13, A*33:14, A*33:15, A*33:16, A*33:17, A*33:18, A*33:19, A*33:20, A*33:22, A*33:23, A*34:02, A*34:03, A*34:04, A*34:06, A*34:07, A*34:08, A*36:01, A*36:02, A*36:03, A*36:04, A*43:01, A*66:01, A*66:02, A*66:03, A*66:04, A*66:05, A*66:06, A*66:07, A*66:08, A*66:09, A*68:01, A*68:02, A*68:03, A*68:04, A*68:05, A*68:06, A*68:07, A*68:08, A*68:09, A*68:10, A*68:12, A*68:13, A*68:14, A*68:15, A*68:16, A*68:17, A*68:19, A*68:20, A*68:21, A*68:22, A*68:23, A*68:24, A*68:25, A*68:26,

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Profile 59 Class I	oth.114Q, oth.245AS	$^{0.996}$ 1.029 $^{1.063}$	No	0.154701	A*02:135, A*02:65, A*25:01, A*25:02, A*25:03, A*25:04, A*25:05, A*25:06, A*25:07, A*25:08, A*26:01, A*26:02, A*26:03, A*26:04, A*26:05, A*26:06, A*26:07, A*26:08, A*26:09, A*26:10, A*26:12, A*26:13, A*26:14, A*26:15, A*26:16, A*26:17, A*26:18, A*26:19, A*26:20, A*26:21, A*26:22, A*26:23, A*26:24, A*26:26, A*26:27, A*26:28, A*26:29, A*26:30, A*26:31, A*26:32, A*26:33, A*26:34, A*26:35, A*26:36, A*26:37, A*26:38, A*31:01, A*31:02, A*31:05, A*31:07, A*31:08, A*31:09, A*31:10, A*31:11, A*31:12, A*31:13, A*31:15, A*31:16, A*31:17, A*31:18, A*31:19, A*31:20, A*31:21, A*31:22, A*31:23, A*31:24, A*32:01, A*32:02, A*32:03, A*32:05, A*32:06, A*32:07, A*32:08, A*32:09, A*32:10, A*32:11, A*32:12, A*32:13, A*32:14, A*32:15, A*32:16, A*32:17, A*32:18, A*33:01, A*33:03, A*33:04, A*33:05, A*33:06, A*33:07, A*33:08, A*33:09, A*33:10, A*33:11, A*33:12, A*33:13, A*33:14, A*33:15, A*33:16, A*33:17, A*33:20, A*33:21, A*33:22, A*33:23, A*34:01, A*34:05, A*34:06, A*43:01, A*66:01, A*66:02, A*66:03, A*66:04, A*66:05, A*66:06, A*66:07, A*66:08, A*66:09, A*74:01, A*74:02, A*74:03, A*74:04, A*74:05, A*74:06, A*74:07, A*74:08, A*74:09, A*74:10, A*74:11, A*74:13
Profile 60 Class I	oth.99F, oth.9S	$^{0.957}$ 0.989 $^{1.023}$	No	0.591402	A*23:01, A*23:02, A*23:03, A*23:04, A*23:05, A*23:06, A*23:09, A*23:10, A*23:12, A*23:13, A*23:14, A*23:15, A*23:16, A*23:17, A*23:18, A*23:19, A*23:20, A*23:21, A*24:02, A*24:03, A*24:04, A*24:05, A*24:06, A*24:07, A*24:08, A*24:10, A*24:13, A*24:17, A*24:18, A*24:19, A*24:20, A*24:21, A*24:22, A*24:23, A*24:24, A*24:25, A*24:26, A*24:27, A*24:28, A*24:29, A*24:30, A*24:31, A*24:32, A*24:33, A*24:34, A*24:35, A*24:37, A*24:38, A*24:39, A*24:41, A*24:42, A*24:43, A*24:44, A*24:46, A*24:47, A*24:49, A*24:52, A*24:54, A*24:55, A*24:56, A*24:58, A*24:59, A*24:61, A*24:62, A*24:63, A*24:66, A*24:67, A*24:68, A*24:69, A*24:70, A*24:71, A*24:72, A*24:73, A*24:74, A*24:75, A*24:76, A*24:77, A*24:78, A*24:79, A*24:80, A*24:81, A*24:85, A*24:87, A*24:89, A*24:91, A*24:93, A*24:94, A*24:95, A*24:96, A*24:97, A*24:98, A*24:99, C*04:01, C*04:04, C*04:05, C*04:07, C*04:08, C*04:10, C*04:11, C*04:12, C*04:13, C*04:14, C*04:18, C*04:19, C*04:20, C*04:23, C*04:24, C*04:25, C*04:26, C*04:27, C*04:28, C*04:29,

							C*04:30, C*04:31, C*04:32, C*04:33, C*04:34, C*04:35, C*04:36, C*04:38, C*04:40, C*14:02, C*14:03, C*14:04, C*14:06, C*14:08, C*14:10, C*14:11
Profile 62 Class I	Abv.193PV, oth.184H	0.949	1.003	1.059	No	0.930917	C*01:02, C*01:03, C*01:04, C*01:05, C*01:06, C*01:07, C*01:08, C*01:09, C*01:10, C*01:12, C*01:13, C*01:14, C*01:15, C*01:16, C*01:17, C*01:18, C*01:19, C*01:20, C*01:21, C*01:22, C*01:23, C*01:24, C*01:25, C*01:26, C*01:27, C*02:02, C*02:03, C*02:04, C*02:05, C*02:06, C*02:07, C*02:08, C*02:09, C*02:10, C*02:11, C*02:12, C*02:13, C*02:14, C*02:15, C*02:16, C*02:17, C*02:18, C*02:19, C*02:20, C*02:21, C*02:22, C*02:23, C*02:26, C*02:27, C*03:02, C*03:03, C*03:04, C*03:05, C*03:06, C*03:07, C*03:08, C*03:09, C*03:10, C*03:11, C*03:12, C*03:13, C*03:14, C*03:15, C*03:16, C*03:17, C*03:18, C*03:19, C*03:21, C*03:22, C*03:23, C*03:24, C*03:25, C*03:26, C*03:27, C*03:28, C*03:29, C*03:30, C*03:31, C*03:32, C*03:33, C*03:34, C*03:35, C*03:36, C*03:37, C*03:38, C*03:39, C*03:40, C*03:41, C*03:42, C*03:43, C*03:44, C*03:45, C*03:46, C*03:47, C*03:48, C*03:49, C*03:50, C*03:57, C*03:58, C*04:01, C*04:03, C*04:04, C*04:05, C*04:06, C*04:07, C*04:08, C*04:10, C*04:11, C*04:12, C*04:13, C*04:14, C*04:15, C*04:16, C*04:17, C*04:18, C*04:19, C*04:20, C*04:23, C*04:24, C*04:25, C*04:26, C*04:27, C*04:28, C*04:29, C*04:30, C*04:31, C*04:32, C*04:33, C*04:34, C*04:35, C*04:36, C*04:37, C*04:38, C*04:40, C*05:01, C*05:04, C*05:05, C*05:06, C*05:08, C*05:09, C*05:10, C*05:11, C*05:12, C*05:13, C*05:14, C*05:15, C*05:16, C*05:17, C*05:18, C*05:19, C*05:20, C*05:21, C*05:22, C*05:23, C*05:24, C*05:25, C*06:02, C*06:03, C*06:04, C*06:05, C*06:06, C*06:07, C*06:08, C*06:09, C*06:10, C*06:11, C*06:12, C*06:13, C*06:14, C*06:15, C*06:17, C*06:18, C*06:19, C*06:20, C*06:22, C*06:23, C*07:41, C*08:01, C*08:02, C*08:03, C*08:04, C*08:05, C*08:06, C*08:07, C*08:08, C*08:09, C*08:10, C*08:11, C*08:12, C*08:13, C*08:14, C*08:15, C*08:16, C*08:17, C*08:18, C*08:19, C*08:21, C*08:22, C*08:23, C*12:02, C*12:03, C*12:04, C*12:05, C*12:06, C*12:07, C*12:08, C*12:09, C*12:10, C*12:11, C*12:12, C*12:13, C*12:14, C*12:15, C*12:16, C*12:17, C*12:18, C*12:19, C*12:20, C*12:21, C*14:02, C*14:03, C*14:04, C*14:05, C*14:06, C*14:08, C*14:09, C*14:10, C*15:02, C*15:03, C*15:04, C*15:05, C*15:06, C*15:07, C*15:08, C*15:09, C*15:10, C*15:11, C*15:12, C*15:13, C*15:15, C*15:16, C*15:17, C*15:18, C*15:19, C*15:21, C*18:01, C*18:02, C*18:03
Profile 63 Class I	Abv.150AAH, oth.150AH	1.162	1.206	1.252	Yes	6.96E-17	A*01:12, A*01:19, A*01:21, A*01:26, A*02:01, A*02:02, A*02:04, A*02:05, A*02:06, A*02:07, A*02:08, A*02:09, A*02:10, A*02:101, A*02:102, A*02:103, A*02:104, A*02:105, A*02:106, A*02:107, A*02:108, A*02:109, A*02:11, A*02:110, A*02:111, A*02:112, A*02:114, A*02:115, A*02:116, A*02:118, A*02:119, A*02:12, A*02:120, A*02:121, A*02:122, A*02:123, A*02:124, A*02:126, A*02:127, A*02:128, A*02:129, A*02:13, A*02:131, A*02:132, A*02:133, A*02:134, A*02:136, A*02:137, A*02:138, A*02:139,

	A*02:14, A*02:140, A*02:141, A*02:142, A*02:143, A*02:144, A*02:145, A*02:146, A*02:147, A*02:149, A*02:150, A*02:151, A*02:153, A*02:154, A*02:155, A*02:156, A*02:157, A*02:16, A*02:17, A*02:18, A*02:19, A*02:20, A*02:21, A*02:22, A*02:24, A*02:26, A*02:27, A*02:28, A*02:29, A*02:30, A*02:31, A*02:33, A*02:34, A*02:35, A*02:36, A*02:37, A*02:39, A*02:41, A*02:42, A*02:44, A*02:45, A*02:46, A*02:47, A*02:48, A*02:49, A*02:50, A*02:52, A*02:54, A*02:55, A*02:56, A*02:57, A*02:58, A*02:59, A*02:60, A*02:61, A*02:62, A*02:63, A*02:64, A*02:66, A*02:67, A*02:68, A*02:69, A*02:70, A*02:71, A*02:72, A*02:73, A*02:74, A*02:75, A*02:76, A*02:77, A*02:78, A*02:79, A*02:80, A*02:81, A*02:84, A*02:86, A*02:87, A*02:89, A*02:90, A*02:91, A*02:92, A*02:93, A*02:95, A*02:96, A*02:97, A*02:99, A*03:01, A*03:02, A*03:04, A*03:05, A*03:06, A*03:07, A*03:08, A*03:09, A*03:10, A*03:12, A*03:13, A*03:14, A*03:15, A*03:16, A*03:17, A*03:19, A*03:20, A*03:22, A*03:23, A*03:24, A*03:25, A*03:26, A*03:27, A*03:28, A*03:29, A*03:30, A*03:31, A*03:32, A*03:33, A*03:34, A*03:35, A*03:37, A*03:38, A*03:39, A*03:40, A*03:41, A*03:43, A*03:44, A*03:45, A*03:46, A*03:47, A*03:50, A*03:51, A*11:01, A*11:02, A*11:04, A*11:05, A*11:06, A*11:07, A*11:08, A*11:09, A*11:10, A*11:11, A*11:12, A*11:13, A*11:15, A*11:16, A*11:17, A*11:18, A*11:19, A*11:20, A*11:22, A*11:23, A*11:24, A*11:25, A*11:26, A*11:27, A*11:29, A*11:30, A*11:31, A*11:32, A*11:33, A*11:34, A*11:35, A*11:36, A*11:37, A*11:38, A*11:39, A*11:40, A*11:41, A*11:42, A*24:02, A*24:03, A*24:04, A*24:05, A*24:06, A*24:07, A*24:08, A*24:10, A*24:13, A*24:14, A*24:15, A*24:17, A*24:18, A*24:19, A*24:20, A*24:21, A*24:22, A*24:23, A*24:25, A*24:26, A*24:27, A*24:28, A*24:29, A*24:30, A*24:31, A*24:32, A*24:33, A*24:34, A*24:35, A*24:37, A*24:38, A*24:39, A*24:41, A*24:42, A*24:43, A*24:44, A*24:46, A*24:47, A*24:49, A*24:50, A*24:51, A*24:52, A*24:53, A*24:54, A*24:55, A*24:56, A*24:57, A*24:58, A*24:59, A*24:61, A*24:62, A*24:63, A*24:64, A*24:66, A*24:67, A*24:68, A*24:69, A*24:70, A*24:72, A*24:73, A*24:74, A*24:75, A*24:76, A*24:77, A*24:78, A*24:79, A*24:80, A*24:81, A*24:82, A*24:87, A*24:88, A*24:89, A*24:91, A*24:92, A*24:93, A*24:94, A*24:95, A*24:96, A*24:97, A*24:98, A*26:14, A*29:05, A*30:04, A*30:06, A*30:17, A*31:24, A*32:02, A*32:04, A*32:06, A*32:10, A*33:19, A*34:03, A*68:01, A*68:02, A*68:03, A*68:04, A*68:05, A*68:06, A*68:07, A*68:08, A*68:09, A*68:10, A*68:12, A*68:13, A*68:14, A*68:15, A*68:17, A*68:19, A*68:20, A*68:21, A*68:22, A*68:23, A*68:24, A*68:25, A*68:26, A*68:27, A*68:28, A*68:29, A*68:30, A*68:31, A*68:32, A*68:33, A*68:34, A*68:35, A*68:36, A*68:37, A*68:38, A*68:39, A*68:40, A*68:42, A*68:43, A*68:44, A*68:45, A*68:46, A*68:47, A*69:01, C*07:25

Profile 64	Class I	oth.62RN, oth.63NI	$^{0.989}$ 1.029 $^{1.070}$	No	0.239237	B*07:02, B*07:03, B*07:04, B*07:05, B*07:06, B*07:07, B*07:08, B*07:09, B*07:10, B*07:11, B*07:12, B*07:14, B*07:15, B*07:16, B*07:17, B*07:18, B*07:19, B*07:20, B*07:21, B*07:22, B*07:23, B*07:24, B*07:25, B*07:26, B*07:27, B*07:28, B*07:29, B*07:30, B*07:31, B*07:32, B*07:33, B*07:34, B*07:35, B*07:36, B*07:37, B*07:38, B*07:39, B*07:40, B*07:41, B*07:42, B*07:43, B*07:44, B*07:45, B*07:46, B*07:47, B*07:48, B*07:50, B*07:51, B*07:52, B*07:53, B*07:55, B*07:56, B*07:57, B*07:58, B*07:59, B*07:60, B*07:61, B*07:62, B*07:63, B*07:64, B*07:65, B*07:66, B*07:68, B*07:69, B*07:70, B*07:71, B*07:72, B*07:75, B*07:76, B*08:01, B*08:02, B*08:03, B*08:04, B*08:07, B*08:09, B*08:11, B*08:12, B*08:13, B*08:14, B*08:15, B*08:16, B*08:18, B*08:20, B*08:21, B*08:22, B*08:23, B*08:24, B*08:25, B*08:26, B*08:27, B*08:28, B*08:29, B*08:31, B*08:32, B*08:33, B*08:34, B*08:35, B*08:36, B*08:37, B*08:40, B*14:01, B*14:02, B*14:03, B*14:05, B*14:06, B*14:08, B*14:09, B*14:10, B*15:02, B*15:08, B*15:09, B*15:10, B*15:108, B*15:11, B*15:112, B*15:114, B*15:115, B*15:119, B*15:121, B*15:124, B*15:13, B*15:133, B*15:134, B*15:139, B*15:143, B*15:144, B*15:148, B*15:15, B*15:153, B*15:18, B*15:21, B*15:23, B*15:29, B*15:31, B*15:37, B*15:44, B*15:51, B*15:52, B*15:55, B*15:64, B*15:72, B*15:76, B*15:80, B*15:88, B*15:89, B*15:90, B*15:93, B*15:99, B*18:01, B*18:02, B*18:03, B*18:04, B*18:05, B*18:06, B*18:07, B*18:08, B*18:09, B*18:10, B*18:11, B*18:13, B*18:14, B*18:15, B*18:18, B*18:19, B*18:20, B*18:21, B*18:22, B*18:24, B*18:25, B*18:26, B*18:27, B*18:28, B*18:29, B*18:30, B*18:31, B*18:32, B*18:33, B*27:23, B*35:01, B*35:02, B*35:03, B*35:04, B*35:05, B*35:06, B*35:07, B*35:08, B*35:09, B*35:11, B*35:12, B*35:14, B*35:15, B*35:17, B*35:18, B*35:19, B*35:20, B*35:21, B*35:22, B*35:23, B*35:24, B*35:25, B*35:26, B*35:27, B*35:29, B*35:30, B*35:31, B*35:32, B*35:33, B*35:34, B*35:35, B*35:36, B*35:37, B*35:38, B*35:39, B*35:41, B*35:42, B*35:43, B*35:44, B*35:45, B*35:46, B*35:47, B*35:48, B*35:49, B*35:50, B*35:51, B*35:52, B*35:54, B*35:55, B*35:56, B*35:57, B*35:58, B*35:59, B*35:60, B*35:61, B*35:62, B*35:64, B*35:65, B*35:66, B*35:67, B*35:68, B*35:70, B*35:71, B*35:72, B*35:74, B*35:75, B*35:76, B*35:77, B*35:78, B*35:79, B*35:81, B*35:82, B*35:83, B*35:84, B*35:85, B*35:86, B*35:87, B*35:88, B*35:89, B*35:90, B*35:91, B*35:92, B*35:93, B*35:94, B*35:95, B*35:97, B*35:99, B*37:08, B*38:01, B*38:02, B*38:05, B*38:06, B*38:07, B*38:08, B*38:09, B*38:10, B*38:11, B*38:12, B*38:13, B*38:14, B*38:15, B*38:16, B*38:17, B*38:18, B*38:19, B*39:01, B*39:03, B*39:04, B*39:05, B*39:06, B*39:07, B*39:09, B*39:10, B*39:11, B*39:12, B*39:14, B*39:15, B*39:16, B*39:17, B*39:18, B*39:19, B*39:20, B*39:24, B*39:26, B*39:27, B*39:28, B*39:29, B*39:30, B*39:31, B*39:32, B*39:33, B*39:34, B*39:35, B*39:36, B*39:37, B*39:38, B*39:39, B*39:41, B*39:42, B*39:43,

						B*39:44, B*39:45, B*39:46, B*39:47, B*39:48, B*40:08, B*40:25, B*40:68, B*42:01, B*42:02, B*42:04, B*42:05, B*42:06, B*42:07, B*42:08, B*42:09, B*42:10, B*44:06, B*44:12, B*48:06, B*51:01, B*51:02, B*51:03, B*51:04, B*51:05, B*51:06, B*51:07, B*51:08, B*51:09, B*51:10, B*51:12, B*51:13, B*51:14, B*51:15, B*51:16, B*51:17, B*51:18, B*51:19, B*51:20, B*51:21, B*51:22, B*51:23, B*51:24, B*51:26, B*51:28, B*51:29, B*51:30, B*51:31, B*51:32, B*51:33, B*51:34, B*51:35, B*51:36, B*51:37, B*51:38, B*51:39, B*51:40, B*51:42, B*51:43, B*51:45, B*51:46, B*51:48, B*51:49, B*51:50, B*51:51, B*51:52, B*51:53, B*51:54, B*51:55, B*51:56, B*51:57, B*51:58, B*51:59, B*51:60, B*51:61, B*51:62, B*51:63, B*51:64, B*51:65, B*53:01, B*53:02, B*53:03, B*53:04, B*53:05, B*53:06, B*53:07, B*53:08, B*53:09, B*53:10, B*53:11, B*53:12, B*53:13, B*53:14, B*53:15, B*53:16, B*53:18, B*54:01, B*54:02, B*54:03, B*54:04, B*54:06, B*54:07, B*54:09, B*54:10, B*54:11, B*54:12, B*54:13, B*54:14, B*54:15, B*54:16, B*54:17, B*55:01, B*55:02, B*55:03, B*55:04, B*55:05, B*55:07, B*55:08, B*55:09, B*55:10, B*55:11, B*55:12, B*55:13, B*55:14, B*55:15, B*55:16, B*55:17, B*55:19, B*55:20, B*55:21, B*55:22, B*55:23, B*55:24, B*55:25, B*55:26, B*55:27, B*55:28, B*55:29, B*55:30, B*55:31, B*55:32, B*55:33, B*56:01, B*56:02, B*56:03, B*56:04, B*56:05, B*56:06, B*56:07, B*56:09, B*56:10, B*56:11, B*56:12, B*56:13, B*56:15, B*56:16, B*56:17, B*56:18, B*56:20, B*56:21, B*56:22, B*56:23, B*56:24, B*59:01, B*59:02, B*59:03, B*59:04, B*67:01, B*73:01, B*78:01, B*78:02, B*78:03, B*78:04, B*81:01, B*81:02, B*81:03, B*82:01, B*82:02, B*83:01
Profile 67 Class I	oth.95W, oth.97T	$^{1.032}$ 1.069 $^{1.106}$	Yes	0.001563	B*08:09, B*13:02, B*13:03, B*13:04, B*13:08, B*13:09, B*13:14, B*13:15, B*13:16, B*13:18, B*13:19, B*15:04, B*15:137, B*15:155, B*15:42, B*15:83, B*27:14, B*35:37, B*35:60, B*39:06, B*39:33, B*39:34, B*40:06, B*40:44, B*40:53, B*40:70, B*40:75, B*40:83, B*40:86, B*40:93, B*40:95, B*40:96, B*42:04, B*44:20, B*44:47, B*46:11, B*46:18, B*51:01, B*51:02, B*51:03, B*51:05, B*51:07, B*51:08, B*51:09, B*51:10, B*51:12, B*51:13, B*51:14, B*51:15, B*51:16, B*51:17, B*51:18, B*51:19, B*51:20, B*51:21, B*51:22, B*51:23, B*51:24, B*51:26, B*51:28, B*51:29, B*51:30, B*51:31, B*51:32, B*51:33, B*51:34, B*51:35, B*51:36, B*51:37, B*51:38, B*51:39, B*51:40, B*51:43, B*51:48, B*51:49, B*51:50, B*51:51, B*51:52, B*51:53, B*51:54, B*51:55, B*51:57, B*51:58, B*51:60, B*51:61, B*51:63, B*51:65, B*52:01, B*52:02, B*52:03, B*52:04, B*52:05, B*52:06, B*52:07, B*52:08, B*52:09, B*52:10, B*52:11, B*52:12, B*52:13, B*52:14, B*54:01, B*54:02, B*54:03, B*54:04, B*54:07, B*54:10, B*54:11, B*54:12, B*54:13, B*54:14, B*54:15, B*54:16, B*54:17, B*55:01, B*55:02, B*55:03, B*55:05, B*55:07, B*55:09, B*55:10, B*55:12, B*55:13, B*55:15, B*55:16, B*55:17, B*55:18, B*55:19, B*55:20, B*55:21, B*55:22, B*55:23, B*55:24, B*55:25, B*55:26, B*55:27,

	B*55:28, B*55:29, B*55:30, B*55:31, B*55:32, B*55:33, B*55:34, B*56:01, B*56:05, B*56:06, B*56:07, B*56:08, B*56:13, B*56:14, B*56:15, B*56:16, B*56:17, B*56:20, B*56:21, B*56:22, B*56:23, B*56:24, B*58:08, B*59:01, B*59:02, B*59:03, B*59:04, B*73:01, B*78:01, B*78:02, B*78:03, B*78:04, B*78:05, B*78:06

HLA Class II Eplet Mismatch Profiles

Profile	Class	EMM	Hazard ratio	Meeting threshold for false discovery rate	P-value	Examples of donor alleles informing eplet combinations that could give rise to the EMM profiles (when not present in recipient)				
Profile 01	Class II	Abv.57DE$^{\surd}$ Abv.57DEDP$^{\surd}$, oth.58EEDP$^{\surd}$	$^{1.025}$ 1.064 $^{1.104}$	No	0.005983	DRB1*03:08, DRB1*08:41, DRB1*11:05, DRB1*11:10, DRB1*11:104, DRB1*11:109, DRB1*11:114, DRB1*11:12, DRB1*11:125, DRB1*11:13, DRB1*11:18, DRB1*11:23, DRB1*11:28, DRB1*11:36, DRB1*11:42, DRB1*11:47, DRB1*11:53, DRB1*11:58, DRB1*11:63, DRB1*11:69, DRB1*11:75, DRB1*11:80, DRB1*11:85, DRB1*11:90,	DRB1*03:65, DRB1*11:01, DRB1*11:06, DRB1*11:100, DRB1*11:105, DRB1*11:11, DRB1*11:115, DRB1*11:121, DRB1*11:126, DRB1*11:14, DRB1*11:19, DRB1*11:24, DRB1*11:29, DRB1*11:37, DRB1*11:43, DRB1*11:48, DRB1*11:54, DRB1*11:59, DRB1*11:64, DRB1*11:70, DRB1*11:76, DRB1*11:81, DRB1*11:86, DRB1*11:91,	DRB1*04:15, DRB1*11:02, DRB1*11:07, DRB1*11:101, DRB1*11:106, DRB1*11:111, DRB1*11:117, DRB1*11:122, DRB1*11:127, DRB1*11:15, DRB1*11:20, DRB1*11:25, DRB1*11:30, DRB1*11:39, DRB1*11:44, DRB1*11:49, DRB1*11:55, DRB1*11:60, DRB1*11:66, DRB1*11:72, DRB1*11:77, DRB1*11:82, DRB1*11:87, DRB1*11:92,	DRB1*04:61, DRB1*11:03, DRB1*11:08, DRB1*11:102, DRB1*11:107, DRB1*11:112, DRB1*11:118, DRB1*11:123, DRB1*11:128, DRB1*11:16, DRB1*11:21, DRB1*11:26, DRB1*11:32, DRB1*11:40, DRB1*11:45, DRB1*11:50, DRB1*11:56, DRB1*11:61, DRB1*11:67, DRB1*11:73, DRB1*11:78, DRB1*11:83, DRB1*11:88, DRB1*11:93,	DRB1*08:31, DRB1*11:04, DRB1*11:09, DRB1*11:103, DRB1*11:108, DRB1*11:113, DRB1*11:119, DRB1*11:124, DRB1*11:129, DRB1*11:17, DRB1*11:22, DRB1*11:27, DRB1*11:34, DRB1*11:41, DRB1*11:46, DRB1*11:51, DRB1*11:57, DRB1*11:62, DRB1*11:68, DRB1*11:74, DRB1*11:79, DRB1*11:84, DRB1*11:89, DRB1*11:94,

						DRB1*11:95, DRB1*11:97, DRB1*11:98, DRB1*11:99, DRB1*12:04, DRB1*14:11, DRB1*16:16, DRB3*02:18, DRB5*01:13,	
Profile 02	Class II	Abv.181M$^{\surd}$, Abv.25Q3, Abv.4Q$^{\surd}$, Abv.57V$^{\surd}$, Abv.73GQ$^{\surd}$, Abv.78V2$^{\surd}$, oth.180VMP, oth.37F$^{\surd}$, oth.37FV$^{\surd}$	$^{1.081}$ 1.121 $^{1.163}$	Yes	2.88E-07	DRB1*07:01, DRB1*07:09	
Profile 03	Class II	Abv.125SQ, Abv.13FE, Abv.31I$^{\surd}$, Abv.74SR3, Abv.74SV2, Abv.96EV$^{\surd}$, oth.13FEL, oth.26L(HLA-DRB1)$^{\surd}$, **oth.37YV** (HLA-DQB1), **oth.56PV**, **oth.85VY**, oth.96ES2	$^{1.049}$ 1.099 $^{1.152}$	Yes	0.000857	DRB1*01:01, DRB1*01:02, DRB1*01:03, DRB1*01:04, DRB1*01:20 And DQB1*05:01, DQB1*05:07, DQB1*05:12	
Profile 04	Class II	Abv.70QT$^{\surd}$, oth.70QA$^{\surd}$	$^{1.151}$ 1.184 $^{1.217}$	Yes	1.67E-23	DRB1*01:01, DRB1*01:02, DRB1*01:05, DRB1*01:06, DRB1*01:07, DRB1*01:08, DRB1*01:09, DRB1*01:10, DRB1*01:12, DRB1*01:13, DRB1*01:14, DRB1*01:15, DRB1*01:17, DRB1*01:18, DRB1*01:19, DRB1*01:20, DRB1*01:21, DRB1*01:22, DRB1*01:24, DRB1*01:25, DRB1*01:26, DRB1*01:27, DRB1*01:28, DRB1*01:30, DRB1*01:31, DRB1*01:32, DRB1*01:34, DRB1*01:36, DRB1*01:37, DRB1*01:38, DRB1*01:41, DRB1*01:43, DRB1*01:44, DRB1*01:45, DRB1*01:46, DRB1*01:47, DRB1*01:48, DRB1*01:49, DRB1*04:01, DRB1*04:03, DRB1*04:04, DRB1*04:05, DRB1*04:06, DRB1*04:07, DRB1*04:08, DRB1*04:09, DRB1*04:10, DRB1*04:100, DRB1*04:102, DRB1*04:103, DRB1*04:104, DRB1*04:105, DRB1*04:107, DRB1*04:108, DRB1*04:109, DRB1*04:11, DRB1*04:110, DRB1*04:111, DRB1*04:112, DRB1*04:113, DRB1*04:114, DRB1*04:115, DRB1*04:116, DRB1*04:117, DRB1*04:118, DRB1*04:121, DRB1*04:122, DRB1*04:123, DRB1*04:13, DRB1*04:16,	

						DRB1*04:17,	DRB1*04:19,	DRB1*04:20,	DRB1*04:21,	DRB1*04:23,
						DRB1*04:26,	DRB1*04:27,	DRB1*04:28,	DRB1*04:29,	DRB1*04:30,
						DRB1*04:31,	DRB1*04:32,	DRB1*04:33,	DRB1*04:34,	DRB1*04:35,
						DRB1*04:38,	DRB1*04:39,	DRB1*04:40,	DRB1*04:41,	DRB1*04:42,
						DRB1*04:43,	DRB1*04:45,	DRB1*04:46,	DRB1*04:49,	DRB1*04:50,
						DRB1*04:51,	DRB1*04:52,	DRB1*04:55,	DRB1*04:56,	DRB1*04:57,
						DRB1*04:59,	DRB1*04:60,	DRB1*04:61,	DRB1*04:62,	DRB1*04:63,
						DRB1*04:64,	DRB1*04:65,	DRB1*04:66,	DRB1*04:67,	DRB1*04:68,
						DRB1*04:70,	DRB1*04:71,	DRB1*04:73,	DRB1*04:75,	DRB1*04:76,
						DRB1*04:77,	DRB1*04:79,	DRB1*04:80,	DRB1*04:83,	DRB1*04:84,
						DRB1*04:85,	DRB1*04:87,	DRB1*04:88,	DRB1*04:89,	DRB1*04:90,
						DRB1*04:91,	DRB1*04:92,	DRB1*04:93,	DRB1*04:96,	DRB1*04:97,
						DRB1*10:04,	DRB1*11:26,	DRB1*11:34,	DRB1*11:69,	DRB1*11:79,
						DRB1*11:82,	DRB1*13:09,	DRB1*13:129,	DRB1*13:44,	DRB1*13:86,
						DRB1*14:02,	DRB1*14:06,	DRB1*14:09,	DRB1*14:106,	DRB1*14:108,
						DRB1*14:109,	DRB1*14:119,	DRB1*14:121,	DRB1*14:13,	DRB1*14:17,
						DRB1*14:19,	DRB1*14:20,	DRB1*14:21,	DRB1*14:24,	DRB1*14:29,
						DRB1*14:30,	DRB1*14:33,	DRB1*14:37,	DRB1*14:41,	DRB1*14:46,
						DRB1*14:48,	DRB1*14:49,	DRB1*14:51,	DRB1*14:52,	DRB1*14:80,
						DRB1*14:83,	DRB1*14:89,	DRB1*14:94,	DRB1*15:01,	DRB1*15:02,
						DRB1*15:03,	DRB1*15:04,	DRB1*15:05,	DRB1*15:06,	DRB1*15:07,
						DRB1*15:08,	DRB1*15:09,	DRB1*15:11,	DRB1*15:12,	DRB1*15:13,
						DRB1*15:14,	DRB1*15:15,	DRB1*15:16,	DRB1*15:19,	DRB1*15:20,
						DRB1*15:22,	DRB1*15:23,	DRB1*15:24,	DRB1*15:26,	DRB1*15:27,
						DRB1*15:28,	DRB1*15:29,	DRB1*15:30,	DRB1*15:31,	DRB1*15:32,
						DRB1*15:33,	DRB1*15:34,	DRB1*15:35,	DRB1*15:36,	DRB1*15:38,
						DRB1*15:39,	DRB1*15:40,	DRB1*15:41,	DRB1*15:42,	DRB1*15:43,
						DRB1*15:45,	DRB1*15:46,	DRB1*15:47,	DRB1*15:48,	DRB1*15:49,
						DRB1*15:51,	DRB1*15:52,	DRB1*15:53,	DRB1*15:54,	DRB1*15:55,
						DRB1*15:56,	DRB1*15:58,	DRB1*15:59,	DRB1*15:60,	DRB1*15:61,
						DRB1*15:62,	DRB1*15:63,	DRB1*15:64,	DRB1*15:65,	DRB1*15:66,
						DRB1*15:67,	DRB1*15:68,	DRB1*15:69,	DRB1*15:70,	DRB1*15:71,
						DRB1*15:72,	DRB1*15:73,	DRB1*15:74,	DRB1*15:75,	DRB1*15:76,
						DRB1*15:77,	DRB3*02:27,	DRB5*01:06,	DRB5*01:11,	DRB5*02:02,
						DRB5*02:03,	DRB5*02:04,	DRB5*02:05,	DRB5*02:06	
Profile 05	Class II	Abv.37L$^{\surd}$, oth.28EH$^{\surd}$, oth.38L$^{\surd}$	1.004	1.070	1.140	No	0.081742	DRB1*08:32,	DRB1*12:01,	DRB1*12:02,	DRB1*12:03,	DRB1*12:04,
								DRB1*12:06,	DRB1*12:07,	DRB1*12:08,	DRB1*12:09,	DRB1*12:10,
								DRB1*12:11,	DRB1*12:12,	DRB1*12:13,	DRB1*12:16,	DRB1*12:17,
								DRB1*12:18,	DRB1*12:19,	DRB1*12:20,	DRB1*12:21,	DRB1*12:22,

						DRB1*12:23, DRB1*12:33,	DRB1*12:25, DRB1*12:34,	DRB1*12:26, DRB1*12:35,	DRB1*12:29, DRB1*12:36	DRB1*12:30,
Profile 07	Class II	Abv.74R√, Abv.77N√, oth.13SEY√, oth.26Y√	1.060	1.103	1.148	Yes	4.92E-05	DRB1*03:01, DRB1*03:09, DRB1*03:18, DRB1*03:25, DRB1*03:32, DRB1*03:39, DRB1*03:46, DRB1*03:52, DRB1*03:59, DRB1*03:64, DRB1*03:71, DRB1*03:79, DRB3*01:02, DRB3*01:08, DRB3*01:14,	DRB1*03:04, DRB1*03:10, DRB1*03:19, DRB1*03:26, DRB1*03:33, DRB1*03:42, DRB1*03:47, DRB1*03:55, DRB1*03:60, DRB1*03:65, DRB1*03:72, DRB1*03:80, DRB3*01:03, DRB3*01:10, DRB3*01:15	DRB1*03:05, DRB1*03:12, DRB1*03:20, DRB1*03:28, DRB1*03:34, DRB1*03:43, DRB1*03:48, DRB1*03:56, DRB1*03:61, DRB1*03:66, DRB1*03:73, DRB1*03:82, DRB3*01:04, DRB3*01:11,	DRB1*03:06, DRB1*03:13, DRB1*03:22, DRB1*03:30, DRB1*03:36, DRB1*03:44, DRB1*03:50, DRB1*03:57, DRB1*03:62, DRB1*03:69, DRB1*03:75, DRB1*03:83, DRB3*01:05, DRB3*01:12,	DRB1*03:08, DRB1*03:16, DRB1*03:23, DRB1*03:31, DRB1*03:37, DRB1*03:45, DRB1*03:51, DRB1*03:58, DRB1*03:63, DRB1*03:70, DRB1*03:77, DRB3*01:01, DRB3*01:06, DRB3*01:13,
Profile 17	Class II	oth.104S√, oth.180VTP√, oth.98K√, oth.98KS	1.005	1.054	1.106	No	0.070914	DRB1*01:01, DRB1*01:20, DRB1*03:06, DRB1*08:02, DRB1*08:09, DRB1*08:16, DRB1*11:01, DRB1*11:06, DRB1*11:129, DRB1*11:19, DRB1*11:34, DRB1*12:01, DRB1*13:01, DRB1*13:08, DRB1*13:14, DRB1*13:36, DRB1*14:03, DRB1*14:10, DRB1*14:46, DRB1*15:02, DRB1*16:02,	DRB1*01:02, DRB1*03:01, DRB1*03:10, DRB1*08:03, DRB1*08:10, DRB1*08:17, DRB1*11:02, DRB1*11:08, DRB1*11:13, DRB1*11:21, DRB1*11:35, DRB1*12:02, DRB1*13:02, DRB1*13:10, DRB1*13:17, DRB1*13:56, DRB1*14:04, DRB1*14:11, DRB1*14:54, DRB1*15:03, DRB1*16:03,	DRB1*01:03, DRB1*03:02, DRB1*03:15, DRB1*08:04, DRB1*08:11, DRB1*08:18, DRB1*11:03, DRB1*11:09, DRB1*11:14, DRB1*11:27, DRB1*11:39, DRB1*12:06, DRB1*13:03, DRB1*13:11, DRB1*13:20, DRB1*13:87, DRB1*14:05, DRB1*14:13, DRB1*14:57, DRB1*15:04, DRB1*16:04	DRB1*01:04, DRB1*03:03, DRB1*03:55, DRB1*08:06, DRB1*08:13, DRB1*08:35, DRB1*11:04, DRB1*11:11, DRB1*11:15, DRB1*11:29, DRB1*11:46, DRB1*12:10, DRB1*13:05, DRB1*13:117, DRB1*13:27, DRB1*14:01, DRB1*14:06, DRB1*14:14, DRB1*14:82, DRB1*15:07,	DRB1*01:13, DRB1*03:04, DRB1*08:01, DRB1*08:07, DRB1*08:14, DRB1*08:41, DRB1*11:05, DRB1*11:12, DRB1*11:18, DRB1*11:32, DRB1*11:70, DRB1*12:17, DRB1*13:06, DRB1*13:12, DRB1*13:29, DRB1*14:02, DRB1*14:07, DRB1*14:21, DRB1*15:01, DRB1*16:01,

Profile 21	Class II	oth.120S$^{\surd}$, oth.180V$^{\surd}$, oth.33N$^{\surd}$	$^{0.884}$ 0.952 $^{1.026}$	No	0.279924	DRB1*01:01, DRB1*01:20, DRB1*03:06, DRB1*07:04, DRB1*08:04, DRB1*08:11, DRB1*08:18, DRB1*09:18, DRB1*11:04, DRB1*11:11, DRB1*11:15, DRB1*11:29, DRB1*11:46, DRB1*12:06, DRB1*13:03, DRB1*13:11, DRB1*13:20, DRB1*13:87, DRB1*14:05, DRB1*14:13, DRB1*14:57, DRB1*15:04, DRB1*16:04, DRB3*02:11, DRB3*03:03	DRB1*01:02, DRB1*03:01, DRB1*03:10, DRB1*07:09, DRB1*08:06, DRB1*08:13, DRB1*08:35, DRB1*09:19, DRB1*11:05, DRB1*11:12, DRB1*11:18, DRB1*11:32, DRB1*11:70, DRB1*12:10, DRB1*13:05, DRB1*13:117, DRB1*13:27, DRB1*14:01, DRB1*14:06, DRB1*14:14, DRB1*14:82, DRB1*15:07, DRB3*01:01, DRB3*02:20,	DRB1*01:03, DRB1*03:02, DRB1*03:15, DRB1*08:01, DRB1*08:07, DRB1*08:14, DRB1*08:41, DRB1*11:01, DRB1*11:06, DRB1*11:129, DRB1*11:19, DRB1*11:34, DRB1*11:97, DRB1*12:17, DRB1*13:06, DRB1*13:12, DRB1*13:29, DRB1*14:02, DRB1*14:07, DRB1*14:21, DRB1*15:01, DRB1*16:01, DRB3*02:01, DRB3*02:24,	DRB1*01:04, DRB1*03:03, DRB1*03:55, DRB1*08:02, DRB1*08:09, DRB1*08:16, DRB1*09:01, DRB1*11:02, DRB1*11:08, DRB1*11:13, DRB1*11:21, DRB1*11:35, DRB1*12:01, DRB1*13:01, DRB1*13:08, DRB1*13:14, DRB1*13:36, DRB1*14:03, DRB1*14:10, DRB1*14:46, DRB1*15:02, DRB1*16:02, DRB3*02:02, DRB3*02:28,	DRB1*01:13, DRB1*03:04, DRB1*07:01, DRB1*08:03, DRB1*08:10, DRB1*08:17, DRB1*09:02, DRB1*11:03, DRB1*11:09, DRB1*11:14, DRB1*11:27, DRB1*11:39, DRB1*12:02, DRB1*13:02, DRB1*13:10, DRB1*13:17, DRB1*13:56, DRB1*14:04, DRB1*14:11, DRB1*14:54, DRB1*15:03, DRB1*16:03, DRB3*02:10, DRB3*03:01,
Profile 28	Class II	**oth.37YA**, oth.67VT, **oth.74EL**	$^{1.046}$ 1.085 $^{1.125}$	Yes	0.000209	DQB1*03:01, DQB1*03:07, DQB1*03:12, DQB1*03:18, DQB1*03:24, DQB1*03:31, DQB1*03:36, DQB1*03:41, DQB1*06:03, DQB1*06:09, DQB1*06:14, DQB1*06:20, DQB1*06:27, DQB1*06:34,	DQB1*03:02, DQB1*03:08, DQB1*03:14, DQB1*03:19, DQB1*03:26, DQB1*03:32, DQB1*03:37, DQB1*03:42, DQB1*06:04, DQB1*06:10, DQB1*06:15, DQB1*06:21, DQB1*06:29, DQB1*06:36,	DQB1*03:03, DQB1*03:09, DQB1*03:15, DQB1*03:21, DQB1*03:27, DQB1*03:33, DQB1*03:38, DQB1*03:43, DQB1*06:05, DQB1*06:11, DQB1*06:16, DQB1*06:22, DQB1*06:31, DQB1*06:37,	DQB1*03:04, DQB1*03:10, DQB1*03:16, DQB1*03:22, DQB1*03:29, DQB1*03:34, DQB1*03:39, DQB1*03:44, DQB1*06:07, DQB1*06:12, DQB1*06:18, DQB1*06:23, DQB1*06:32, DQB1*06:38,	DQB1*03:05, DQB1*03:11, DQB1*03:17, DQB1*03:23, DQB1*03:30, DQB1*03:35, DQB1*03:40, DQB1*06:02, DQB1*06:08, DQB1*06:13, DQB1*06:19, DQB1*06:25, DQB1*06:33, DQB1*06:39,

						DQB1*06:40, DQB1*06:48,	DQB1*06:41, DQB1*06:49,	DQB1*06:44, DQB1*06:50,	DQB1*06:46, DQB1*06:52	DQB1*06:47,
Profile 29	Class II	Abv.52PL3, **Abv.55PP**, oth.66ER, **oth.70RT**	1.046	1.080	1.116	Yes	8.43E-05	DQB1*03:01, DQB1*03:07, DQB1*03:14, DQB1*03:20, DQB1*03:27, DQB1*03:32, DQB1*03:37, DQB1*03:42,	DQB1*03:02, DQB1*03:09, DQB1*03:15, DQB1*03:21, DQB1*03:28, DQB1*03:33, DQB1*03:38, DQB1*03:43,	DQB1*03:03, DQB1*03:10, DQB1*03:17, DQB1*03:22, DQB1*03:29, DQB1*03:34, DQB1*03:39, DQB1*03:44	DQB1*03:04, DQB1*03:11, DQB1*03:18, DQB1*03:24, DQB1*03:30, DQB1*03:35, DQB1*03:40,	DQB1*03:05, DQB1*03:12, DQB1*03:19, DQB1*03:26, DQB1*03:31, DQB1*03:36, DQB1*03:41,
Profile 30	Class II	Abv.31FYY, Abv.37YV (HLA-DRB1)√, oth.37Y√	1.066	1.098	1.132	Yes	2.94E-07	DRB1*03:17, DRB1*04:01, DRB1*04:07, DRB1*04:101, DRB1*04:107, DRB1*04:111, DRB1*04:118, DRB1*04:124, DRB1*04:17, DRB1*04:25, DRB1*04:30, DRB1*04:35, DRB1*04:40, DRB1*04:47, DRB1*04:53, DRB1*04:58, DRB1*04:63, DRB1*04:70, DRB1*04:75, DRB1*04:83, DRB1*04:90, DRB1*04:97, DRB1*08:04, DRB1*08:10, DRB1*08:15, DRB1*08:22, DRB1*08:27, DRB1*08:33, DRB1*08:40, DRB1*08:46,	DRB1*03:40, DRB1*04:02, DRB1*04:08, DRB1*04:103, DRB1*04:108, DRB1*04:112, DRB1*04:12, DRB1*04:13, DRB1*04:18, DRB1*04:26, DRB1*04:31, DRB1*04:36, DRB1*04:42, DRB1*04:48, DRB1*04:54, DRB1*04:59, DRB1*04:64, DRB1*04:71, DRB1*04:76, DRB1*04:86, DRB1*04:92, DRB1*04:98, DRB1*08:05, DRB1*08:11, DRB1*08:17, DRB1*08:23, DRB1*08:28, DRB1*08:34, DRB1*08:41, DRB1*08:47,	DRB1*03:41, DRB1*04:03, DRB1*04:09, DRB1*04:104, DRB1*04:109, DRB1*04:115, DRB1*04:121, DRB1*04:14, DRB1*04:22, DRB1*04:27, DRB1*04:32, DRB1*04:37, DRB1*04:43, DRB1*04:50, DRB1*04:55, DRB1*04:60, DRB1*04:66, DRB1*04:72, DRB1*04:79, DRB1*04:87, DRB1*04:93, DRB1*08:01, DRB1*08:06, DRB1*08:12, DRB1*08:18, DRB1*08:24, DRB1*08:29, DRB1*08:37, DRB1*08:43, DRB1*08:48,	DRB1*03:49, DRB1*04:04, DRB1*04:10, DRB1*04:105, DRB1*04:11, DRB1*04:116, DRB1*04:122, DRB1*04:15, DRB1*04:23, DRB1*04:28, DRB1*04:33, DRB1*04:38, DRB1*04:44, DRB1*04:51, DRB1*04:56, DRB1*04:61, DRB1*04:67, DRB1*04:73, DRB1*04:80, DRB1*04:88, DRB1*04:95, DRB1*08:02, DRB1*08:07, DRB1*08:13, DRB1*08:19, DRB1*08:25, DRB1*08:30, DRB1*08:38, DRB1*08:44, DRB1*08:49,	DRB1*03:75, DRB1*04:05, DRB1*04:100, DRB1*04:106, DRB1*04:110, DRB1*04:117, DRB1*04:123, DRB1*04:16, DRB1*04:24, DRB1*04:29, DRB1*04:34, DRB1*04:39, DRB1*04:45, DRB1*04:52, DRB1*04:57, DRB1*04:62, DRB1*04:69, DRB1*04:74, DRB1*04:82, DRB1*04:89, DRB1*04:96, DRB1*08:03, DRB1*08:08, DRB1*08:14, DRB1*08:20, DRB1*08:26, DRB1*08:31, DRB1*08:39, DRB1*08:45, DRB1*11:01,

						DRB1*11:02,	DRB1*11:03,	DRB1*11:04,	DRB1*11:05,	DRB1*11:06,
						DRB1*11:07,	DRB1*11:08,	DRB1*11:100,	DRB1*11:101,	DRB1*11:102,
						DRB1*11:103,	DRB1*11:104,	DRB1*11:105,	DRB1*11:106,	DRB1*11:107,
						DRB1*11:108,	DRB1*11:109,	DRB1*11:11,	DRB1*11:110,	DRB1*11:111,
						DRB1*11:112,	DRB1*11:116,	DRB1*11:117,	DRB1*11:119,	DRB1*11:120,
						DRB1*11:123,	DRB1*11:124,	DRB1*11:125,	DRB1*11:126,	DRB1*11:128,
						DRB1*11:129,	DRB1*11:14,	DRB1*11:18,	DRB1*11:19,	DRB1*11:21,
						DRB1*11:22,	DRB1*11:23,	DRB1*11:25,	DRB1*11:26,	DRB1*11:27,
						DRB1*11:30,	DRB1*11:31,	DRB1*11:32,	DRB1*11:33,	DRB1*11:34,
						DRB1*11:35,	DRB1*11:36,	DRB1*11:37,	DRB1*11:38,	DRB1*11:39,
						DRB1*11:41,	DRB1*11:42,	DRB1*11:43,	DRB1*11:45,	DRB1*11:48,
						DRB1*11:51,	DRB1*11:53,	DRB1*11:54,	DRB1*11:55,	DRB1*11:56,
						DRB1*11:57,	DRB1*11:60,	DRB1*11:61,	DRB1*11:64,	DRB1*11:65,
						DRB1*11:66,	DRB1*11:67,	DRB1*11:68,	DRB1*11:69,	DRB1*11:70,
						DRB1*11:73,	DRB1*11:74,	DRB1*11:75,	DRB1*11:77,	DRB1*11:78,
						DRB1*11:79,	DRB1*11:81,	DRB1*11:82,	DRB1*11:84,	DRB1*11:86,
						DRB1*11:88,	DRB1*11:89,	DRB1*11:90,	DRB1*11:91,	DRB1*11:93,
						DRB1*11:94,	DRB1*11:95,	DRB1*11:96,	DRB1*11:97,	DRB1*11:98,
						DRB1*11:99,	DRB1*13:03,	DRB1*13:04,	DRB1*13:07,	DRB1*13:100,
						DRB1*13:101,	DRB1*13:108,	DRB1*13:11,	DRB1*13:116,	DRB1*13:118,
						DRB1*13:12,	DRB1*13:122,	DRB1*13:13,	DRB1*13:133,	DRB1*13:134,
						DRB1*13:14,	DRB1*13:17,	DRB1*13:21,	DRB1*13:22,	DRB1*13:23,
						DRB1*13:24,	DRB1*13:25,	DRB1*13:30,	DRB1*13:33,	DRB1*13:37,
						DRB1*13:38,	DRB1*13:44,	DRB1*13:45,	DRB1*13:46,	DRB1*13:47,
						DRB1*13:48,	DRB1*13:49,	DRB1*13:54,	DRB1*13:55,	DRB1*13:58,
						DRB1*13:66,	DRB1*13:70,	DRB1*13:75,	DRB1*13:81,	DRB1*13:82,
						DRB1*13:86,	DRB1*13:88,	DRB1*13:89,	DRB1*13:90,	DRB1*13:94,
						DRB1*13:95,	DRB1*14:102,	DRB1*14:116,	DRB1*14:25,	DRB1*14:42,
						DRB1*14:53,	DRB1*14:58,	DRB1*14:69		
Profile 31	Class II	oth.31FH$^{\surd}$, oth.32H$^{\surd}$, oth.37N$^{\surd}$	1.022	1.057	1.094	No	0.006989	DRB1*03:01,	DRB1*03:02,	DRB1*03:03,	DRB1*03:05,	DRB1*03:06,
								DRB1*03:07,	DRB1*03:08,	DRB1*03:09,	DRB1*03:10,	DRB1*03:11,
								DRB1*03:12,	DRB1*03:13,	DRB1*03:14,	DRB1*03:15,	DRB1*03:16,
								DRB1*03:18,	DRB1*03:19,	DRB1*03:20,	DRB1*03:23,	DRB1*03:24,
								DRB1*03:27,	DRB1*03:28,	DRB1*03:29,	DRB1*03:32,	DRB1*03:34,
								DRB1*03:37,	DRB1*03:38,	DRB1*03:39,	DRB1*03:42,	DRB1*03:45,
								DRB1*03:46,	DRB1*03:47,	DRB1*03:48,	DRB1*03:50,	DRB1*03:51,
								DRB1*03:53,	DRB1*03:54,	DRB1*03:55,	DRB1*03:56,	DRB1*03:57,
								DRB1*03:58,	DRB1*03:59,	DRB1*03:60,	DRB1*03:61,	DRB1*03:62,
								DRB1*03:63,	DRB1*03:64,	DRB1*03:65,	DRB1*03:66,	DRB1*03:69,
								DRB1*03:70,	DRB1*03:72,	DRB1*03:73,	DRB1*03:74,	DRB1*03:76,

						DRB1*03:77, DRB1*03:82, DRB1*11:122, DRB1*11:83, DRB1*13:06, DRB1*13:104, DRB1*13:112, DRB1*13:121, DRB1*13:130, DRB1*13:141, DRB1*13:26, DRB1*13:32, DRB1*13:41, DRB1*13:56, DRB1*13:67, DRB1*13:78, DRB1*13:92, DRB1*14:02, DRB1*14:108, DRB1*14:13, DRB1*14:24, DRB1*14:46, DRB1*14:59, DRB1*14:80, DRB1*14:95,	DRB1*03:78, DRB1*03:83, DRB1*11:16, DRB1*11:87, DRB1*13:09, DRB1*13:105, DRB1*13:114, DRB1*13:126, DRB1*13:131, DRB1*13:15, DRB1*13:27, DRB1*13:35, DRB1*13:42, DRB1*13:59, DRB1*13:71, DRB1*13:79, DRB1*13:93, DRB1*14:03, DRB1*14:109, DRB1*14:17, DRB1*14:27, DRB1*14:47, DRB1*14:63, DRB1*14:81, DRB1*14:98,	DRB1*03:79, DRB1*03:84, DRB1*11:20, DRB1*13:01, DRB1*13:10, DRB1*13:109, DRB1*13:117, DRB1*13:127, DRB1*13:138, DRB1*13:16, DRB1*13:28, DRB1*13:36, DRB1*13:43, DRB1*13:61, DRB1*13:73, DRB1*13:80, DRB1*13:96, DRB1*14:06, DRB1*14:115, DRB1*14:18, DRB1*14:29, DRB1*14:48, DRB1*14:64, DRB1*14:83, DRB3*01:08,	DRB1*03:80, DRB1*11:09, DRB1*11:40, DRB1*13:02, DRB1*13:102, DRB1*13:110, DRB1*13:119, DRB1*13:128, DRB1*13:139, DRB1*13:18, DRB1*13:29, DRB1*13:39, DRB1*13:51, DRB1*13:63, DRB1*13:74, DRB1*13:85, DRB1*13:98, DRB1*14:09, DRB1*14:12, DRB1*14:19, DRB1*14:30, DRB1*14:51, DRB1*14:67, DRB1*14:85, DRB3*02:06,	DRB1*03:81, DRB1*11:113, DRB1*11:59, DRB1*13:05, DRB1*13:103, DRB1*13:111, DRB1*13:120, DRB1*13:129, DRB1*13:140, DRB1*13:20, DRB1*13:31, DRB1*13:40, DRB1*13:53, DRB1*13:65, DRB1*13:77, DRB1*13:91, DRB1*13:99, DRB1*14:106, DRB1*14:121, DRB1*14:21, DRB1*14:33, DRB1*14:52, DRB1*14:78, DRB1*14:89, DRB3*02:20
Profile 32	Class II	**Abv.52PQ2**, **Abv.52PR**, **oth.67VG**, **oth.85VA**	1.060	1.096	1.133	Yes	5.19E-06	DQB1*05:01, DQB1*05:07, DQB1*05:12, DQB1*06:02, DQB1*06:13, DQB1*06:24, DQB1*06:40, DQB1*06:50	DQB1*05:02, DQB1*05:08, DQB1*05:13, DQB1*06:03, DQB1*06:14, DQB1*06:28, DQB1*06:41,	DQB1*05:03, DQB1*05:09, DQB1*05:14, DQB1*06:08, DQB1*06:16, DQB1*06:30, DQB1*06:44,	DQB1*05:05, DQB1*05:10, DQB1*05:15, DQB1*06:10, DQB1*06:20, DQB1*06:31, DQB1*06:47,	DQB1*05:06, DQB1*05:11, DQB1*05:16, DQB1*06:11, DQB1*06:23, DQB1*06:33, DQB1*06:49,
Profile 35	Class II	**Abv.45EV**, oth.167H2, oth.55PPD	1.010	1.042	1.074	No	0.027664	DQB1*03:01, DQB1*03:24, DQB1*03:36,	DQB1*03:09, DQB1*03:27, DQB1*03:42	DQB1*03:19, DQB1*03:28,	DQB1*03:21, DQB1*03:29,	DQB1*03:22, DQB1*03:35,
Profile 36	Class II	Abv.71K√, oth.70QK√	1.037	1.071	1.106	Yes	0.000411	DRB1*01:10, DRB1*03:04, DRB1*03:09,	DRB1*01:16, DRB1*03:05, DRB1*03:10,	DRB1*03:01, DRB1*03:06, DRB1*03:11,	DRB1*03:02, DRB1*03:07, DRB1*03:12,	DRB1*03:03, DRB1*03:08, DRB1*03:13,

						DRB1*03:14, DRB1*03:19, DRB1*03:24, DRB1*03:29, DRB1*03:34, DRB1*03:39, DRB1*03:44, DRB1*03:49, DRB1*03:54, DRB1*03:59, DRB1*03:64, DRB1*03:71, DRB1*03:76, DRB1*03:81, DRB1*04:09, DRB1*04:114, DRB1*04:16, DRB1*04:34, DRB1*04:64, DRB1*04:98, DRB1*11:125, DRB1*14:111, DRB1*15:25, DRB3*01:05, DRB3*01:10, DRB3*01:15, DRB3*02:05, DRB3*02:10, DRB3*02:15, DRB3*02:20, DRB3*02:25, DRB3*03:03,	DRB1*03:15, DRB1*03:20, DRB1*03:25, DRB1*03:30, DRB1*03:35, DRB1*03:40, DRB1*03:45, DRB1*03:50, DRB1*03:55, DRB1*03:60, DRB1*03:65, DRB1*03:72, DRB1*03:77, DRB1*03:82, DRB1*04:100, DRB1*04:115, DRB1*04:21, DRB1*04:35, DRB1*04:66, DRB1*11:07, DRB1*11:53, DRB1*14:19, DRB3*01:01, DRB3*01:06, DRB3*01:11, DRB3*02:01, DRB3*02:06, DRB3*02:11, DRB3*02:16, DRB3*02:21, DRB3*02:27,	DRB1*03:16, DRB1*03:21, DRB1*03:26, DRB1*03:31, DRB1*03:36, DRB1*03:41, DRB1*03:46, DRB1*03:51, DRB1*03:56, DRB1*03:61, DRB1*03:66, DRB1*03:73, DRB1*03:78, DRB1*03:83, DRB1*04:111, DRB1*04:117, DRB1*04:22, DRB1*04:38, DRB1*04:67, DRB1*11:103, DRB1*11:79, DRB1*14:21, DRB3*01:02, DRB3*01:07, DRB3*01:12, DRB3*02:02, DRB3*02:07, DRB3*02:12, DRB3*02:17, DRB3*02:22, DRB3*02:28,	DRB1*03:17, DRB1*03:22, DRB1*03:27, DRB1*03:32, DRB1*03:37, DRB1*03:42, DRB1*03:47, DRB1*03:52, DRB1*03:57, DRB1*03:62, DRB1*03:69, DRB1*03:74, DRB1*03:79, DRB1*03:84, DRB1*04:112, DRB1*04:123, DRB1*04:26, DRB1*04:62, DRB1*04:72, DRB1*11:105, DRB1*14:107, DRB1*14:76, DRB3*01:03, DRB3*01:08, DRB3*01:13, DRB3*02:03, DRB3*02:08, DRB3*02:13, DRB3*02:18, DRB3*02:23, DRB3*03:01,	DRB1*03:18, DRB1*03:23, DRB1*03:28, DRB1*03:33, DRB1*03:38, DRB1*03:43, DRB1*03:48, DRB1*03:53, DRB1*03:58, DRB1*03:63, DRB1*03:70, DRB1*03:75, DRB1*03:80, DRB1*04:01, DRB1*04:113, DRB1*04:13, DRB1*04:33, DRB1*04:63, DRB1*04:76, DRB1*11:107, DRB1*14:109, DRB1*14:79, DRB3*01:04, DRB3*01:09, DRB3*01:14, DRB3*02:04, DRB3*02:09, DRB3*02:14, DRB3*02:19, DRB3*02:24, DRB3*03:02,
Profile 37	Class II	Abv.120N$^{\surd}$, Abv.96Y2	1.058	1.094	1.130	Yes	6.82E-06	DRB1*04:01, DRB1*04:06, DRB1*04:11, DRB1*04:92,	DRB1*04:02, DRB1*04:07, DRB1*04:15, DRB1*04:98	DRB1*04:03, DRB1*04:08, DRB1*04:16,	DRB1*04:04, DRB1*04:09, DRB1*04:31,	DRB1*04:05, DRB1*04:10, DRB1*04:34,
Profile 38	Class II	Abv.142M3$^{\surd}$, Abv.71A, Abv.96Q$^{\surd}$	1.101	1.140	1.181	Yes	9.98E-10	DRB1*15:01, DRB1*15:02, DRB1*15:03, DRB1*15:04, DRB1*15:07				

Profile 40	Class II	Abv.25R$^{\surd}$, Abv.4R$^{\surd}$ oth.181T$^{\surd}$, oth.78Y$^{\surd}$	$^{0.960}$ 1.076 $^{1.207}$	No	0.290997	DRB1*01:01, DRB1*03:02, DRB1*04:03, DRB1*04:08, DRB1*08:02, DRB1*08:09, DRB1*08:16, DRB1*11:02, DRB1*11:14, DRB1*12:10, DRB1*13:05, DRB1*14:01, DRB1*14:07, DRB1*15:01, DRB1*16:02, DRB3*02:10, DRB5*02:02	DRB1*01:02, DRB1*03:06, DRB1*04:04, DRB1*04:09, DRB1*08:03, DRB1*08:10, DRB1*08:18, DRB1*11:03, DRB1*11:15, DRB1*12:17, DRB1*13:12, DRB1*14:02, DRB1*14:11, DRB1*15:02, DRB1*16:03, DRB3*02:11,	DRB1*01:03, DRB1*03:10, DRB1*04:05, DRB1*04:10, DRB1*08:04, DRB1*08:11, DRB1*08:35, DRB1*11:04, DRB1*12:01, DRB1*13:01, DRB1*13:17, DRB1*14:03, DRB1*14:46, DRB1*15:03, DRB3*01:01, DRB3*03:01,	DRB1*01:04, DRB1*04:01, DRB1*04:06, DRB1*04:11, DRB1*08:06, DRB1*08:13, DRB1*08:41, DRB1*11:11, DRB1*12:02, DRB1*13:02, DRB1*13:27, DRB1*14:04, DRB1*14:54, DRB1*15:04, DRB3*02:01, DRB5*01:01,	DRB1*03:01, DRB1*04:02, DRB1*04:07, DRB1*08:01, DRB1*08:07, DRB1*08:14, DRB1*11:01, DRB1*11:13, DRB1*12:06, DRB1*13:03, DRB1*13:56, DRB1*14:05, DRB1*14:57, DRB1*16:01, DRB3*02:02, DRB5*01:02,

Profile 43	Class II	Abv.45GE3, oth.66D, oth.66DR, oth.73G$^{\surd}$	$^{1.085}$ 1.124 $^{1.163}$	Yes	3.2E-08	DRB1*01:16, , DRB1*03:01, DRB1*03:02, DRB1*03:03, DRB1*03:04, DRB1*03:05, DRB1*03:06, DRB1*03:07, DRB1*03:08, DRB1*03:09, DRB1*03:10, DRB1*03:11, DRB1*03:12, DRB1*03:13, DRB1*03:14, DRB1*03:15, DRB1*03:16, DRB1*03:17, DRB1*03:18, DRB1*03:19, DRB1*03:20, DRB1*03:21, DRB1*03:22, DRB1*03:23, DRB1*03:24, DRB1*03:25, DRB1*03:26, DRB1*03:27, DRB1*03:28, DRB1*03:29, DRB1*03:30, DRB1*03:31, DRB1*03:32, DRB1*03:33, DRB1*03:34, DRB1*03:35, DRB1*03:36, DRB1*03:37, DRB1*03:38, DRB1*03:39, DRB1*03:40, DRB1*03:41, DRB1*03:42, DRB1*03:43, DRB1*03:44, DRB1*03:45, DRB1*03:46, DRB1*03:47, DRB1*03:48, DRB1*03:49, DRB1*03:50, DRB1*03:51, DRB1*03:52, DRB1*03:53, DRB1*03:54, DRB1*03:55, DRB1*03:56, DRB1*03:57, DRB1*03:58, DRB1*03:59, DRB1*03:60, DRB1*03:61, DRB1*03:62, DRB1*03:63, DRB1*03:64, DRB1*03:65, DRB1*03:66, DRB1*03:69, DRB1*03:70, DRB1*03:71, DRB1*03:72, DRB1*03:73, DRB1*03:74, DRB1*03:75, DRB1*03:77, DRB1*03:78, DRB1*03:79, DRB1*03:80, DRB1*03:81, DRB1*03:82, DRB1*03:83, DRB1*03:84, DRB1*04:22, DRB1*04:98, DRB1*07:01, DRB1*07:03, DRB1*07:04, DRB1*07:05, DRB1*07:06, DRB1*07:07, DRB1*07:08, DRB1*07:09, DRB1*07:11, DRB1*07:12, DRB1*07:13, DRB1*07:14, DRB1*07:15, DRB1*07:16, DRB1*07:17, DRB1*07:19, DRB1*07:20, DRB1*07:21, DRB1*07:22, DRB1*11:07, DRB1*11:103, DRB1*11:105, DRB1*11:107, DRB1*11:125, DRB1*11:53, DRB1*14:104, DRB1*14:107, DRB1*14:111, DRB1*14:76, DRB1*14:79, DRB1*15:25, DRB3*01:01, DRB3*01:02, DRB3*01:03, DRB3*01:04, DRB3*01:05, DRB3*01:06, DRB3*01:07, DRB3*01:08, DRB3*01:09, DRB3*01:10, DRB3*01:11, DRB3*01:12, DRB3*01:13, DRB3*01:14, DRB3*01:15, DRB3*02:01, DRB3*02:02, DRB3*02:03, DRB3*02:04, DRB3*02:05, DRB3*02:06, DRB3*02:07, DRB3*02:08, DRB3*02:09, DRB3*02:10, DRB3*02:11, DRB3*02:12, DRB3*02:13, DRB3*02:14, DRB3*02:15, DRB3*02:16, DRB3*02:17, DRB3*02:18, DRB3*02:19, DRB3*02:20, DRB3*02:21, DRB3*02:22, DRB3*02:23, DRB3*02:24, DRB3*02:25, DRB3*02:26, DRB3*02:28, DRB3*03:01, DRB3*03:02, DRB3*03:03 And DQB1*02:01, DQB1*02:02, DQB1*02:03, DQB1*02:04, DQB1*02:05, DQB1*02:06, DQB1*02:07
Profile 44	Class II	oth.125G, oth.55RPD, **oth.70GT**, **oth.87F**	$^{1.061}$ 1.095 $^{1.131}$	Yes	3.34E-06	DQB1*06:02, DQB1*06:03, DQB1*06:41, DQB1*06:44, DQB1*06:47

Profile 46	Class II	Abv.46VY3, Abv.73A√, oth.77TY√	1.023	1.091	1.164	No	0.025738	DQB1*03:01, DQB1*03:02, DQB1*03:03, DQB1*03:04, DQB1*03:05, DQB1*03:06, DQB1*03:07, DQB1*03:08, DQB1*03:09, DQB1*03:10, DQB1*03:11, DQB1*03:12, DQB1*03:13, DQB1*03:14, DQB1*03:15, DQB1*03:16, DQB1*03:17, DQB1*03:18, DQB1*03:19, DQB1*03:20, DQB1*03:21, DQB1*03:22, DQB1*03:23, DQB1*03:24, DQB1*03:25, DQB1*03:26, DQB1*03:27, DQB1*03:28, DQB1*03:29, DQB1*03:30, DQB1*03:31, DQB1*03:32, DQB1*03:33, DQB1*03:34, DQB1*03:35, DQB1*03:36, DQB1*03:37, DQB1*03:38, DQB1*03:39, DQB1*03:40, DQB1*03:41, DQB1*03:42, DQB1*03:43, DQB1*03:44, DQB1*04:01, DQB1*04:02, DQB1*04:03, DQB1*04:04, DQB1*04:05, DQB1*04:06, DQB1*04:07, DQB1*04:08, DQB1*05:01, DQB1*05:02, DQB1*05:03, DQB1*05:04, DQB1*05:05, DQB1*05:06, DQB1*05:07, DQB1*05:08, DQB1*05:09, DQB1*05:10, DQB1*05:11, DQB1*05:12, DQB1*05:13, DQB1*05:14, DQB1*05:15, DQB1*05:16, DQB1*06:01, DQB1*06:02, DQB1*06:03, DQB1*06:04, DQB1*06:05, DQB1*06:06, DQB1*06:07, DQB1*06:08, DQB1*06:09, DQB1*06:10, DQB1*06:11, DQB1*06:12, DQB1*06:13, DQB1*06:14, DQB1*06:15, DQB1*06:16, DQB1*06:17, DQB1*06:18, DQB1*06:19, DQB1*06:20, DQB1*06:21, DQB1*06:22, DQB1*06:23, DQB1*06:24, DQB1*06:25, DQB1*06:27, DQB1*06:28, DQB1*06:29, DQB1*06:30, DQB1*06:31, DQB1*06:32, DQB1*06:33, DQB1*06:34, DQB1*06:35, DQB1*06:36, DQB1*06:37, DQB1*06:38, DQB1*06:39, DQB1*06:40, DQB1*06:41, DQB1*06:42, DQB1*06:43, DQB1*06:44, DQB1*06:45, DQB1*06:46, DQB1*06:47, DQB1*06:48, DQB1*06:49, DQB1*06:50, DQB1*06:52 DRB1*01:01, DRB1*01:02, DRB1*01:03, DRB1*01:05, DRB1*01:06, DRB1*01:07, DRB1*01:08, DRB1*01:09, DRB1*01:10, DRB1*01:12, DRB1*01:13, DRB1*01:14, DRB1*01:15, DRB1*01:17, DRB1*01:18, DRB1*01:19, DRB1*01:20, DRB1*01:22, DRB1*01:23, DRB1*01:24, DRB1*01:25, DRB1*01:26, DRB1*01:27, DRB1*01:28, DRB1*01:29, DRB1*01:30, DRB1*01:31, DRB1*01:32, DRB1*01:34, DRB1*01:36, DRB1*01:37, DRB1*01:38, DRB1*01:41, DRB1*01:42, DRB1*01:43, DRB1*01:44, DRB1*01:45, DRB1*01:46, DRB1*01:47, DRB1*01:48, DRB1*01:49, DRB1*04:01, DRB1*04:02, DRB1*04:03, DRB1*04:04, DRB1*04:05, DRB1*04:06, DRB1*04:07, DRB1*04:08, DRB1*04:09, DRB1*04:10, DRB1*04:100, DRB1*04:101, DRB1*04:102, DRB1*04:103, DRB1*04:104, DRB1*04:105, DRB1*04:106, DRB1*04:107, DRB1*04:108, DRB1*04:109, DRB1*04:11, DRB1*04:110, DRB1*04:111, DRB1*04:112, DRB1*04:113, DRB1*04:114, DRB1*04:115, DRB1*04:116, DRB1*04:117, DRB1*04:118, DRB1*04:12, DRB1*04:121, DRB1*04:122, DRB1*04:123,

DRB1*04:124,	DRB1*04:13,	DRB1*04:14,	DRB1*04:15,	DRB1*04:16,
DRB1*04:17,	DRB1*04:18,	DRB1*04:19,	DRB1*04:20,	DRB1*04:21,
DRB1*04:23,	DRB1*04:24,	DRB1*04:25,	DRB1*04:26,	DRB1*04:27,
DRB1*04:28,	DRB1*04:29,	DRB1*04:30,	DRB1*04:31,	DRB1*04:32,
DRB1*04:33,	DRB1*04:34,	DRB1*04:35,	DRB1*04:36,	DRB1*04:37,
DRB1*04:38,	DRB1*04:39,	DRB1*04:40,	DRB1*04:41,	DRB1*04:42,
DRB1*04:43,	DRB1*04:45,	DRB1*04:46,	DRB1*04:47,	DRB1*04:49,
DRB1*04:51,	DRB1*04:52,	DRB1*04:53,	DRB1*04:54,	DRB1*04:55,
DRB1*04:56,	DRB1*04:57,	DRB1*04:58,	DRB1*04:59,	DRB1*04:60,
DRB1*04:61,	DRB1*04:62,	DRB1*04:63,	DRB1*04:64,	DRB1*04:65,
DRB1*04:66,	DRB1*04:67,	DRB1*04:68,	DRB1*04:69,	DRB1*04:70,
DRB1*04:71,	DRB1*04:73,	DRB1*04:75,	DRB1*04:76,	DRB1*04:77,
DRB1*04:78,	DRB1*04:79,	DRB1*04:80,	DRB1*04:82,	DRB1*04:83,
DRB1*04:84,	DRB1*04:85,	DRB1*04:86,	DRB1*04:87,	DRB1*04:88,
DRB1*04:89,	DRB1*04:91,	DRB1*04:92,	DRB1*04:93,	DRB1*04:96,
DRB1*04:97,	DRB1*04:99,	DRB1*08:01,	DRB1*08:02,	DRB1*08:03,
DRB1*08:04,	DRB1*08:05,	DRB1*08:06,	DRB1*08:07,	DRB1*08:08,
DRB1*08:09,	DRB1*08:10,	DRB1*08:11,	DRB1*08:12,	DRB1*08:13,
DRB1*08:14,	DRB1*08:15,	DRB1*08:16,	DRB1*08:17,	DRB1*08:18,
DRB1*08:19,	DRB1*08:20,	DRB1*08:21,	DRB1*08:22,	DRB1*08:23,
DRB1*08:24,	DRB1*08:25,	DRB1*08:26,	DRB1*08:27,	DRB1*08:28,
DRB1*08:29,	DRB1*08:30,	DRB1*08:31,	DRB1*08:32,	DRB1*08:33,
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						DRB1*16:01, DRB1*16:07, DRB1*16:12, DRB1*16:18, DRB4*01:03, DRB5*01:01, DRB5*01:06, DRB5*01:14, DRB5*02:06	DRB1*16:02, DRB1*16:08, DRB1*16:14, DRB1*16:19, DRB4*01:05, DRB5*01:02, DRB5*01:07, DRB5*02:02,	DRB1*16:03, DRB1*16:09, DRB1*16:15, DRB3*02:27, DRB4*01:06, DRB5*01:03, DRB5*01:09, DRB5*02:03,	DRB1*16:04, DRB1*16:10, DRB1*16:16, DRB4*01:01, DRB4*01:07, DRB5*01:04, DRB5*01:11, DRB5*02:04,	DRB1*16:05, DRB1*16:11, DRB1*16:17, DRB4*01:02, DRB4*01:08, DRB5*01:05, DRB5*01:13, DRB5*02:05,
Profile 47	Class II	oth.167R, oth.45G	$^{1.070}$ 1.136 $^{1.207}$	Yes	0.000504	DQB1*02:01, DQB1*03:02, DQB1*03:31, DQB1*03:39, DQB1*04:07, DQB1*05:10, DQB1*06:02, DQB1*06:34, DQB1*06:42,	DQB1*02:02, DQB1*03:03, DQB1*03:32, DQB1*03:43, DQB1*05:01, DQB1*05:12, DQB1*06:03, DQB1*06:36, DQB1*06:44,	DQB1*02:04, DQB1*03:05, DQB1*03:33, DQB1*04:01, DQB1*05:02, DQB1*05:14, DQB1*06:04, DQB1*06:38, DQB1*06:47,	DQB1*02:06, DQB1*03:25, DQB1*03:34, DQB1*04:02, DQB1*05:03, DQB1*05:15, DQB1*06:09, DQB1*06:39, DQB1*06:52	DQB1*02:07, DQB1*03:30, DQB1*03:38, DQB1*04:06, DQB1*05:07, DQB1*05:16, DQB1*06:12, DQB1*06:41,
Profile 48	Class II	oth.28D$^{\surd}$, oth.28DY$^{\surd}$	$^{0.971}$ 1.018 $^{1.066}$	No	0.536359	DRB1*03:01, DRB1*03:08, DRB1*03:13, DRB1*03:18, DRB1*03:23, DRB1*03:30, DRB1*03:35, DRB1*03:41, DRB1*03:46, DRB1*03:51, DRB1*03:57, DRB1*03:62, DRB1*03:69, DRB1*03:75, DRB1*03:80, DRB1*04:01, DRB1*04:06, DRB1*04:100, DRB1*04:105, DRB1*04:11, DRB1*04:114, DRB1*04:12,	DRB1*03:04, DRB1*03:09, DRB1*03:14, DRB1*03:19, DRB1*03:24, DRB1*03:31, DRB1*03:36, DRB1*03:42, DRB1*03:47, DRB1*03:52, DRB1*03:58, DRB1*03:63, DRB1*03:70, DRB1*03:76, DRB1*03:81, DRB1*04:02, DRB1*04:07, DRB1*04:101, DRB1*04:106, DRB1*04:110, DRB1*04:115, DRB1*04:121,	DRB1*03:05, DRB1*03:10, DRB1*03:15, DRB1*03:20, DRB1*03:25, DRB1*03:32, DRB1*03:37, DRB1*03:43, DRB1*03:48, DRB1*03:54, DRB1*03:59, DRB1*03:64, DRB1*03:71, DRB1*03:77, DRB1*03:82, DRB1*04:03, DRB1*04:08, DRB1*04:102, DRB1*04:107, DRB1*04:111, DRB1*04:116, DRB1*04:122,	DRB1*03:06, DRB1*03:11, DRB1*03:16, DRB1*03:21, DRB1*03:26, DRB1*03:33, DRB1*03:39, DRB1*03:44, DRB1*03:49, DRB1*03:55, DRB1*03:60, DRB1*03:65, DRB1*03:72, DRB1*03:78, DRB1*03:83, DRB1*04:04, DRB1*04:09, DRB1*04:103, DRB1*04:108, DRB1*04:112, DRB1*04:117, DRB1*04:123,	DRB1*03:07, DRB1*03:12, DRB1*03:17, DRB1*03:22, DRB1*03:28, DRB1*03:34, DRB1*03:40, DRB1*03:45, DRB1*03:50, DRB1*03:56, DRB1*03:61, DRB1*03:66, DRB1*03:73, DRB1*03:79, DRB1*03:84, DRB1*04:05, DRB1*04:10, DRB1*04:104, DRB1*04:109, DRB1*04:113, DRB1*04:118, DRB1*04:124,

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DRB1*11:75,	DRB1*11:76,	DRB1*11:77,	DRB1*11:78,	DRB1*11:79,
DRB1*11:80,	DRB1*11:81,	DRB1*11:82,	DRB1*11:83,	DRB1*11:84,
DRB1*11:85,	DRB1*11:86,	DRB1*11:87,	DRB1*11:88,	DRB1*11:89,
DRB1*11:90,	DRB1*11:91,	DRB1*11:93,	DRB1*11:94,	DRB1*11:95,
DRB1*11:96,	DRB1*11:97,	DRB1*11:98,	DRB1*11:99,	DRB1*12:27,
DRB1*13:01,	DRB1*13:02,	DRB1*13:03,	DRB1*13:04,	DRB1*13:05,
DRB1*13:06,	DRB1*13:07,	DRB1*13:08,	DRB1*13:09,	DRB1*13:10,
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DRB1*13:107,	DRB1*13:108,	DRB1*13:109,	DRB1*13:11,	DRB1*13:110,
DRB1*13:111,	DRB1*13:112,	DRB1*13:114,	DRB1*13:115,	DRB1*13:116,
DRB1*13:117,	DRB1*13:118,	DRB1*13:119,	DRB1*13:12,	DRB1*13:120,
DRB1*13:121,	DRB1*13:122,	DRB1*13:123,	DRB1*13:124,	DRB1*13:125,
DRB1*13:126,	DRB1*13:127,	DRB1*13:128,	DRB1*13:129,	DRB1*13:13,
DRB1*13:130,	DRB1*13:131,	DRB1*13:132,	DRB1*13:133,	DRB1*13:134,
DRB1*13:135,	DRB1*13:136,	DRB1*13:138,	DRB1*13:139,	DRB1*13:14,
DRB1*13:140,	DRB1*13:141,	DRB1*13:16,	DRB1*13:17,	DRB1*13:18,
DRB1*13:20,	DRB1*13:21,	DRB1*13:22,	DRB1*13:23,	DRB1*13:24,
DRB1*13:25,	DRB1*13:27,	DRB1*13:28,	DRB1*13:29,	DRB1*13:30,
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DRB1*13:36,	DRB1*13:37,	DRB1*13:38,	DRB1*13:39,	DRB1*13:40,
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DRB1*13:46,	DRB1*13:47,	DRB1*13:48,	DRB1*13:49,	DRB1*13:50,
DRB1*13:51,	DRB1*13:52,	DRB1*13:54,	DRB1*13:55,	DRB1*13:56,
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DRB1*13:63,	DRB1*13:64,	DRB1*13:65,	DRB1*13:66,	DRB1*13:67,
DRB1*13:68,	DRB1*13:69,	DRB1*13:70,	DRB1*13:71,	DRB1*13:72,
DRB1*13:73,	DRB1*13:74,	DRB1*13:75,	DRB1*13:76,	DRB1*13:77,
DRB1*13:78,	DRB1*13:79,	DRB1*13:80,	DRB1*13:81,	DRB1*13:82,
DRB1*13:83,	DRB1*13:84,	DRB1*13:87,	DRB1*13:88,	DRB1*13:89,
DRB1*13:90,	DRB1*13:91,	DRB1*13:92,	DRB1*13:93,	DRB1*13:94,
DRB1*13:95,	DRB1*13:96,	DRB1*13:97,	DRB1*13:98,	DRB1*13:99,
DRB1*14:01,	DRB1*14:04,	DRB1*14:05,	DRB1*14:07,	DRB1*14:08,
DRB1*14:09,	DRB1*14:10,	DRB1*14:100,	DRB1*14:101,	DRB1*14:103,

						DRB1*14:104, DRB1*14:105, DRB1*14:107, DRB1*14:11, DRB1*14:110, DRB1*14:111, DRB1*14:112, DRB1*14:113, DRB1*14:114, DRB1*14:116, DRB1*14:117, DRB1*14:118, DRB1*14:119, DRB1*14:120, DRB1*14:122, DRB1*14:123, DRB1*14:125, DRB1*14:126, DRB1*14:127, DRB1*14:14, DRB1*14:15, DRB1*14:16, DRB1*14:17, DRB1*14:21, DRB1*14:22, DRB1*14:23, DRB1*14:25, DRB1*14:26, DRB1*14:28, DRB1*14:30, DRB1*14:31, DRB1*14:32, DRB1*14:33, DRB1*14:34, DRB1*14:35, DRB1*14:36, DRB1*14:37, DRB1*14:38, DRB1*14:39, DRB1*14:42, DRB1*14:43, DRB1*14:44, DRB1*14:45, DRB1*14:50, DRB1*14:53, DRB1*14:54, DRB1*14:55, DRB1*14:56, DRB1*14:57, DRB1*14:58, DRB1*14:59, DRB1*14:60, DRB1*14:61, DRB1*14:62, DRB1*14:64, DRB1*14:65, DRB1*14:68, DRB1*14:69, DRB1*14:71, DRB1*14:72, DRB1*14:73, DRB1*14:74, DRB1*14:75, DRB1*14:76, DRB1*14:79, DRB1*14:80, DRB1*14:82, DRB1*14:84, DRB1*14:86, DRB1*14:87, DRB1*14:88, DRB1*14:90, DRB1*14:91, DRB1*14:93, DRB1*14:95, DRB1*14:96, DRB1*14:97, DRB1*14:99, DRB1*15:01, DRB1*15:02, DRB1*15:04, DRB1*15:05, DRB1*15:06, DRB1*15:07, DRB1*15:08, DRB1*15:09, DRB1*15:10, DRB1*15:11, DRB1*15:12, DRB1*15:13, DRB1*15:14, DRB1*15:15, DRB1*15:16, DRB1*15:18, DRB1*15:19, DRB1*15:20, DRB1*15:21, DRB1*15:22, DRB1*15:24, DRB1*15:25, DRB1*15:26, DRB1*15:27, DRB1*15:28, DRB1*15:29, DRB1*15:30, DRB1*15:31, DRB1*15:32, DRB1*15:33, DRB1*15:34, DRB1*15:35, DRB1*15:36, DRB1*15:37, DRB1*15:38, DRB1*15:39, DRB1*15:40, DRB1*15:41, DRB1*15:42, DRB1*15:43, DRB1*15:44, DRB1*15:45, DRB1*15:46, DRB1*15:47, DRB1*15:48, DRB1*15:49, DRB1*15:51, DRB1*15:52, DRB1*15:53, DRB1*15:55, DRB1*15:56, DRB1*15:58, DRB1*15:59, DRB1*15:60, DRB1*15:61, DRB1*15:62, DRB1*15:63, DRB1*15:64, DRB1*15:65, DRB1*15:66, DRB1*15:67, DRB1*15:68, DRB1*15:69, DRB1*15:70, DRB1*15:71, DRB1*15:72, DRB1*15:73, DRB1*15:74, DRB1*15:75, DRB1*15:76, DRB1*15:77, DRB1*16:01, DRB1*16:02, DRB1*16:03, DRB1*16:04, DRB1*16:05, DRB1*16:07, DRB1*16:08, DRB1*16:09, DRB1*16:10, DRB1*16:11, DRB1*16:12, DRB1*16:14, DRB1*16:15, DRB1*16:16, DRB1*16:17, DRB1*16:18, DRB1*16:19, DRB3*01:01, DRB3*01:02, DRB3*01:04, DRB3*01:06, DRB3*01:07, DRB3*01:08, DRB3*01:10, DRB3*01:11, DRB3*01:12, DRB3*01:13, DRB3*01:14, DRB3*01:15
Profile 49	Class II	Abv.112Y$^{\surd}$, oth.57A$^{\surd}$	$^{0.954}$ 1.021 $^{1.093}$	No	0.621299	DRB1*14:01

Profile 55	Class II	oth.85VV[√], oth.86V[√]	1.025	1.058	1.091	No	0.003335	DRB1*01:04, DRB1*03:04, DRB1*03:11, DRB1*03:18, DRB1*03:24, DRB1*03:31, DRB1*03:37, DRB1*03:45, DRB1*03:51, DRB1*03:58, DRB1*03:64, DRB1*03:71, DRB1*03:77, DRB1*03:83, DRB1*04:06, DRB1*04:109, DRB1*04:12, DRB1*04:15, DRB1*04:32, DRB1*04:41, DRB1*04:50, DRB1*04:56, DRB1*04:67, DRB1*04:78, DRB1*04:93, DRB1*08:04, DRB1*08:31, DRB1*11:04, DRB1*11:115, DRB1*11:124, DRB1*11:18, DRB1*11:38, DRB1*11:44, DRB1*11:54, DRB1*11:60, DRB1*11:76, DRB1*11:85, DRB1*12:03, DRB1*13:08, DRB1*13:106,	DRB1*01:06, DRB1*03:06, DRB1*03:12, DRB1*03:19, DRB1*03:25, DRB1*03:32, DRB1*03:39, DRB1*03:46, DRB1*03:52, DRB1*03:59, DRB1*03:65, DRB1*03:72, DRB1*03:78, DRB1*03:84, DRB1*04:10, DRB1*04:11, DRB1*04:121, DRB1*04:18, DRB1*04:36, DRB1*04:42, DRB1*04:51, DRB1*04:58, DRB1*04:68, DRB1*04:79, DRB1*04:95, DRB1*08:06, DRB1*09:06, DRB1*11:07, DRB1*11:116, DRB1*11:127, DRB1*11:25, DRB1*11:40, DRB1*11:46, DRB1*11:55, DRB1*11:63, DRB1*11:77, DRB1*11:88, DRB1*12:19, DRB1*13:09, DRB1*13:108,	DRB1*01:20, DRB1*03:07, DRB1*03:13, DRB1*03:21, DRB1*03:26, DRB1*03:33, DRB1*03:42, DRB1*03:47, DRB1*03:54, DRB1*03:60, DRB1*03:66, DRB1*03:73, DRB1*03:79, DRB1*04:02, DRB1*04:100, DRB1*04:110, DRB1*04:122, DRB1*04:22, DRB1*04:37, DRB1*04:44, DRB1*04:52, DRB1*04:59, DRB1*04:70, DRB1*04:85, DRB1*04:96, DRB1*08:10, DRB1*10:02, DRB1*11:102, DRB1*11:118, DRB1*11:13, DRB1*11:34, DRB1*11:41, DRB1*11:48, DRB1*11:56, DRB1*11:65, DRB1*11:78, DRB1*11:89, DRB1*13:01, DRB1*13:10, DRB1*13:11,	DRB1*03:01, DRB1*03:08, DRB1*03:15, DRB1*03:22, DRB1*03:28, DRB1*03:34, DRB1*03:43, DRB1*03:49, DRB1*03:55, DRB1*03:61, DRB1*03:69, DRB1*03:75, DRB1*03:80, DRB1*04:03, DRB1*04:101, DRB1*04:114, DRB1*04:124, DRB1*04:23, DRB1*04:39, DRB1*04:46, DRB1*04:53, DRB1*04:60, DRB1*04:71, DRB1*04:88, DRB1*04:97, DRB1*08:20, DRB1*11:02, DRB1*11:104, DRB1*11:119, DRB1*11:16, DRB1*11:35, DRB1*11:42, DRB1*11:50, DRB1*11:58, DRB1*11:67, DRB1*11:83, DRB1*11:92, DRB1*13:04, DRB1*13:102, DRB1*13:110,	DRB1*03:03, DRB1*03:10, DRB1*03:16, DRB1*03:23, DRB1*03:30, DRB1*03:36, DRB1*03:44, DRB1*03:50, DRB1*03:56, DRB1*03:62, DRB1*03:70, DRB1*03:76, DRB1*03:82, DRB1*04:04, DRB1*04:108, DRB1*04:118, DRB1*04:13, DRB1*04:25, DRB1*04:40, DRB1*04:49, DRB1*04:55, DRB1*04:65, DRB1*04:73, DRB1*04:91, DRB1*04:99, DRB1*08:28, DRB1*11:03, DRB1*11:113, DRB1*11:123, DRB1*11:17, DRB1*11:36, DRB1*11:43, DRB1*11:52, DRB1*11:59, DRB1*11:70, DRB1*11:84, DRB1*11:98, DRB1*13:06, DRB1*13:105, DRB1*13:111,

DRB1*13:112, DRB1*13:114, DRB1*13:116, DRB1*13:117, DRB1*13:121,
DRB1*13:125, DRB1*13:127, DRB1*13:129, DRB1*13:130, DRB1*13:131,
DRB1*13:138, DRB1*13:141, DRB1*13:15, DRB1*13:17, DRB1*13:18,
DRB1*13:19, DRB1*13:20, DRB1*13:22, DRB1*13:24, DRB1*13:27,
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DRB1*13:72, DRB1*13:75, DRB1*13:76, DRB1*13:77, DRB1*13:78,
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DRB1*14:01, DRB1*14:04, DRB1*14:05, DRB1*14:06, DRB1*14:08,
DRB1*14:10, DRB1*14:100, DRB1*14:101, DRB1*14:103, DRB1*14:104,
DRB1*14:105, DRB1*14:106, DRB1*14:107, DRB1*14:108, DRB1*14:11,
DRB1*14:110, DRB1*14:111, DRB1*14:112, DRB1*14:113, DRB1*14:114,
DRB1*14:117, DRB1*14:118, DRB1*14:12, DRB1*14:120, DRB1*14:121,
DRB1*14:122, DRB1*14:123, DRB1*14:124, DRB1*14:125, DRB1*14:126,
DRB1*14:127, DRB1*14:15, DRB1*14:16, DRB1*14:17, DRB1*14:18,
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DRB1*14:81, DRB1*14:82, DRB1*14:83, DRB1*14:84, DRB1*14:86,
DRB1*14:87, DRB1*14:88, DRB1*14:90, DRB1*14:91, DRB1*14:95,
DRB1*14:96, DRB1*14:97, DRB1*15:01, DRB1*15:03, DRB1*15:04,
DRB1*15:05, DRB1*15:06, DRB1*15:07, DRB1*15:09, DRB1*15:10,
DRB1*15:12, DRB1*15:13, DRB1*15:16, DRB1*15:18, DRB1*15:20,
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DRB1*15:59, DRB1*15:61, DRB1*15:62, DRB1*15:64, DRB1*15:65,
DRB1*15:66, DRB1*15:67, DRB1*15:69, DRB1*15:70, DRB1*15:71,
DRB1*15:72, DRB1*15:73, DRB1*15:74, DRB1*15:75, DRB1*15:76,
DRB1*15:77, DRB1*16:15, DRB3*02:01, DRB3*02:04, DRB3*02:24,

							DRB3*03:01, DRB4*01:04,	DRB3*03:02, DRB4*01:05,	DRB4*01:01, DRB4*01:06,	DRB4*01:02, DRB4*01:07,	DRB4*01:03, DRB4*01:08
Profile 57	Class II	Abv.70R[√], Abv.70RE[√]	[1.012]	1.064	[1.120]	No	0.042851	DRB1*04:101, DRB1*09:04, DRB1*09:09, DRB1*09:14, DRB1*09:19, DRB1*14:04, DRB1*14:101, DRB1*14:113, DRB1*14:122, DRB1*14:14, DRB1*14:36, DRB1*14:44, DRB1*14:58, DRB1*14:64, DRB1*14:75, DRB1*14:90, DRB1*14:97, DRB4*01:04, DRB5*01:12	DRB1*04:69, DRB1*09:05, DRB1*09:10, DRB1*09:15, DRB1*11:17, DRB1*14:05, DRB1*14:103, DRB1*14:114, DRB1*14:124, DRB1*14:18, DRB1*14:38, DRB1*14:45, DRB1*14:59, DRB1*14:68, DRB1*14:82, DRB1*14:91, DRB1*14:99, DRB4*01:05,	DRB1*04:78, DRB1*09:06, DRB1*09:11, DRB1*09:16, DRB1*11:52, DRB1*14:07, DRB1*14:11, DRB1*14:117, DRB1*14:125, DRB1*14:23, DRB1*14:39, DRB1*14:50, DRB1*14:60, DRB1*14:70, DRB1*14:86, DRB1*14:93, DRB4*01:01, DRB4*01:06,	DRB1*09:01, DRB1*09:07, DRB1*09:12, DRB1*11:89, DRB1*14:08, DRB1*14:110, DRB1*14:118, DRB1*14:126, DRB1*14:26, DRB1*14:42, DRB1*14:54, DRB1*14:61, DRB1*14:71, DRB1*14:87, DRB1*14:95, DRB4*01:02, DRB4*01:07,	DRB1*09:02, DRB1*09:08, DRB1*09:13, DRB1*09:18, DRB1*14:01, DRB1*14:10, DRB1*14:112, DRB1*14:120, DRB1*14:127, DRB1*14:28, DRB1*14:43, DRB1*14:56, DRB1*14:62, DRB1*14:72, DRB1*14:88, DRB1*14:96, DRB4*01:03, DRB4*01:08,

Profile 58	Class II	oth.26L (HLA-DQB1), oth.13GM	1.001 1.038 1.076	No	0.09476	DQB1*02:01, DQB1*02:05, DQB1*03:03, DQB1*03:15, DQB1*03:25, DQB1*03:33, DQB1*03:39, DQB1*04:03, DQB1*06:07, DQB1*06:11, DQB1*06:15, DQB1*06:19, DQB1*06:25, DQB1*06:30, DQB1*06:36, DQB1*06:40, DQB1*06:46, DQB1*06:52	DQB1*02:02, DQB1*02:06, DQB1*03:06, DQB1*03:18, DQB1*03:30, DQB1*03:34, DQB1*03:40, DQB1*06:02, DQB1*06:08, DQB1*06:12, DQB1*06:16, DQB1*06:21, DQB1*06:27, DQB1*06:32, DQB1*06:37, DQB1*06:41, DQB1*06:47,	DQB1*02:03, DQB1*02:07, DQB1*03:07, DQB1*03:20, DQB1*03:31, DQB1*03:37, DQB1*03:41, DQB1*06:03, DQB1*06:09, DQB1*06:13, DQB1*06:17, DQB1*06:22, DQB1*06:28, DQB1*06:33, DQB1*06:38, DQB1*06:42, DQB1*06:48,	DQB1*02:04, DQB1*03:02, DQB1*03:08, DQB1*03:23, DQB1*03:32, DQB1*03:38, DQB1*03:43, DQB1*06:04, DQB1*06:10, DQB1*06:14, DQB1*06:18, DQB1*06:24, DQB1*06:29, DQB1*06:34, DQB1*06:39, DQB1*06:44, DQB1*06:50,	
Profile 61	Class II	**Abv.77R**, oth.75V	1.077 1.112 1.149	Yes	5.03E-08	DQB1*02:01, DQB1*02:07, DQB1*05:05, DQB1*05:10, DQB1*05:15,	DQB1*02:02, DQB1*05:01, DQB1*05:06, DQB1*05:11, DQB1*05:16,	DQB1*02:03, DQB1*05:02, DQB1*05:07, DQB1*05:12, DQB1*06:06	DQB1*02:04, DQB1*05:03, DQB1*05:08, DQB1*05:13,	DQB1*02:06, DQB1*05:04, DQB1*05:09, DQB1*05:14,
Profile 65	Class II	oth.57DA$^{\surd}$, oth.58AY$^{\surd}$	1.095 1.146 1.200	Yes	9.38E-07	DRB1*01:01, DRB1*01:06, DRB1*01:11, DRB1*01:17, DRB1*01:22, DRB1*01:28, DRB1*01:34, DRB1*01:42, DRB1*01:48, DRB1*03:04, DRB1*03:11, DRB1*03:18, DRB1*03:23, DRB1*03:28, DRB1*03:33,	DRB1*01:02, DRB1*01:07, DRB1*01:12, DRB1*01:18, DRB1*01:23, DRB1*01:29, DRB1*01:35, DRB1*01:44, DRB1*01:49, DRB1*03:05, DRB1*03:14, DRB1*03:19, DRB1*03:24, DRB1*03:29, DRB1*03:34,	DRB1*01:03, DRB1*01:08, DRB1*01:13, DRB1*01:19, DRB1*01:24, DRB1*01:30, DRB1*01:36, DRB1*01:45, DRB1*03:01, DRB1*03:06, DRB1*03:15, DRB1*03:20, DRB1*03:25, DRB1*03:30, DRB1*03:35,	DRB1*01:04, DRB1*01:09, DRB1*01:15, DRB1*01:20, DRB1*01:25, DRB1*01:31, DRB1*01:38, DRB1*01:46, DRB1*03:02, DRB1*03:07, DRB1*03:16, DRB1*03:21, DRB1*03:26, DRB1*03:31, DRB1*03:36,	DRB1*01:05, DRB1*01:10, DRB1*01:16, DRB1*01:21, DRB1*01:27, DRB1*01:32, DRB1*01:41, DRB1*01:47, DRB1*03:03, DRB1*03:09, DRB1*03:17, DRB1*03:22, DRB1*03:27, DRB1*03:32, DRB1*03:37,

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						DRB4*01:03, DRB4*01:08, DRB5*01:05, DRB5*01:14, DRB5*02:06	DRB4*01:04, DRB5*01:01, DRB5*01:06, DRB5*02:02,	DRB4*01:05, DRB5*01:02, DRB5*01:07, DRB5*02:03,	DRB4*01:06, DRB5*01:03, DRB5*01:09, DRB5*02:04,	DRB4*01:07, DRB5*01:04, DRB5*01:11, DRB5*02:05,
Profile 66	Class II	Abv.16Y, Abv.74L[√], oth.189S[√]	[1.012] 1.074 [1.139]	No	0.048843	DRB1*08:01, DRB1*08:10,	DRB1*08:02, DRB1*08:13,	DRB1*08:03, DRB1*08:16,	DRB1*08:06, DRB1*08:35	DRB1*08:09,

Models were adjusted for recipient characteristics: age, sex, time on dialysis, insurance, and cause of ESRD; donor characteristics: age, sex, and donor type; transplant characteristics: donor-recipient weight ratio, transplant era, induction agent, calcineurin inhibitor type, and steroids for maintenance immunosuppression.

● Eplet mismatches and profiles associated with death-censored graft failure in Accelerated Failure Time models accounting for false discovery rate.

[√]Eplet also associated with HLA-DRB3/4/5.

^Note that eplet 52PQ2 includes former eplets 52PQ+85GV

HLA-DQB1 EMMs found to be reactive by Schawalder, L. et al. *HLA* (2020) are **bolded and underlined**.

Abbreviations: Abv/AbVer, Antibody-Verified eplet mismatches; EMM, eplet mismatch(es); Oth, Non Antibody-Verified

SUPPLEMENTARY MATERIAL S4 - RELATION BETWEEN EPLET MISMATCHES ASSOCIATED WITH DEATH-CENSORED GRAFT FAILURE IN THE MAIN ANALYTICAL COHORT AND IN SENSITIVITY ANALYSES

Figure a

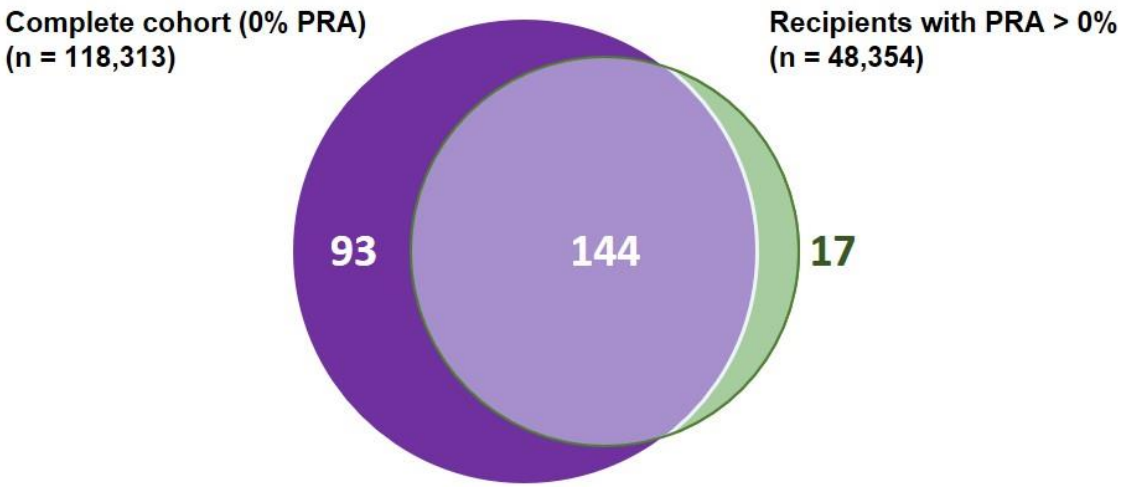
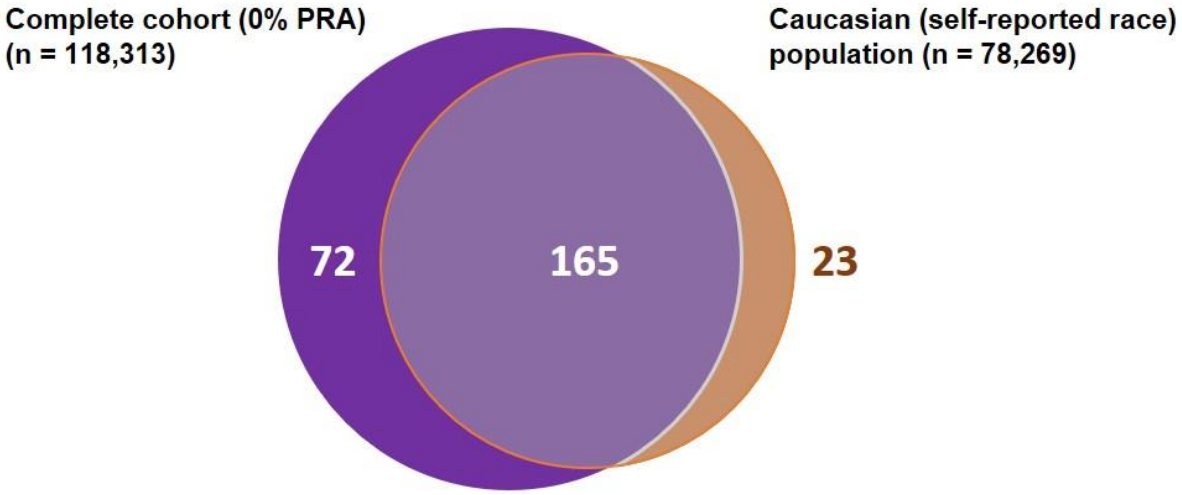


Figure b



SUPPLEMENTARY MATERIAL S5: Members of Genome Canada Transplant Consortium

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K. Tinckam, University of Toronto

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H. Cardinal, Universite de Montreal

S. DeSerres, Universite Laval

L. Allan, University of British Columbia

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M. Mengel, University of Alberta

B. Sis, University of Alberta

F. Claas, University of Leiden

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D. Ostrow, University of British Columbia

C. Stiller, Western University

R. Parekh, University of Toronto

L. Richard, Hema Quebec

L. Senecal, Universite de Montreal

SUPPLEMENTARY MATERIAL S6: STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	3	Please see ABSTRACT. Study design was removed from the Title upon the request of KIR editorial board
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	3	Please see ABSTRACT
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5	Please see INTRODUCTION
Objectives	3	State specific objectives, including any prespecified hypotheses	5	Please see INTRODUCTION
Methods				
Study design	4	Present key elements of study design early in the paper	3, 5, 6	Please see ABSTRACT, INTROUCTION and METHODS (study design)
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6	Please see METHODS, study design and population; Data source
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	6	Please see METHODS, study design and population; Data source

		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case		
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	6-7	Please see METHODS, Allele-level HLA type imputation and EMM estimation, Outcome definition, and potential confounding variables
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	6-9	Please see METHODS
Bias	9	Describe any efforts to address potential sources of bias	7-9	Please see METHODS Sensitivity analysis
Study size	10	Explain how the study size was arrived at	6	Please see METHODS, study design and population, Data source. All eligible cohort participants were included.

Continued on next page

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6-7	Please see METHODS, Allele-level HLA type imputation and EMM estimation, Outcome definition, and potential confounding variables
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7-9	See METHODS, Statistical analysis
		(*b*) Describe any methods used to examine subgroups and interactions	8-9	See METHODS, Sensitivity analysis (subgroup of self-reported Caucasian donor-recipient pairs)
		(*c*) Explain how missing data were addressed	7	See METHODS, Statistical analysis
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy		
		(*e*) Describe any sensitivity analyses	8-9	See METHODS, Sensitivity analysis
Results				
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	9	See RESULTS
		(b) Give reasons for non-participation at each stage		See FIGURE 1
		(c) Consider use of a flow diagram		See FIGURE 1
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders		See TABLE 1
		(b) Indicate number of participants with missing data for each variable of interest		See TABLE 1
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	9	See RESULTS
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	9	See RESULTS

		Case-control study—Report numbers in each exposure category, or summary measures of exposure		
		Cross-sectional study—Report numbers of outcome events or summary measures		
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-12	See RESULTS, TABLE 2; SUPPLEMENTARY MATERIAL I to III
		(*b*) Report category boundaries when continuous variables were categorized	9-12	See RESULTS, TABLEs 1 and 2; FIGUREs 2-5; SUPPLEMENTARY MATERIAL I to III
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period		

Continued on next page

Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	6-8	See RESULTS, TABLE 2; FIGUREs 2-6; SUPPLEMENTARY MATERIAL I to III
Discussion				
Key results	18	Summarise key results with reference to study objectives	12	See DISCUSSION first paragraph
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16-17	See DISCUSSION, Limitations
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-17	See DISCUSSION
Generalisability	21	Discuss the generalisability (external validity) of the study results	16-17	See DISCUSSION, Limitations
Other information				
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	2	See Funding

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.