◆ Clinical raw data (=renaldata.xlsx)

renaldata: original dataset

renalitems

renaldata

◆ Processes for generating models to predict graft loss after rejection from raw data (=ardata7) by way of Symbolic Regression via Genetic Programming

■ The function BuildModel[] was coded by the author to use DataModeler easily and not included in Mathematica or DataModeler.

- Epoch 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10: Final Result with quality box values: {100, 0.2}

In[•]:= `BuildModel[]`

■ Building functions with Symbolic regression

□ Phase 1 Reading in data

```
Patient data name: renaldata, its dimensions: {51, 212}
```

□ Phase 2 Data Definition

The origianl colum labels:

```
{{1, RMale}, {2, Rage}, {3, InfectionCount}, {4, FeverOnly},
 {5, Pyrexia}, {6, Inflammation}, {7, VirusInfection}, {8, CMV}, {9, anemia},
 {10, HeartDisease}, {11, RespiratoryInfection}, {12, UpperRespiratoryInfection},
 {13, UpperDigestivetract}, {14, Diarrhea}, {15, UTI}, {16, WBCinUrine},
 {17, WBCpeakover10}, {18, urology}, {19, Skin}, {20, WoundInfection},
 {21, HerpesZoster}, {22, Orthopedics}, {23, Ascites}, {24, Surgery},
 {25, AerobicGPC}, {26, AerobicGNR}, {27, candida}, {28, staphylococcusaureus},
 {29, streptococcusaureus}, {30, enterobacteraerogenes}, {31, enterobactereclacue},
 {32, enterococcusfaecalis}, {33, citobacterdiversus}, {34, pseudomonas},
 {35, infectiondatefirst}, {36, infectiondatelast}, {37, asthma}, {38, pastanemia},
 {39, infarctionhemohorrage}, {40, calcification}, {41, digestiveorgan},
 {42, appendicitis}, {43, polyp}, {44, ulcer}, {45, GERD}, {46, pastheart},
 {47, kidney}, {48, pastliverbilialy}, {49, HBV}, {50, HCV}, {51, stone},
 {52, hypothyroidism}, {53, gynecology}, {54, ocular}, {55, allergy},
 {56, hypertention}, {57, type2DM}, {58, BTF}, {59, timeoftransplantation},
 {60, Regraft}, {61, ABOI}, {62, HLAABmm}, {63, HLADRmm}, {64, HLAmm},
 {65, PRAclass1pre}, {66, PRAclass2pre}, {67, PRAclass1after}, {68, PRAclass2after},
 {69, MFImax}, {70, twinpeak}, {71, DSAclass1}, {72, DSAclass1number}, {73, DSAclass2},
 {74, DSAclass2number}, {75, preDSA}, {76, denovoDSA}, {77, antiHLAclass1},
 {78, HSAclass1number}, {79, antiHLAclass2}, {80, HSAclass2number},
 {81, DSAandHSAclass2}, {82, DSAandHSAclass1}, {83, DSAandHLAclass2pre},
 {84, DSAandHLAclass1pre}, {85, A23}, {86, A25}, {87, A26}, {88, A32}, {89, A34},
 {90, A66}, {91, B13}, {92, B18}, {93, B27}, {94, B35}, {95, B37}, {96, B38},
 {97, B42}, {98, B44}, {99, B45}, {100, B47}, {101, B49}, {102, B50}, {103, B51},
 {104, B52}, {105, B53}, {106, B54}, {107, B55}, {108, B56}, {109, B57}, {110, B58},
 {111, B59}, {112, B61}, {113, B62}, {114, B63}, {115, B7}, {116, B71}, {117, B73},
 {118, B75}, {119, B77}, {120, B78}, {121, B8}, {122, B82}, {123, Cw17}, {124, Cw6},
 {125, Cw9}, {126, DP10}, {127, DP11}, {128, DP13}, {129, DP14}, {130, DP15},
 {131, DP17}, {132, DP18}, {133, DP19}, {134, DP20}, {135, DP3}, {136, DP4},
 {137, DP5}, {138, DP6}, {139, DP9}, {140, DQ11}, {141, DQ2}, {142, DQ4}, {143, DQ5},
 {144, DQ6}, {145, DQ7}, {146, DQ8}, {147, DQ9}, {148, DR1}, {149, DR10}, {150, DR103},
 {151, DR11}, {152, DR12}, {153, DR13}, {154, DR14}, {155, DR15}, {156, DR16},
 {157, DR17}, {158, DR18}, {159, DR4}, {160, DR51}, {161, DR52}, {162, DR53},
 {163, DR7}, {164, DR8}, {165, DR9}, {166, pregnancyhistory}, {167, birthhistory},
 {168, NaturalAbortion}, {169, ArtificialAbortion}, {170, HDperiod}, {171, CGN},
 {172, IgA}, {173, NS}, {174, hypoplastickidney}, {175, MalignantHypertention},
 {176, Banfi}, {177, Banf t }, {178, Banf g }, {179, Banf v }, {180, Banfci},
 {181, Banfct}, {182, Banfcv}, {183, Banfcg}, {184, Banfptc}, {185, Banfptcbm},
 {186, Banfah}, {187, Banfaah}, {188, InterstitialHemorrhage}, {189, CellInvasion},
 {190, lymphinvasion}, {191, thrombusformation}, {192, coaglationnecrosis},
 {193, IgA}, {194, IgM}, {195, IgG}, {196, SABC1q}, {197, C3}, {198, C4d}, {199, C5b},
 {200, bulbarsclerosis}, {201, CRPpreRej}, {202, CRPpostRej}, {203, WBCpeakover5},
 {204, MaxCRP}, {205, WBCpreRej}, {206, WBCpostKTx}, {207, WBCpeakover9postRej},
 {208, MaxWBC}, {209, MMFpostRej}, {210, MMFatRej}, {211, CNIpostRej}, {212, GraftLoss}}
```

◆ **allNames (The last variable GraftLoss is a target response)**

```
{RMale, Rage, InfectionCount, FeverOnly, Pyrexia, Inflammation, VirusInfection,
 CMV, anemia, HeartDisease, RespiratoryInfection, UpperRespiratoryInfection,
 UpperDigestivetract, Diarrhea, UTI, WBCinUrine, WBCpeakover10, urology, Skin,
 WoundInfection, HerpesZoster, Orthopedics, Ascites, Surgery, AerobicGPC, AerobicGNR,
 candida, staphylococcusaureus, streptococcusaureus, enterobacteraerogenes,
 enterobactereclacue, enterococcusfaecalis, citobacterdiversus, pseudomonas,
 infectiondatefirst, infectiondatelast, asthma, pastanemia, infarctionhemohorrage,
 calcification, digestiveorgan, appendicitis, polyp, ulcer, GERD, pastheart,
 kidney, pastliverbilialy, HBV, HCV, stone, hypothyroidism, gynecology, ocular,
 allergy, hypertention, type2DM, BTF, timeoftransplantation, Regraft, ABOI, HLAABmm,
 HLADRmm, HLAmm, PRAclass1pre, PRAclass2pre, PRAclass1after, PRAclass2after,
 MFImax, twinpeak, DSAclass1, DSAclass1number, DSAclass2, DSAclass2number, preDSA,
 denovoDSA, antiHLAclass1, HSAclass1number, antiHLAclass2, HSAclass2number,
 DSAandHSAclass2, DSAandHSAclass1, DSAandHLAclass2pre, DSAandHLAclass1pre, A23,
 A25, A26, A32, A34, A66, B13, B18, B27, B35, B37, B38, B42, B44, B45, B47, B49,
 B50, B51, B52, B53, B54, B55, B56, B57, B58, B59, B61, B62, B63, B7, B71, B73, B75,
 B77, B78, B8, B82, Cw17, Cw6, Cw9, DP10, DP11, DP13, DP14, DP15, DP17, DP18, DP19,
 DP20, DP3, DP4, DP5, DP6, DP9, DQ11, DQ2, DQ4, DQ5, DQ6, DQ7, DQ8, DQ9, DR1, DR10,
 DR103, DR11, DR12, DR13, DR14, DR15, DR16, DR17, DR18, DR4, DR51, DR52, DR53, DR7,
 DR8, DR9, pregnancyhistory, birthhistory, NaturalAbortion, ArtificialAbortion,
 HDperiod, CGN, IgA, NS, hypoplastickidney, MalignantHypertention, Banfi, Banf t ,
 Banf g , Banf v , Banfci, Banfct, Banfcv, Banfcg, Banfptc, Banfptcbm, Banfah,
 Banfaah, InterstitialHemorrhage, CellInvasion, lymphinvasion, thrombusformation,
 coaglationnecrosis, IgA, IgM, IgG, SABC1q, C3, C4d, C5b, bulbarsclerosis,
 CRPpreRej, CRPpostRej, WBCpeakover5, MaxCRP, WBCpreRej, WBCpostKTx,
 WBCpeakover9postRej, MaxWBC, MMFpostRej, MMFatRej, CNIpostRej, GraftLoss}
```

- **allTrainingData (The last column is a response variable, the others are explanatory variables)**

```
{{0, 37, 4, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 1, 0, 6.052, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 0, 3, 63, 0, 1, 0, 1, 1, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0,
  1, 0, 0, 2, 1, 3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 5.01027, 0,
  1, 0, 0, 0, 1, 2, 0, 2, 1, 1, 0, 0, 1, 0, 2, 0, 0, 0, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0.09804, 0.04287, 0, 0.04, 0.25, 5.674, 13, 9.87, 2.43318, 1.05, -0.481528, 0},
 {1, 66, 7, 0, 0, 0, 1, 1, 1, 0, 1, 1, 0, 1, 5, 4.753, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 1, 0, 0, 0, 1, 1, 11, 572, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1,
  0, 0, 1, 0, 0, 4, 2, 6, 0, 0, 0, 40.79, 4704.57, 1, 0, 0, 1, 3, 0, 3, 1, 1, 1, 14, 2, 0,
  0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
  0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 1, 0, 1, 0, 1, 1,
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  1, 0, 0, 0, 0, 1, 1, 2, 0, 2, 2, 0, 1, 2, 1, 2, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0,
  0.4018, 0.1909, 0, 3.47, 0.0384, 5.52, 24, 14.77, 1.70048, 2.01, -0.462781, 1},
 {1, 62, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 11.22, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1,
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```

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0.818617, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 2, 0, 2, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0,
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{1, 47, 7, 3, 1, 0, 1, 1, 0, 0, 1, 1, 0, 0, 2, 5.412, 2, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0,
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0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0.728268,
0, 0, 0, 1, 0, 2, 3, 0, 0, 0, 0, 1, 0, 3, 0, 0, 0, 0, 3, 3, 0, 0, 0, 0, 0, 0, 0, 0, 0,
0, 0, 0.5439, 4, 5.42, 0.3211, 6.715, 13, 14.65, 3.30692, 1.79, -0.570532, 0},
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7.05818, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0,
0, 1, 0, 1, 0, 0.5854, 16, 18.14, 0, 9.801, 108, 31.9, 1.85273, Null, 0.099077, 0},
{1, 66, 11, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 1, 6, 7.679, 2, 0, 1, 1, 0, 0, 0, 1, 1, 0, 0,
0, 0, 0, 0, 0, 0, 0, 0, 4, 658, 0, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1,
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3.33196, 0, 0, 0, 0, 0, 0, 2, 0, 0, 0, 0, 2, 0, 1, 0, 1, 0, 0, 2, 1, 0, 0, 1, 0, 0, 0, 0,
1, 0, 0, 0, 0.05371, 0, 0.09, 0.2303, 3.115, 3, 4.86, 2.771, 0.97, -0.216114, 0},
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0, 0, 0, 0, 0, 1, 1, 1, 0, 0, 0, 2, 0, 2, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0,
0.07383, 1.045, 2, 12.28, 0.0396, 11.42, 139, 21.61, 2.56178, 5.21, -0.0733244, 0},

```
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{1, 26, 7, 1, 1, 0, 1, 1, 1, 0, 1, 1, 1, 1, 4, 9.18, 4, 0, 0, 0, 0, 0, 1, 0, 1, 1, 0,
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 0, 0.2533, 3, 0.19, 0.2688, 9.888, 58, 12.14, 4.21692, 2.3, -0.17938, 0}, <<30>>,
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```
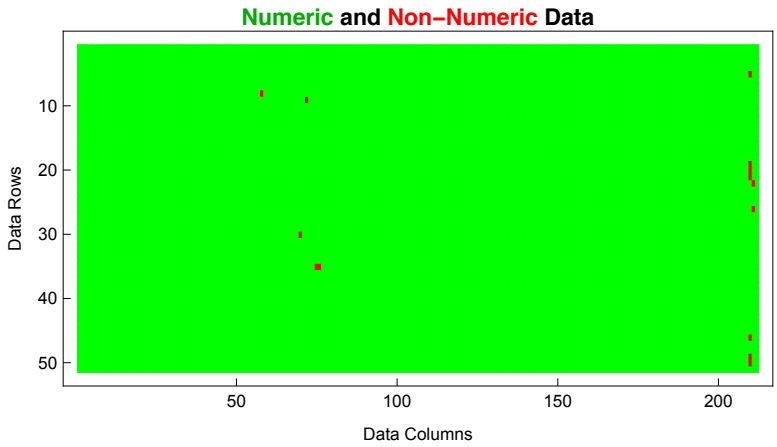


(The above output is suppressed below 100 lines.)

Phase 3 Explorign Data

◆ 1. Data Completeness Check



◇ Empty cells were left unchanged.

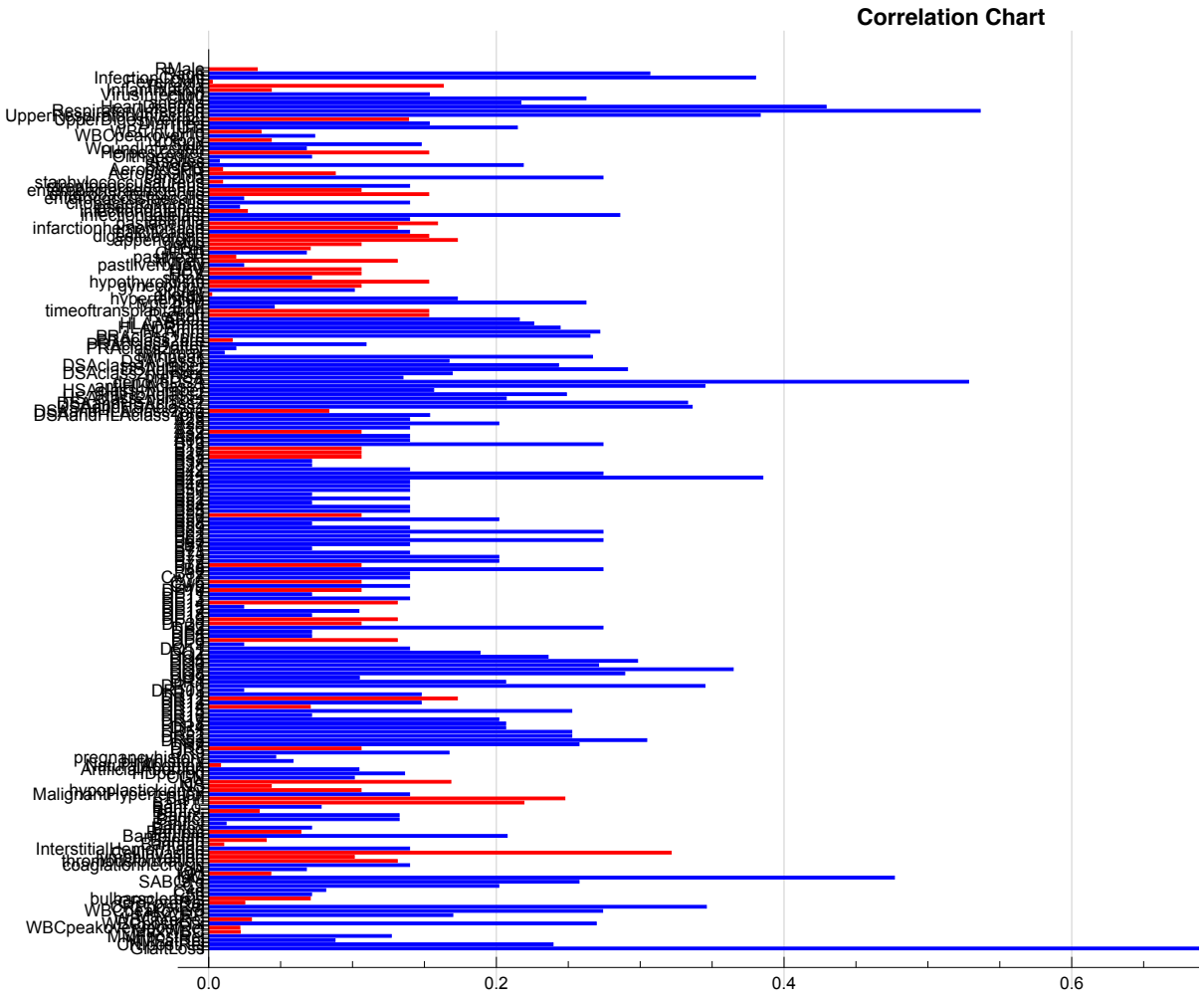
◆ 2. Summary of Basic Statistics

◆ 3. Distribution Plot of Data

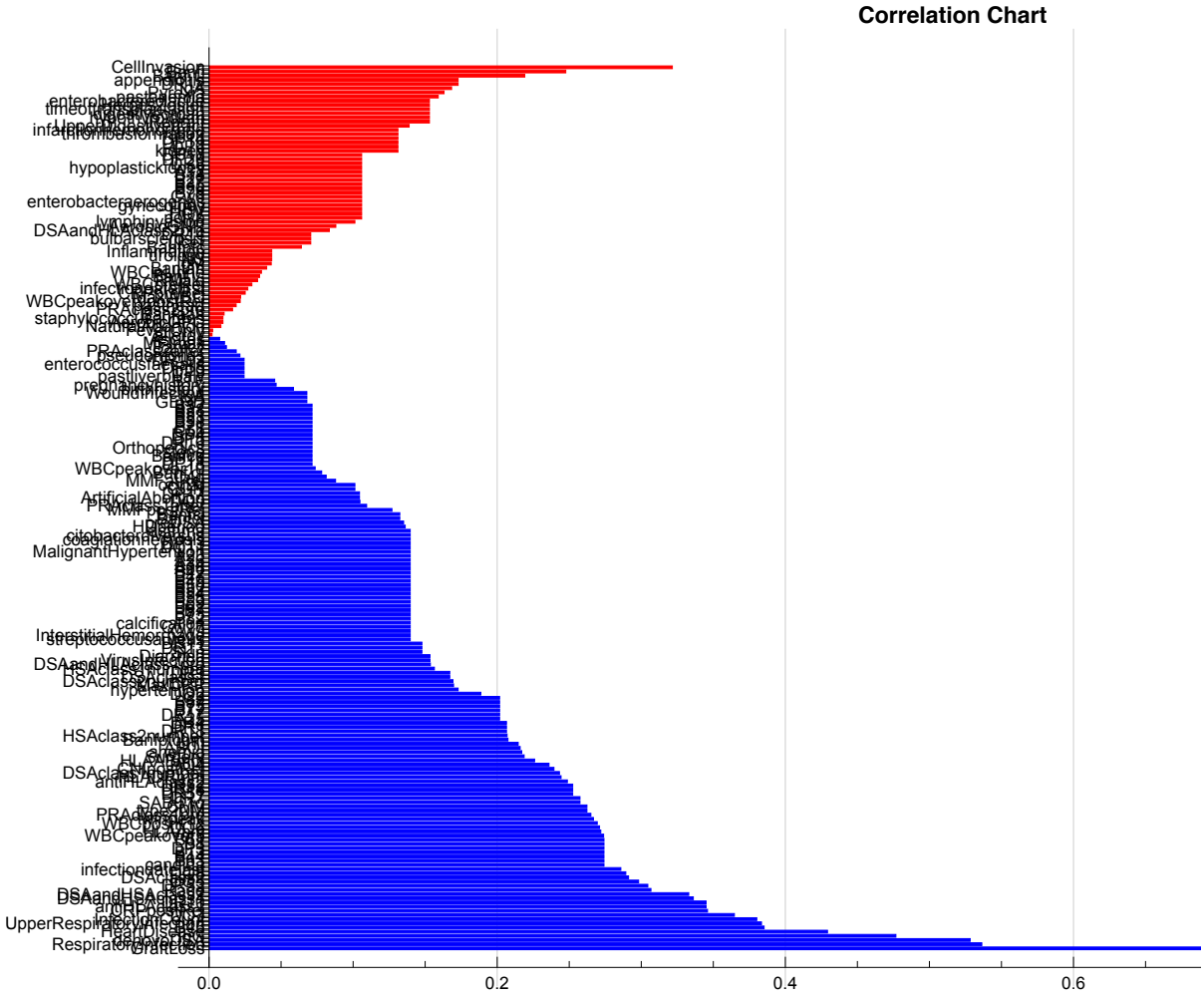
◆ 4. Correlation Matrix Plot of Data

◆ 5. Univariate Plot of Data (X-axes is the target varible)

◆ 6. Correlation Chart of Data in the original order
(BLUE: Positive correlation, RED: Negative correlation)

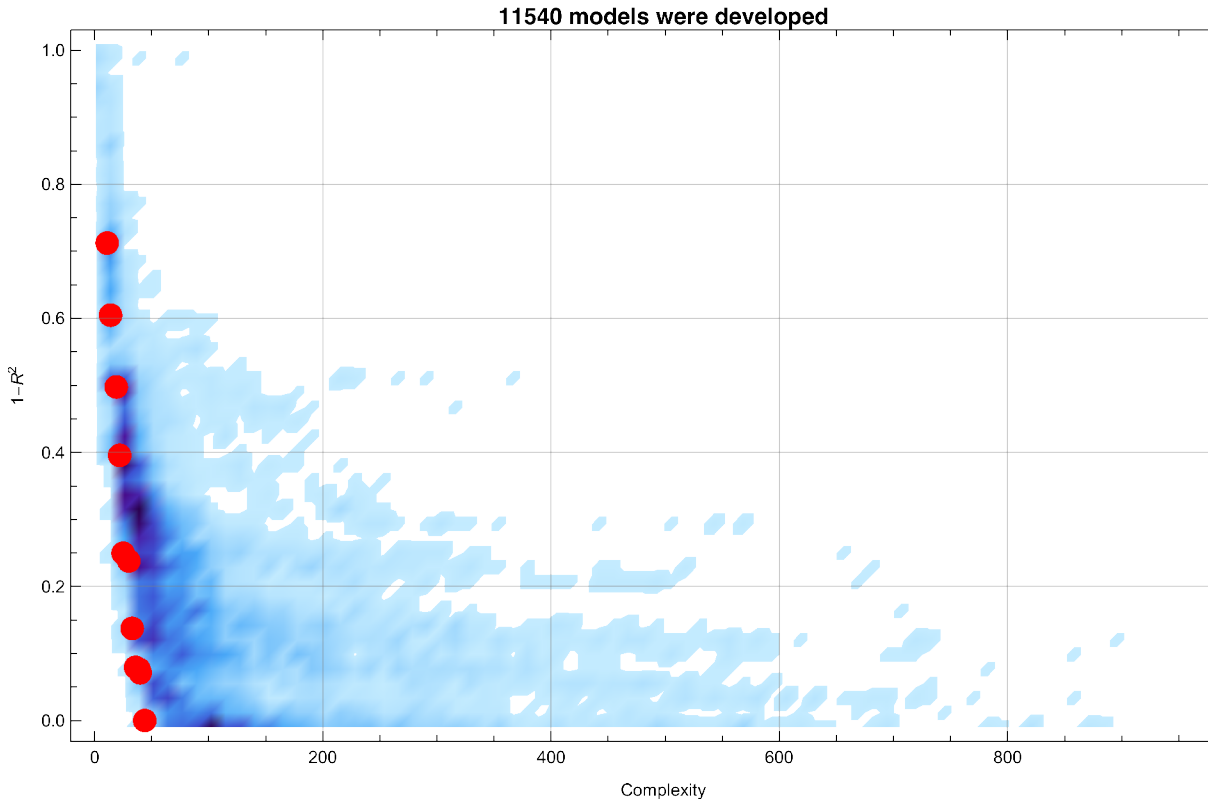


◆ **7. Correlation Chart of**
Data in the correlation coefficient order
(BLUE: Positive correlation, RED: Negative correlation)



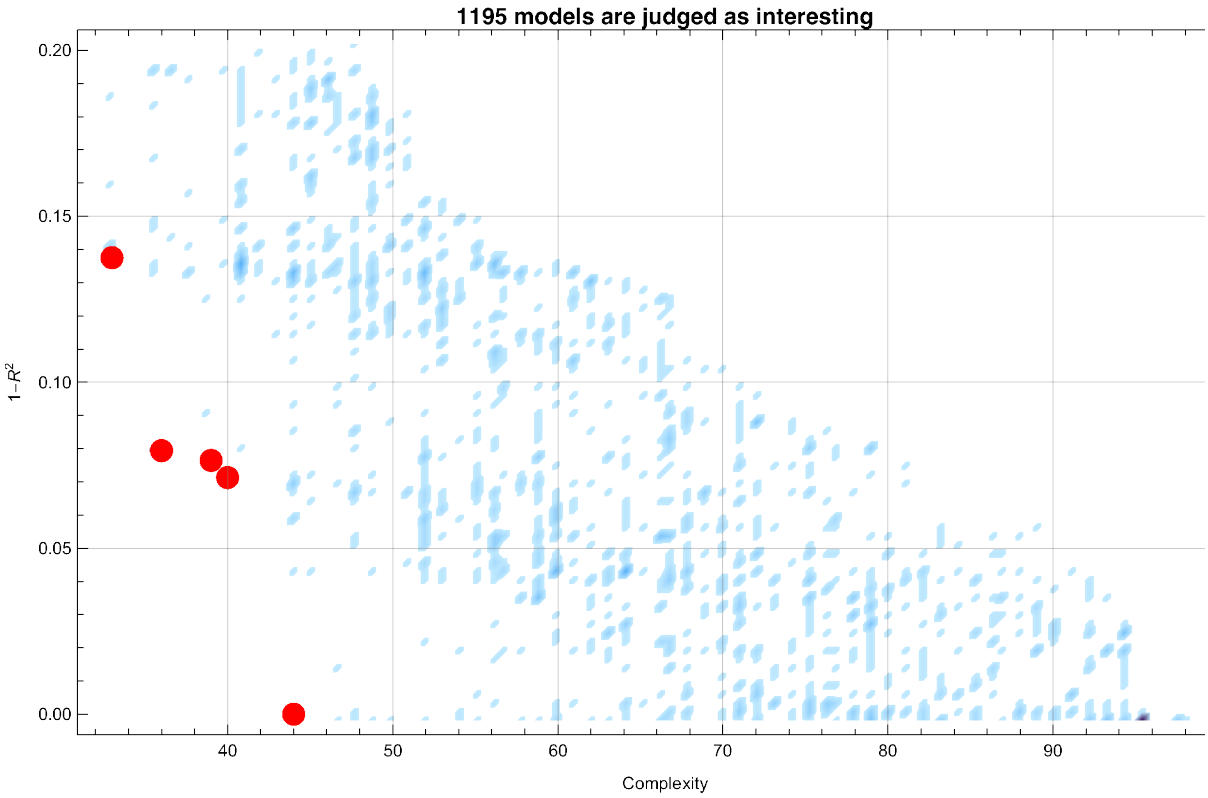
□Phase 4 Model Development with Genetic Programming

- **The project name is PredictGraftLoss.**
- **Archived models in PredictGraftLoss are loaded.**



Phase 5 Selection of Model with Accurary and Simplicity

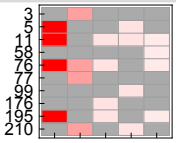
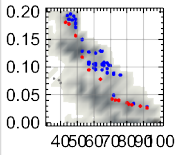
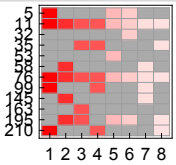
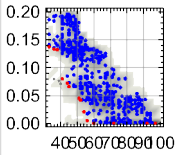
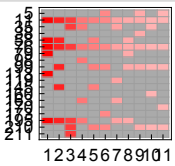
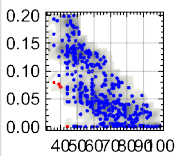
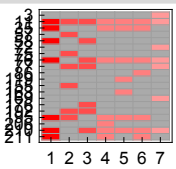
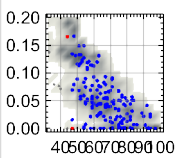
- 1. Model of Interest
  - Quatiliy Box values are {100, 0.2}.



■ 1195 INTERESTING models were selected

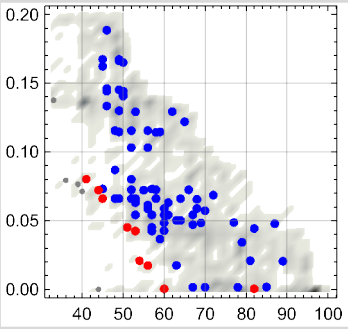
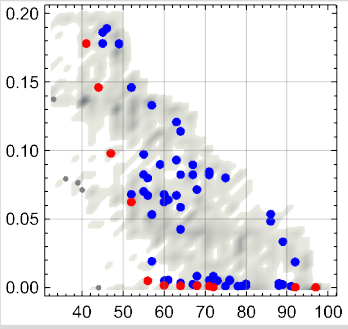
◆ 2. Model Dimensionality Assessment (How many variables are required)

Model Dimensionality Table

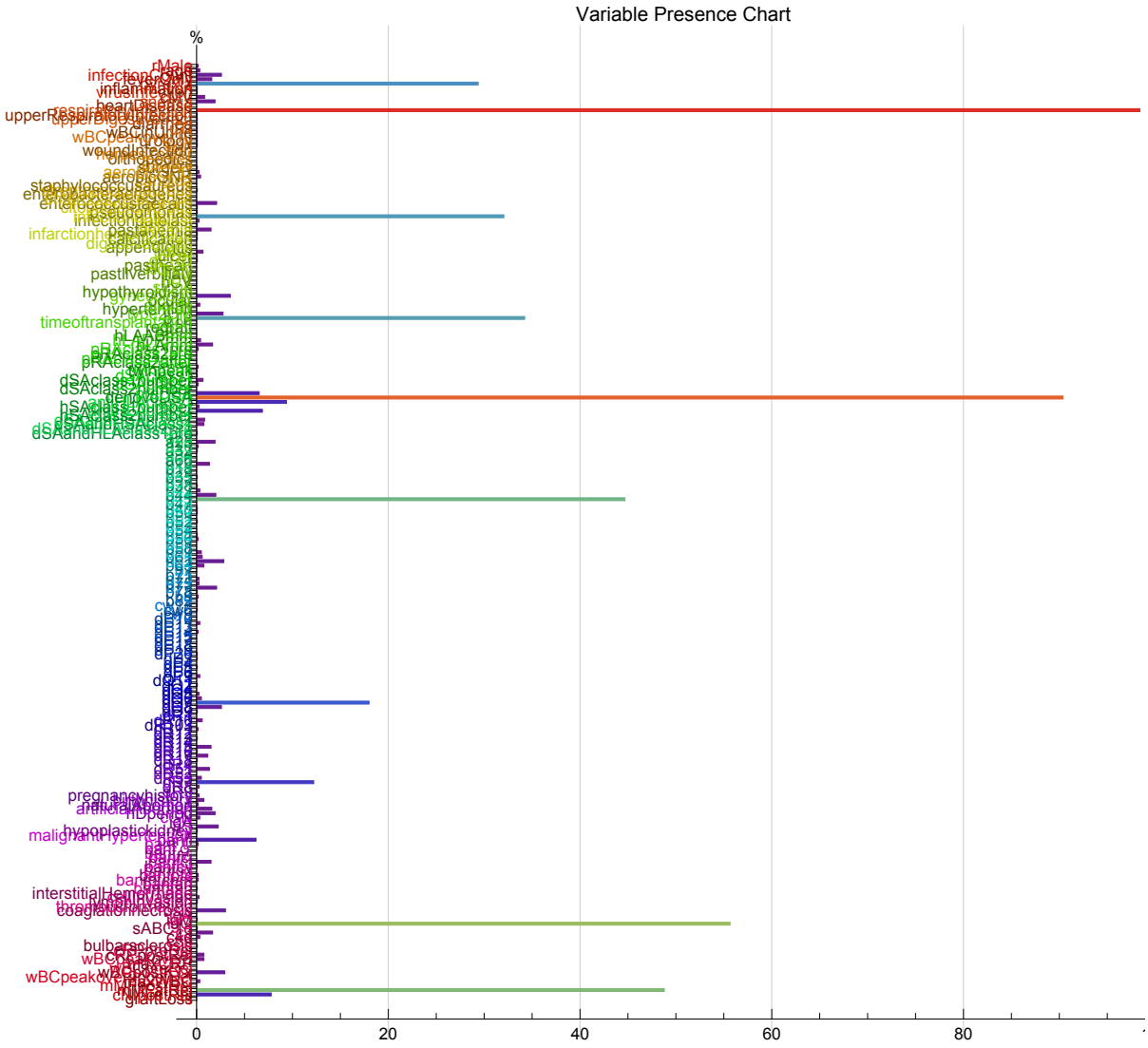
# Vars	# Models ⟹ %	VariableCombinationMap	ParetoFrontPlot
4	60 ⟹ 5.0 %		
5	497 ⟹ 41.6 %		
6	424 ⟹ 35.5 %		
7	167 ⟹ 14.0 %		

◆ 3. Variable Combinations (Ranked popularity of variable combinations)

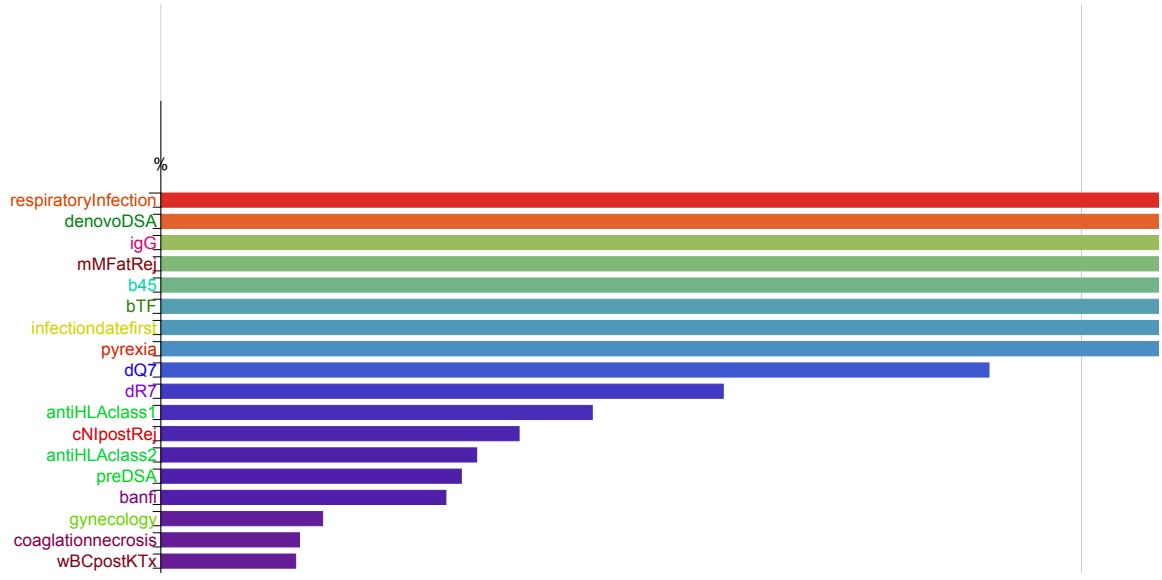
Variable Combination Table

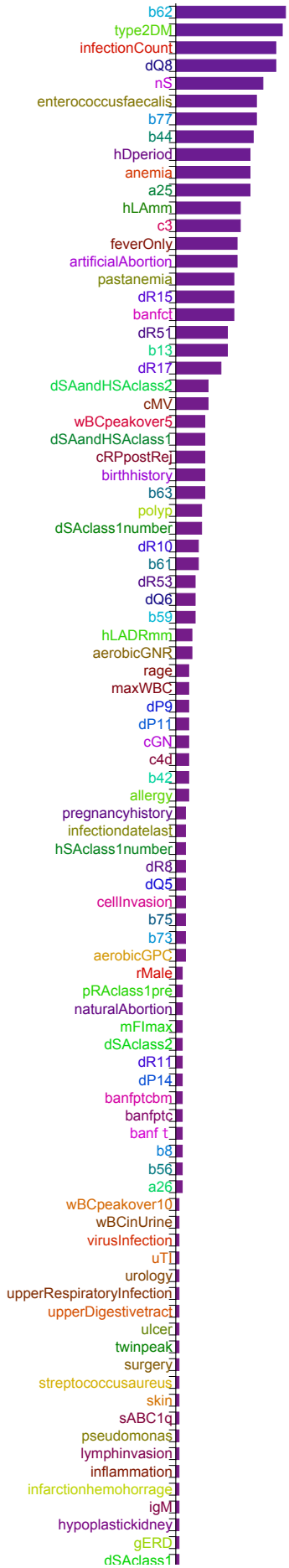
	num ⟹ %	Variables Used	ParetoFrontPlot
1	84 ⟹ 7.0 %	pyrexia respiratoryInfection denovoDSA b45 mMFatRej	
2	69 ⟹ 5.8 %	respiratoryInfection bTF denovoDSA dQ7 igG	

◆ 4-1. Variable Presence (Popularity of each variable) in the ORIGINAL order



◆ 4-2. Variable Presence (Popularity of each variable) SORTED by frequencies




b62
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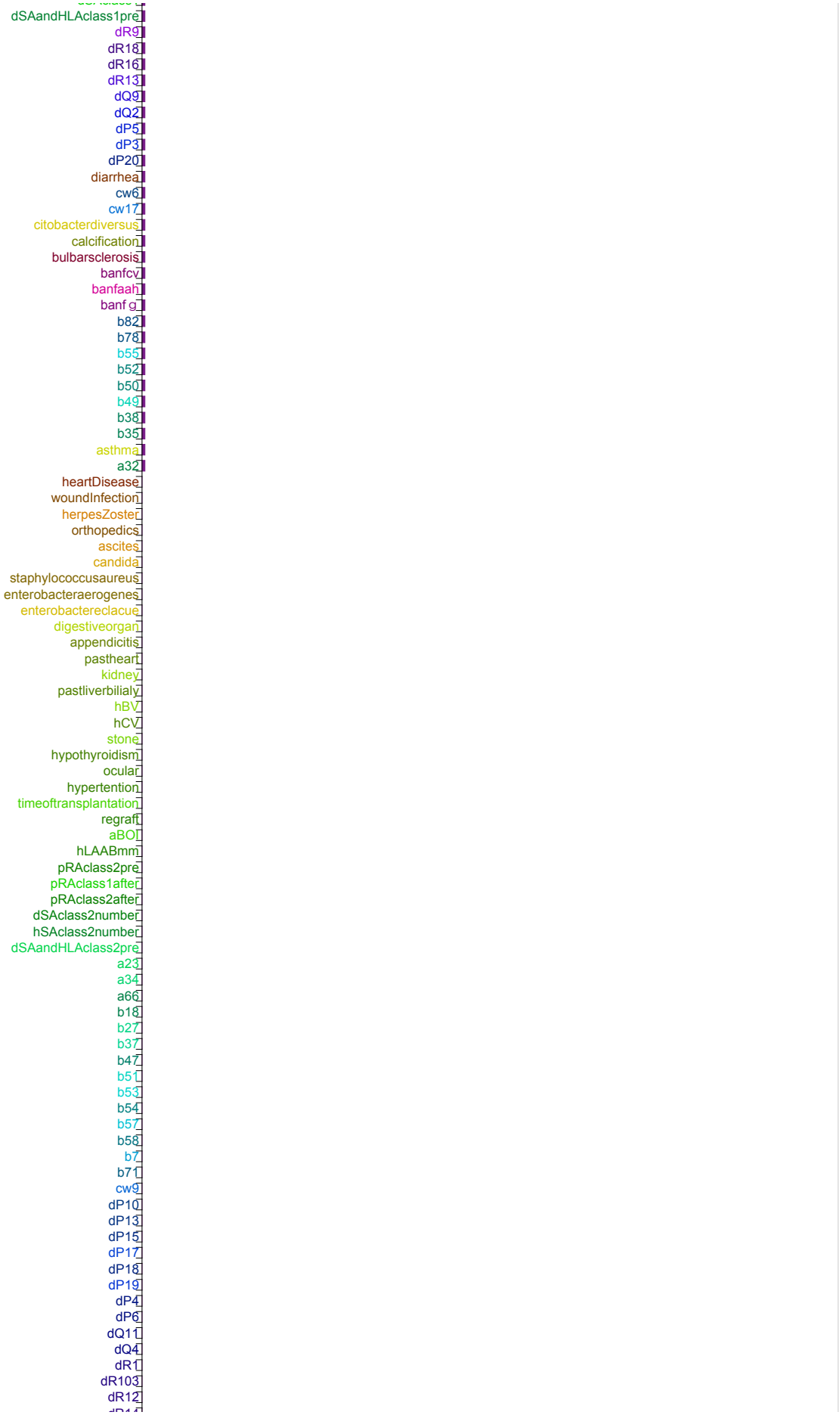
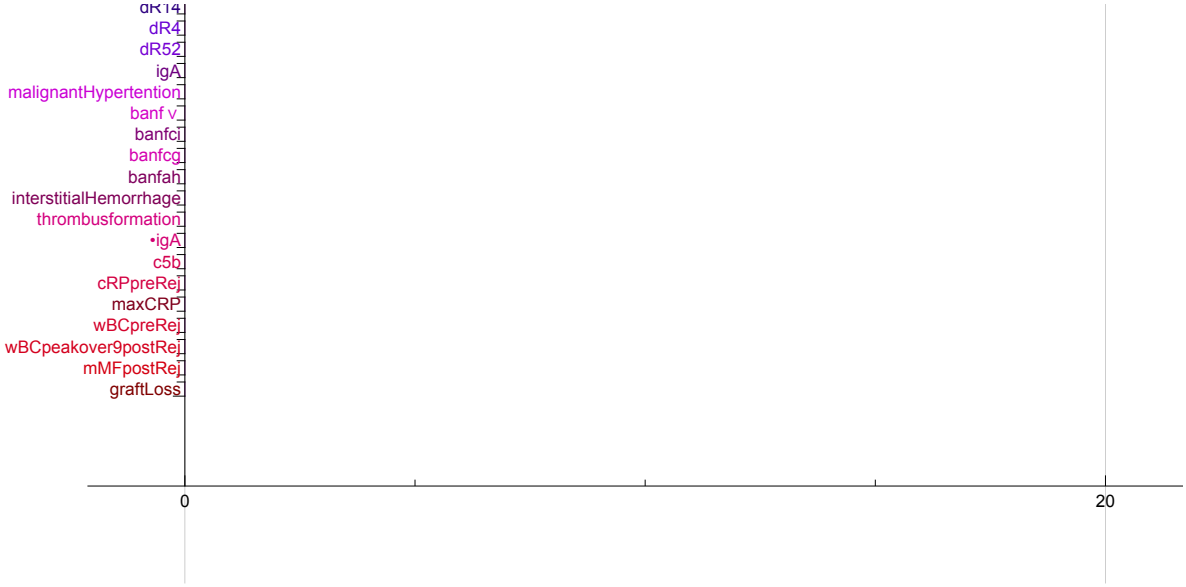
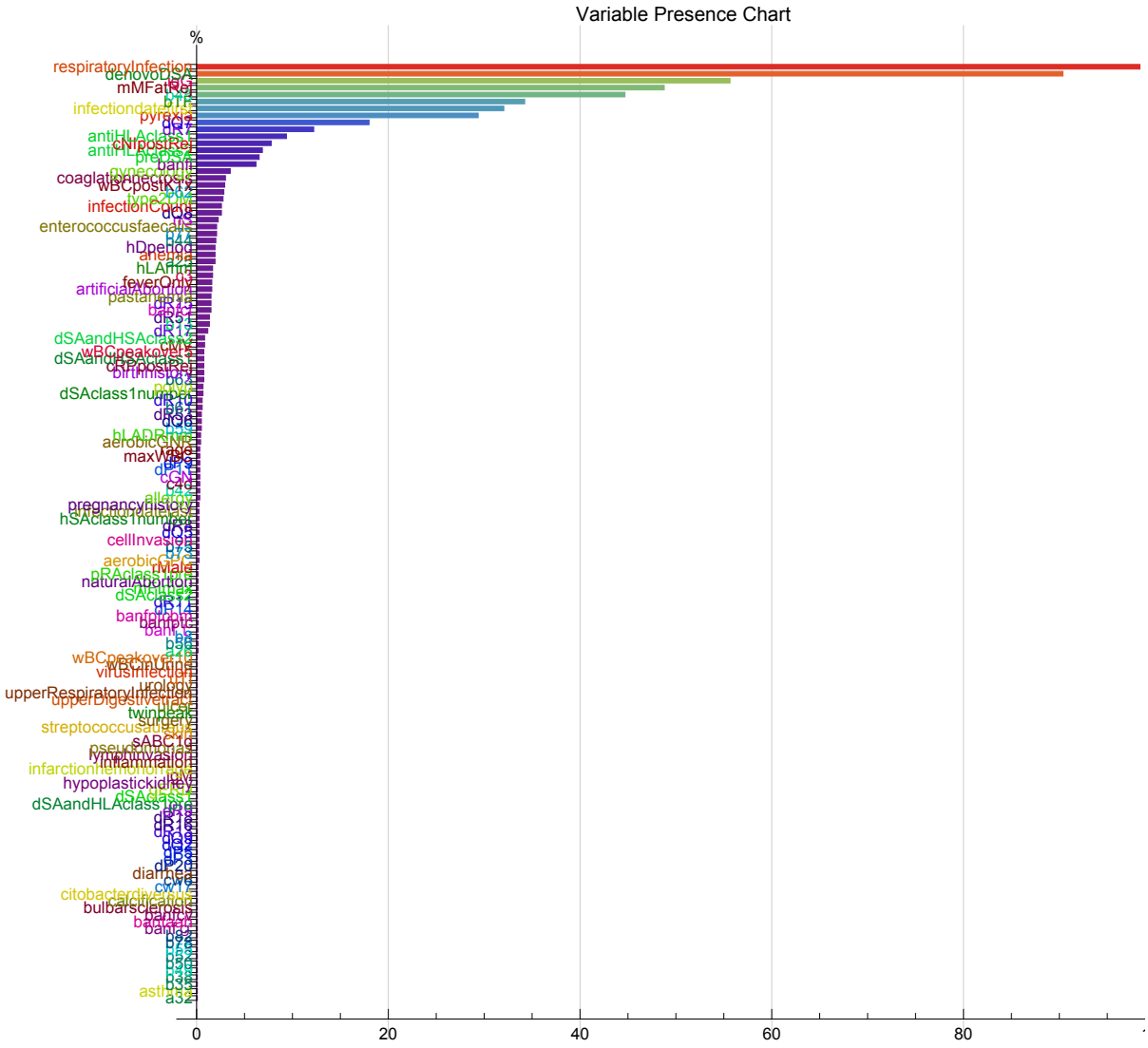
infectionCount
dQ8
nS
enterococcusfaecalis
b77
b44
hDperiod
anemia
a25
hLAmm
c3
feverOnly
artificialAbortion
pastanemia
dR15
banfc
dR51
b13
dR17
dSAandHSAclass2
cMV
wBCpeakover5
dSAandHSAclass1
cRPpostRej
birthhistory
b63
polyp
dSAclass1number
dR10
b61
dR53
dQ6
b59
hLADRmm
aerobicGNR
rage
maxWBC
dP9
dP11
cGN
c4d
b42
allergy
pregnancyhistory
infectiondatelast
hSAclass1number
dR8
dQ5
cellInvasion
b75
b73
aerobicGPC
rMale
pRAclass1pre
naturalAbortion
mFImax
dSAclass2
dR11
dP14
banfptcbm
banfptc
banf t
b8
b56
a26
wBCpeakover10
wBCinUrine
virusInfection
uT
urology
upperRespiratoryInfection
upperDigestivetract
ulcer
twinpeak
surgery
streptococcusaureus
skin
sABC1q
pseudomonas
lymphinvasion
inflammation
infarctionhemohorrage
igM
hypoplastickidney
gERD
dSAclass1

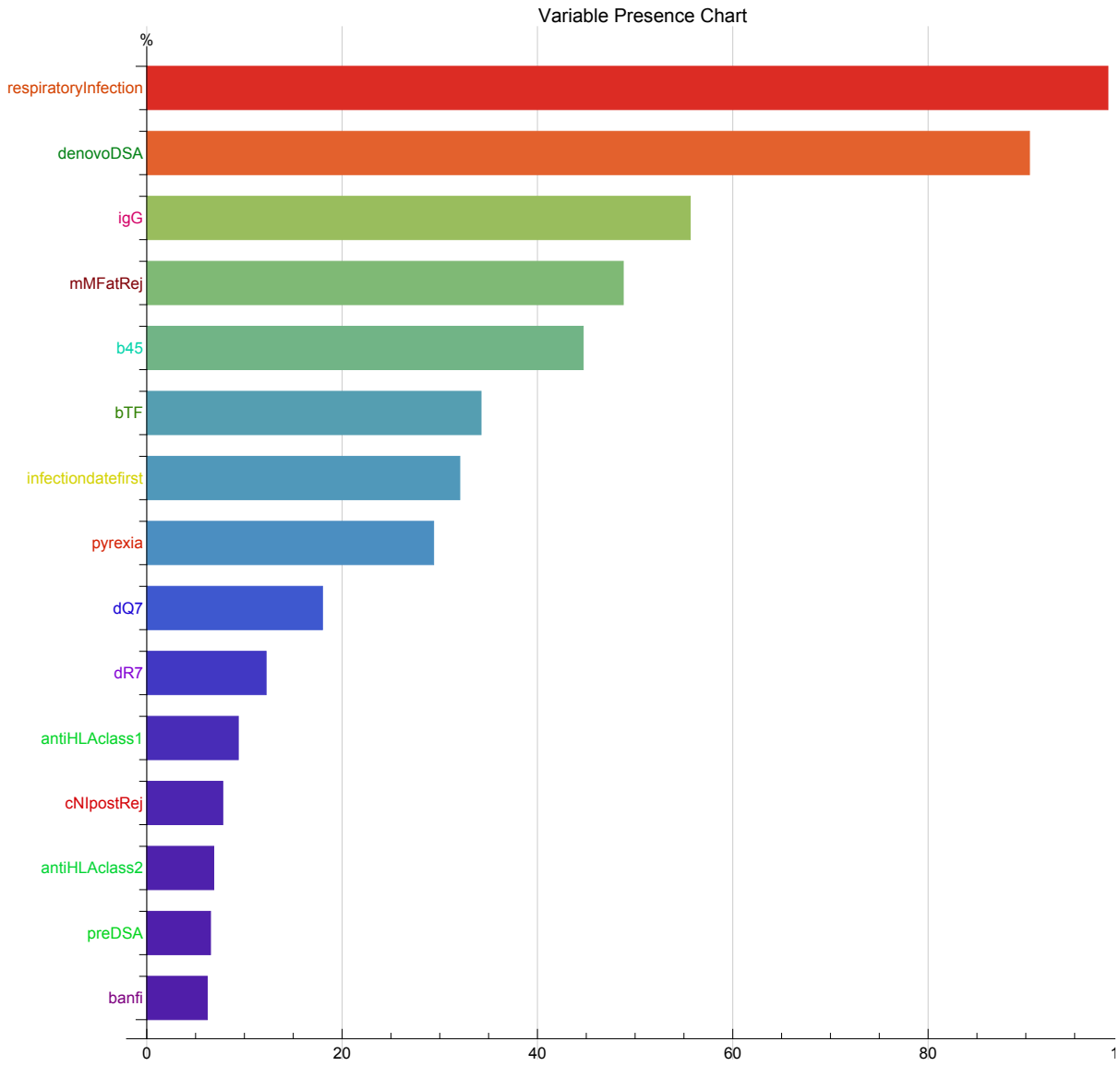

dSAandHLAclass1pre
dR9
dR18
dR16
dR13
dQ9
dQ2
dP5
dP3
dP20
diarrhea
cw6
cw17
citobacterdiversus
calcification
bulbarsclerosis
banfcv
banfaah
banf g
b82
b78
b55
b52
b50
b49
b38
b35
asthma
a32
heartDisease
woundInfection
herpesZoster
orthopedics
ascites
candida
staphylococcusaureus
enterobacteraerogenes
enterobactereclacue
digestiveorgan
appendicitis
pastheart
kidney
pastliverbilialy
hBV
hCV
stone
hypothyroidism
ocular
hypertention
timeoftransplantation
regraft
aBO
hLAABmm
pRAclass2pre
pRAclass1after
pRAclass2after
dSAclass2number
hSAclass2number
dSAandHLAclass2pre
a23
a34
a66
b18
b27
b37
b47
b51
b53
b54
b57
b58
b7
b71
cw9
dP10
dP13
dP15
dP17
dP18
dP19
dP4
dP6
dQ11
dQ4
dR1
dR103
dR12



◆ 4-3. Variable Presence (Popularity of each variable) FOCUSED on important variables



◆ **4-4. Variable Presence (Popularity of each variable) FOCUED on TOP 15 variables**



◆ 5. Metavariable Distribution (Popularity of metavariables)

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MetaVariableDistributionTable

Rank	# models	MetaVariable	# Evolutions	% Evolutions	Max Count	Max %	Mean %
1	189	infectiondatefirst respiratoryInfection	12	23.5	45	100.0	16.5
2	67	dR7 respiratoryInfection	4	7.8	38	72.2	3.1
3	67	dQ7 respiratoryInfection	10	19.6	28	100.0	10.2
4	114	pyrexia respiratoryInfection	10	19.6	27	93.1	11.7
5	114	bTF respiratoryInfection	17	33.3	27	100.0	17.0
6	96	denovoDSA^{3}	17	33.3	26	66.7	8.2
7	42	mMFatRej respiratoryInfection	7	13.7	22	75.9	3.8
8	21	antiHLAclass1 mMFatRej	1	2.0	21	75.0	1.5
9	21	$\text{infectionCount}^{3}$	1	2.0	21	100.0	2.0
10	19	denovoDSA + infectiondatefirst	1	2.0	19	70.4	1.4
11	35	$\frac{1}{\text{mMFatRej}}$	4	7.8	18	85.7	3.5
12	18	$\frac{1}{\text{denovoDSA}+\text{infectiondatefirst}}$	1	2.0	18	66.7	1.3
13	67	denovoDSA^{2}	16	31.4	17	100.0	8.9
14	54	igG respiratoryInfection	10	19.6	17	60.7	5.2
15	17	b62 + igG + respiratoryInfection	1	2.0	17	85.0	1.7
16	16	$\frac{\text{infectionCount}^{3}}{\text{mMFatRej}}$	1	2.0	16	76.2	1.5
17	28	banfi respiratoryInfection	5	9.8	15	53.6	2.6
18	16	antiHLAclass1 + respiratoryInfection + type2DM	2	3.9	15	100.0	3.9
19	15	$\frac{\text{respiratoryInfection}}{\text{denovoDSA}+\text{infectiondatefirst}}$	1	2.0	15	55.6	1.1
20	14	enterococcusfaecalis respiratoryInfection	1	2.0	14	43.8	0.9
21	14	antiHLAclass2 2.0 + bTF	1	2.0	14	70.0	1.4
22	13	$\text{infectionCount}^{3}$ mMFatRej	1	2.0	13	61.9	1.2
23	29	$\text{denovoDSA}^{4.0}$	10	19.6	12	42.9	2.9
24	12	feverOnly hLAmm respiratoryInfection	1	2.0	12	92.3	1.8
25	19	denovoDSA mMFatRej	6	11.8	11	44.0	2.1

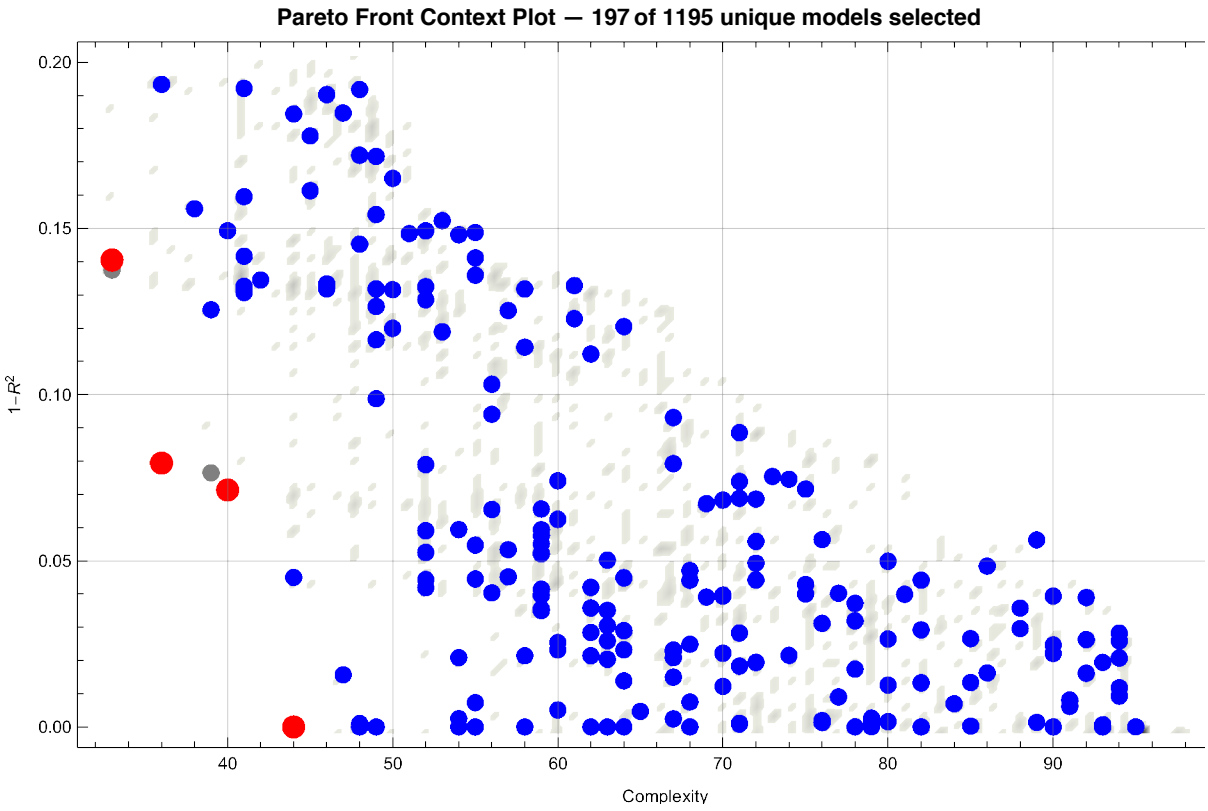
Phase 6 Selecting the best Ensemble and its Phenotype

1. Defining Ensembles

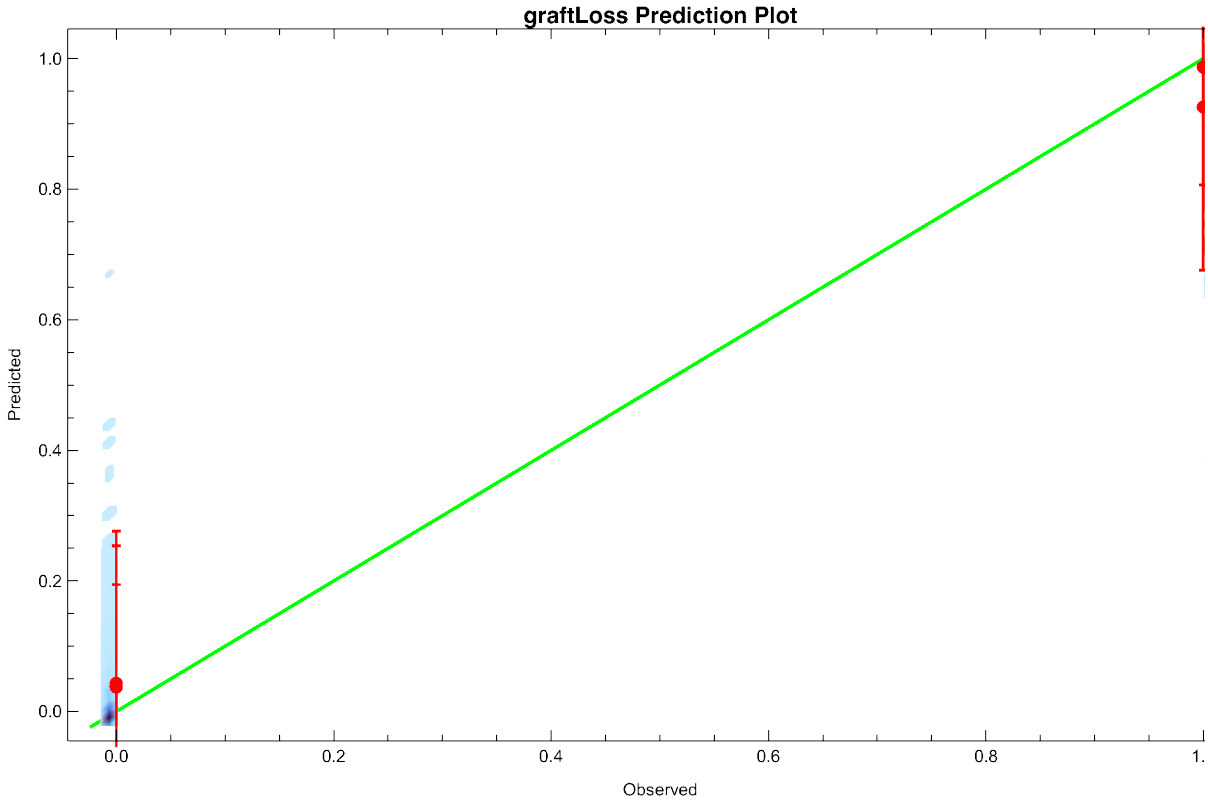
graftLoss (1 of 14)

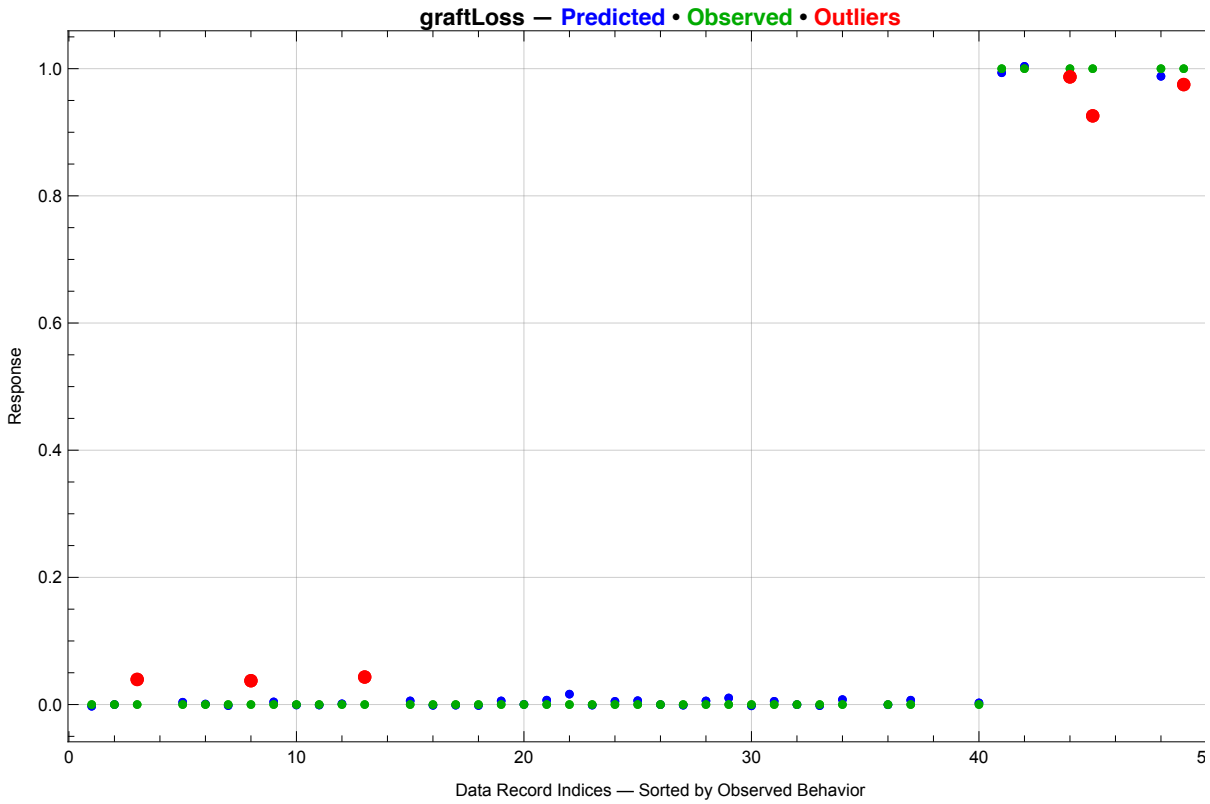
	Complexity	$1-R^2$	Function
1	33	0.141	$-(3.64\times10^{-2})+0.63\ \text{igG}+(2.86\times10^{-2})\ \text{denovoDSA mMFatRej}+(8.54\times10^{-2})\ \text{infectiondatefirst respiratoryInfection}$
2	36	0.079	$-(1.96\times10^{-2})+(8.73\times10^{-2})\ \text{infectiondatefirst respiratoryInfection}+1.02\ b_{45}+0.10\ \text{denovoDSA mMFatRej dR}_{51}$
3	36	0.193	$4.13\times10^{-2}-0.42\ \text{pyrexia}+0.78\ \text{cMV respiratoryInfection}+(3.29\times10^{-2})\ \text{denovoDSA mMFatRej antiHLAclass}_1$
4	38	0.156	$4.18\times10^{-2}+0.10\ \text{cNIpostRej}-(1.17\times10^{-2})\ \text{mMFatRej}+(9.18\times10^{-2})\ \text{infectiondatefirst respiratoryInfection}+1.11\ b_{45}$
5	39	0.126	$1.62\times10^{-2}+0.88\ \text{cMV respiratoryInfection}-0.60\ \text{pyrexia respiratoryInfection}+(3.32\times10^{-2})\ \text{denovoDSA mMFatRej antiHLAclass}_1$
6	40	0.071	$-(2.05\times10^{-2})+(8.68\times10^{-2})\ \text{infectiondatefirst respiratoryInfection}+1.02\ b_{45}+(6.14\times10^{-2})\ \text{denovoDSA mMFatRej}^2\ \text{dR}_{51}$
7	40	0.149	$-(2.40\times10^{-16})+0.60\ \text{bTF mMFatRej}^2\ \text{respiratoryInfection}+1.00\ \text{respiratoryInfection antiHLAclass}_2+1.00\ b_{45}$
8	41	0.131	$6.28\times10^{-17}+0.50\ \text{cGN preDSA}+1.14\ \text{respiratoryInfection}-0.50\ \text{banfi respiratoryInfection}+1.00\ b_{45}$
9	41	0.132	$2.93\times10^{-2}-(1.25\times10^{-2})\ \text{denovoDSA}+0.97\ \text{bTF respiratoryInfection}+1.00\ \text{antiHLAclass}_2\ (\text{respiratoryInfection}+b_{45})$
10	41	0.133	$2.61\times10^{-2}-(1.74\times10^{-2})\ \text{bTF denovoDSA}+0.99\ b_{45}+0.97\ \text{respiratoryInfection (bTF}+\text{dQ}_7)$
11	41	0.142	$3.11\times10^{-2}+(7.20\times10^{-2})\ \text{cNIpostRej}+1.03\ \text{bTF respiratoryInfection}+1.03\ b_{45}+0.96\ \text{respiratoryInfection dQ}_8$
12	41	0.160	$-(3.71\times10^{-2})+(9.01\times10^{-2})\ \text{denovoDSA}-(1.76\times10^{-2})\ \text{respiratoryInfection}+(8.82\times10^{-2})\ \text{infectiondatefirst respiratoryInfection}+0.12\ \text{mMFatRej}\ b_{45}$
13	41	0.192	$2.84\times10^{-2}-0.16\ \text{nS}+0.46\ \text{mMFatRej respiratoryInfection}-1.06\ \text{pyrexia respiratoryInfection}+0.97\ b_{45}$
14	42	0.134	$2.42\times10^{-2}-(1.01\times10^{-2})\ \text{denovoDSA}+1.01\ b_{45}+0.95\ \text{respiratoryInfection}\ (4.80\times10^{-2}+\text{bTF}+\text{dQ}_7)$
15	44	0.000	$-(3.94\times10^{-16})+(2.25\times10^{-17})\ \text{denovoDSA}+0.78\ \text{bTF mMFatRej respiratoryInfection}+1.00\ \text{respiratoryInfection antiHLAclass}_2+1.00\ b_{45}$

◆ 2. Ensembles in ParetoFront



◆ 3. Prediction Performance





◆ 4. Niche Models

The output of the image is omitted. The image is expressed as NICHEIMAGE.

◆ 5. Selected Phenotype

```
MedianAverage[{0.628333 igG + 0.0286076 denovoDSA mMFatRej +
    0.0853686 infectiondatefirst respiratoryInfection - 0.0363697,
   1.0196 b45 + 0.102837 denovoDSA dR51 mMFatRej +
    0.0873113 infectiondatefirst respiratoryInfection - 0.0196015,
   0.0329453 antiHLAclass1 denovoDSA mMFatRej - 0.420542 pyrexia +
    0.779171 cMV respiratoryInfection + 0.0412751, 1.11224 b45 + 0.103846 cNIpostRej -
    0.0116545 mMFatRej + 0.0917536 infectiondatefirst respiratoryInfection + 0.0417812,
   0.0332307 antiHLAclass1 denovoDSA mMFatRej + 0.883713 cMV respiratoryInfection -
    0.599922 pyrexia respiratoryInfection + 0.0161709,
   0.0614038 denovoDSA dR51 mMFatRej^2 + 1.02049 b45 +
    0.0867739 infectiondatefirst respiratoryInfection - 0.020488,
   0.600925 bTF respiratoryInfection mMFatRej^2 + 1. b45 +
    1. antiHLAclass2 respiratoryInfection - 2.39836 × 10^-16, 1. b45 + 0.5 cGN preDSA -
    0.5 banfi respiratoryInfection + 1.13636 respiratoryInfection + 6.28037 × 10^-17,
   -0.012514 denovoDSA + 0.970726 bTF respiratoryInfection +
    1.00469 antiHLAclass2 (b45 + respiratoryInfection) + 0.0292737, 0.991304 b45 -
    0.0173913 bTF denovoDSA + 0.973913 (bTF + dQ7) respiratoryInfection + 0.026087,
   1.02934 b45 + 0.0720363 cNIpostRej + 1.03168 bTF respiratoryInfection +
    0.961704 dQ8 respiratoryInfection + 0.0311305, 0.0900972 denovoDSA +
    0.116274 b45 mMFatRej + 0.0881596 infectiondatefirst respiratoryInfection -
```

$$
\begin{aligned}
&0.0175636\ \text{respiratoryInfection} - 0.0371426,\\
&0.971579\ \text{b45} - 0.161864\ \text{nS} + 0.455524\ \text{mMFatRej respiratoryInfection} -\\
&\quad 1.05678\ \text{pyrexia respiratoryInfection} + 0.0284206,\ 1.01106\ \text{b45} - 0.0100676\ \text{denovoDSA} +\\
&\quad 0.948371\ (\text{bTF} + \text{dQ7} + 0.0480144)\ \text{respiratoryInfection} + 0.0241769,\\
&1.\ \text{b45} + 2.24951 \times 10^{-17}\ \text{denovoDSA} + 1.\ \text{antiHLAclass2 respiratoryInfection} +\\
&\quad 0.775194\ \text{bTF mMFatRej respiratoryInfection} - 3.93615 \times 10^{-16},\\
&0.661157\ \text{b45} + 0.330579\ \text{igG preDSA} + 0.991736\ \text{bTF respiratoryInfection} +\\
&\quad 0.991736\ \text{dQ7 respiratoryInfection} + 0.00826446,\\
&0.316934\ \text{denovoDSA respiratoryInfection dR7} + 0.203788\ \text{dR7} + 0.833252\ \text{igG} +\\
&\quad 0.0845852\ \text{infectiondatefirst respiratoryInfection} - 0.0139621,\\
&0.0263034\ \text{denovoDSA}^2 + 0.475823\ \text{igG preDSA} - 0.485298\ \text{pyrexia respiratoryInfection} +\\
&\quad 0.719048\ \text{respiratoryInfection} - 0.00425272,\\
&1.\ \text{b45} - 0.737523\ \text{pyrexia respiratoryInfection} - \frac{0.867208\ \text{respiratoryInfection}}{\text{mMFatRej}} +\\
&\quad 1.41219\ \text{respiratoryInfection} + 3.42622 \times 10^{-17},\ 1.00969\ \text{b45} - 0.0118647\ \text{denovoDSA} +\\
&\quad 1.02076\ (\text{bTF} + \text{dQ7})\ \text{respiratoryInfection} - 0.0288709\ \text{respiratoryInfection} + 0.0318371,\\
&0.791448\ \text{b45} + 0.0513764\ \text{denovoDSA} - 0.538541\ \text{pyrexia respiratoryInfection} +\\
&\quad 0.773279\ \text{respiratoryInfection} - \frac{0.116403}{\text{mMFatRej}} + 0.0499051,\\
&0.178262\ \text{antiHLAclass1 denovoDSA} + 0.71972\ \text{igG} - 0.300664\ \text{pyrexia} +\\
&\quad 0.718342\ \text{respiratoryInfection} - 0.164267\ \text{upperRespiratoryInfection} + 0.0315023,\\
&0.808211\ \text{igG} - 0.0309738\ \text{cNIpostRej denovoDSA mMFatRej} -\\
&\quad 0.368291\ \text{hLADRmm respiratoryInfection} +\\
&\quad 0.136438\ \text{infectiondatefirst respiratoryInfection} - 0.0123065,\\
&0.000480324\ \text{infectionCount}^3 + 0.656709\ \text{antiHLAclass1} +\\
&\quad 0.0815071\ \text{denovoDSA} - 0.0567552\ \text{mMFatRej} - \frac{0.399138}{\text{mMFatRej}} + 0.284595,\\
&0.775194\ \text{bTF mMFatRej respiratoryInfection}^2 + 1.\ \text{dQ7 respiratoryInfection} + 1.\ \text{b45} +\\
&\quad 7.87117 \times 10^{-18}\ \text{denovoDSA} - 4.07673 \times 10^{-16},\ 1.00441\ \text{b45} + 0.502203\ \text{cGN dQ7 preDSA} +\\
&\quad 0.957178\ (\text{bTF} + \text{dQ7} + 0.0480144)\ \text{respiratoryInfection} - 0.00440546,\\
&0.600047\ \text{bTF respiratoryInfection mMFatRej}^2 + 0.972222\ \text{b45} +\\
&\quad 0.0526316\ \text{diarrhea} + 0.945906\ \text{dQ6 respiratoryInfection} + 0.00146199,\\
&-0.248875\ \text{respiratoryInfection banfi}^2 + 0.154954\ \text{antiHLAclass1 mMFatRej} -\\
&\quad 0.745338\ \text{gynecology respiratoryInfection} + 0.990095\ \text{respiratoryInfection} +\\
&\quad 0.00411837,\ 0.615988\ \text{bTF}^2\ \text{mMFatRej}^2\ \text{respiratoryInfection}^2 +\\
&\quad 0.659137\ \text{dQ7 respiratoryInfection} + 0.133065\ \text{denovoDSA} - 0.0250658,\\
&1.\ \text{b45} - 2.82564 \times 10^{-16}\ \text{denovoDSA} + 2.88317 \times 10^{-17}\ \text{mMFatRej} +\\
&\quad 1.\ \text{bTF respiratoryInfection} + 1.\ \text{dQ6 respiratoryInfection} - 5.73625 \times 10^{-16},\\
&1.02252\ \text{b45} - 0.0122817\ \text{mMFatRej} - 0.216916\ \text{feverOnly hLAmm respiratoryInfection} +\\
&\quad 0.982616\ \text{respiratoryInfection} + 0.0205556\ \text{wBCpeakover5} + 0.00680474,\\
&0.224775\ \text{denovoDSA} - 0.252869\ \text{dSAandHSAclass2} + 0.606179\ \text{igG} +\\
&\quad 0.961042\ \text{bTF respiratoryInfection} + 0.755511\ \text{dQ7 respiratoryInfection} + 0.0389581,\\
&0.0776776\ \text{denovoDSA} + 0.784967\ \text{igG} + 0.876799\ \text{dR7 respiratoryInfection} +\\
&\quad 0.108971\ \text{infectiondatefirst respiratoryInfection} -\\
&\quad 0.313078\ \text{respiratoryInfection} - 0.00714979,\ 0.981454\ \text{b45} - 0.0263543\ \text{bTF} -\\
&\quad 0.0185456\ \text{denovoDSA dP14} + 0.97267\ (\text{bTF} + \text{dQ7})\ \text{respiratoryInfection} + 0.0317228,\\
&0.0540752\ \text{denovoDSA} + 0.142482\ \text{hLADRmm} + 0.53671\ \text{igG} +\\
&\quad 1.14648\ \text{bTF respiratoryInfection} + 0.738382\ \text{dQ7 respiratoryInfection} - 0.146483,\\
&0.119793\ \text{denovoDSA} + 0.917933\ \text{igG} - 0.462159\ \text{banfi respiratoryInfection} -\\
&\quad 1.52944\ \text{igG respiratoryInfection} + 1.05027\ \text{respiratoryInfection} - 0.0377257,\\
&0.928544\ \text{b45} + 0.0674601\ \text{dQ7} + 0.0274462\ \text{preDSA} +
\end{aligned}
$$

$$
\begin{aligned}
&0.938078\,(\text{b45}+\text{bTF}+\text{dQ7})\ \text{respiratoryInfection}-0.00344358,\\
&0.0007622\ \text{denovoDSA}^3-0.0249327\ \text{denovoDSA}+1.00298\ \text{b45}+\\
&0.995687\,(\text{bTF}+\text{dQ8})\ \text{respiratoryInfection}+0.0335996,\\
&-0.371167\ \text{pyrexia}^2+0.806982\ \text{b45}+0.0554628\ \text{denovoDSA}+\\
&0.260229\ \text{mMFatRej}\ \text{respiratoryInfection}+0.19333\ \text{respiratoryInfection}-0.00110144,\\
&-0.00136018\ \text{antiHLAclass2}\ \text{mMFatRej}^2+1.01317\ \text{b45}+0.973589\ \text{antiHLAclass2}\\
&\quad\text{respiratoryInfection}+0.966591\ \text{anemia bTF respiratoryInfection}+0.0334087,\\
&1.00155\ \text{b45}-0.000476931\ \text{mMFatRej}-\frac{4.34859\ \text{respiratoryInfection}}{\text{denovoDSA}+\text{infectiondatefirst}}+\\
&1.42709\ \text{respiratoryInfection}+0.00118125,\\
&0.260067\ \text{b63 denovoDSA}-0.0700156\ \text{denovoDSA}+0.617728\ \text{igG}+\\
&0.96385\ \text{bTF respiratoryInfection}+1.00834\ \text{dQ7 respiratoryInfection}+0.0361496,\\
&0.906183\ \text{b45}+0.17877\ \text{igG}-0.478786\ \text{denovoDSA nS}+0.488197\ \text{mMFatRej}\\
&\quad\text{respiratoryInfection}-1.11523\ \text{pyrexia respiratoryInfection}+0.00443196,\\
&0.127585\ \text{infectiondatefirst respiratoryInfection}^3-0.334801\ \text{respiratoryInfection}+\\
&0.860577\ \text{igG}-0.00609955\ \text{cNIpostRej denovoDSA}^2\ \text{mMFatRej}-0.000747252,\\
&-0.0356691\ \text{banfi}+0.173334\ \text{antiHLAclass1 mMFatRej}+\\
&0.909408\ \text{bTF respiratoryInfection}+0.203255\ \text{denovoDSA respiratoryInfection}+\\
&0.085608\ \text{respiratoryInfection}+0.0406532,\\
&0.944444\,(\text{b13}+\text{respiratoryInfection})\ \text{antiHLAclass2}+0.0555556\ \text{antiHLAclass2}+\\
&0.0625\ \text{bTF}\,(\text{denovoDSA}+16)\ \text{respiratoryInfection}+9.17754\times10^{-17},\\
&0.121622\ \sqrt{\text{igG}}\ \text{preDSA}^3+1.\ \text{bTF respiratoryInfection}+\\
&1.\ \text{dQ7 respiratoryInfection}-0.027027\ \text{respiratoryInfection}+0.027027,\\
&1.\ \text{b45}-2.27029\times10^{-16}\ \text{bTF mMFatRej}+1.\ \text{bTF respiratoryInfection}+\\
&1.\ \text{dQ7 respiratoryInfection}+1.05188\times10^{-15}\ \text{respiratoryInfection}+2.41509\times10^{-16},\\
&1.01019\,(\text{b13}+\text{respiratoryInfection})\ \text{antiHLAclass2}+0.117614\ \text{antiHLAclass2}+\\
&0.991133\ \text{bTF respiratoryInfection}-0.101971\ \sqrt[3]{\text{denovoDSA}}+0.00886708,\\
&0.10165\,(\text{antiHLAclass1}+\text{respiratoryInfection}+\text{type2DM})^3+\\
&0.185504\ \text{respiratoryInfection}+0.461524\ \text{igG}\ \sqrt[3]{\text{preDSA}}-0.038908,\\
&-5.69481\times10^{-17}\ \text{antiHLAclass2 denovoDSA mMFatRej}^2+1.\ \text{b45}+1.\ \text{antiHLAclass2}\\
&\quad\text{respiratoryInfection}+1.\ \text{anemia bTF respiratoryInfection}+1.83631\times10^{-15},\\
&1.00533\ \text{bTF respiratoryInfection}^3+1.00533\ \text{dQ7 respiratoryInfection}+\\
&0.341888\ \text{b45 preDSA}+0.0183866\ \text{denovoDSA mMFatRej preDSA}-0.00533134,\\
&1.\ \text{b45}+0.303739\ \text{denovoDSA pyrexia}-0.945837\left(\text{pyrexia}+\frac{1}{\text{mMFatRej}}\right)\\
&\quad\text{respiratoryInfection}+1.48166\ \text{respiratoryInfection}+3.38615\times10^{-17},\\
&0.00260968\ \text{aerobicGNR cNIpostRej mMFatRej feverOnly}^3-\\
&0.216892\ \text{hLAmm respiratoryInfection feverOnly}+\\
&0.999687\ \text{b45}+0.965759\ \text{respiratoryInfection}+0.000312672,\\
&1.00651\ \text{b45}+0.10474\ \text{cNIpostRej}+0.0294182\ \text{dSAandHSAclass1}-0.00222161\ \text{mMFatRej}-\\
&0.815271\ \text{aerobicGNR respiratoryInfection}+0.850634\ \text{respiratoryInfection}+0.0206192,\\
&1.\ \text{a25}+0.104384\ \text{denovoDSA mMFatRej pyrexia}-\\
&1.\ \text{artificialAbortion respiratoryInfection}-\\
&1.\ \text{pyrexia respiratoryInfection}+1.\ \text{respiratoryInfection}+2.94218\times10^{-17},\\
&0.986361\ \text{b45}+0.00447427\ \text{denovoDSA}-1.53727\ \text{mMFatRej pastanemia respiratoryInfection}-\\
&0.264397\ \text{infectiondatefirst pyrexia respiratoryInfection}+\\
&0.985874\ \text{respiratoryInfection}-0.00202064,\\
&1.00767\ \text{b45}-0.141151\ \text{hLAmm respiratoryInfection}+\\
&0.137433\ \text{infectiondatefirst respiratoryInfection}+\\
&0.0538096\ \text{denovoDSA mMFatRej}\,(\text{dR11}+\text{respiratoryInfection})-0.00766761,\\
&0.994412\ \text{b45}-0.443287\ \text{denovoDSA nS}+0.0386213\ \text{denovoDSA respiratoryInfection}+
\end{aligned}
$$

$$
\begin{bmatrix}
0.463271\,\text{mMFatRej respiratoryInfection} - 1.07208\,\text{pyrexia respiratoryInfection} + \\
0.00558751,\ 0.96875\,\text{b45} - 0.999291\,\text{pastanemia respiratoryInfection} + \\
0.179694\,\text{mMFatRej pyrexia respiratoryInfection} - \\
1.36251\,\text{pyrexia respiratoryInfection} + 0.968041\,\text{respiratoryInfection} + 0.03125, \\
0.609938\,\text{bTF mMFatRej}^2\,\text{respiratoryInfection}^3 + 0.951927\,\text{dQ7 respiratoryInfection} + \\
0.00887254\,\sqrt{\text{denovoDSA}}\,\text{mMFatRej}^2 - 0.0149977, \\
0.96875\,\text{b45} + 1.\,\text{dQ7}\,(\text{bTF} + \text{dQ7})\,\text{respiratoryInfection} + \\
0.775194\,\text{bTF mMFatRej respiratoryInfection} - 0.03125\,\text{respiratoryInfection} + 0.03125, \\
0.00650802\,\text{denovoDSA}^2 + 0.895059\,\text{b45} + 0.478099\,\text{mMFatRej respiratoryInfection} - \\
0.38875\,\text{nS respiratoryInfection} - 1.09849\,\text{pyrexia respiratoryInfection} + 0.0105753, \\
0.18886\,\text{anemia denovoDSA} + 0.768036\,\text{igG} - 0.0224501\,\text{rage respiratoryInfection} - \\
0.981009\,\sqrt[3]{\text{pyrexia}}\,\text{respiratoryInfection} + 1.83255\,\text{respiratoryInfection} - 0.0108891, \\
-0.00189856\,\text{mMFatRej respiratoryInfection infectiondatefirst}^2 + 1.\,\text{b45} + \\
0.152006\,(\text{denovoDSA} + \text{infectiondatefirst})\,\text{respiratoryInfection} - \\
0.305643\,\text{respiratoryInfection} - 5.58773 \times 10^{-15}, \\
0.0299124\,\text{denovoDSA mMFatRej}^2\,\text{respiratoryInfection}^3 + 0.675051\,\text{respiratoryInfection}^2 - \\
0.678805\,\text{pyrexia respiratoryInfection} + 1.\,\text{b45} + 5.37953 \times 10^{-16}, \\
0.927388\,\text{b45} + 0.02382\,\text{denovoDSA} - 0.632568\,\text{pyrexia respiratoryInfection} - \\
\frac{0.248901\,\text{respiratoryInfection}}{\text{mMFatRej}^3} + 0.964796\,\text{respiratoryInfection} - 0.0107574, \\
-0.0659741\,\text{dQ7 denovoDSA}^2 + 0.14214\,\text{denovoDSA} + 1.00508\,\text{igG} + \\
0.981537\,(\text{bTF} + \text{dQ7} + 0.0480144)\,\text{respiratoryInfection} - 0.041876, \\
0.447165\,\text{b44}^3 + 0.526727\,\text{igG} + 1.00223\,\text{bTF respiratoryInfection} + \\
0.840877\,\text{dQ8 respiratoryInfection} + 0.0379339\,\sqrt{\text{denovoDSA}} - 0.00223067, \\
1.\,\text{respiratoryInfection}\,(\text{bTF} + \text{dQ7})^3 + 1.\,\text{b45} + 4.42318 \times 10^{-16}\,\text{banf t} - \\
6.28656 \times 10^{-17}\,\text{bTF denovoDSA mMFatRej} - 4.67308 \times 10^{-16},\ 0.925089\,\text{b45} + \\
0.02357\,\text{denovoDSA} - 0.116528\,\text{banfi infectiondatefirst respiratoryInfection} + \\
0.206992\,\text{infectiondatefirst respiratoryInfection} + \\
0.290183\,\text{bTF mMFatRej respiratoryInfection} - 0.00758409, \\
0.666667\,\text{b63} + 1.\,\text{bTF respiratoryInfection} + 1.\,\text{dQ7 respiratoryInfection} - \\
2.23829 \times 10^{-17}\,\text{banfptcbm denovoDSA mMFatRej respiratoryInfection} + \\
2.63492 \times 10^{-16}\,\text{respiratoryInfection} - 1.69742 \times 10^{-16}, \\
0.218667\left(\frac{\text{bTF}}{\text{mMFatRej}} + 2\,\text{bTF} + \text{denovoDSA} + \text{dQ7}\right)(\text{b45} + \text{respiratoryInfection}) + 0.0157136, \\
-0.284953\,\text{respiratoryInfection banfi}^2 + 0.152674\,\text{antiHLAclass1 mMFatRej} - \\
0.0482142\,\text{denovoDSA respiratoryInfection} - \\
0.867255\,\text{gynecology respiratoryInfection} + 1.14726\,\text{respiratoryInfection} + 0.00494959, \\
0.00220114\,\text{respiratoryInfection denovoDSA}^3 + 0.987167\,\text{b45} + \\
0.470095\,\text{mMFatRej respiratoryInfection} - 0.374207\,\text{nS respiratoryInfection} - \\
1.08032\,\text{pyrexia respiratoryInfection} + 0.0128333, \\
0.900825\,\sqrt[3]{\text{igG} + \text{respiratoryInfection}}\,\text{dQ7} + 0.199786\,\text{dSAandHSAclass1} + \\
1.00226\,\text{bTF respiratoryInfection} - 0.00124288\,\sqrt[3]{\text{denovoDSA}} - 0.0022604, \\
-\frac{4.39312\,\text{respiratoryInfection}^3}{\text{denovoDSA} + \text{infectiondatefirst}} + 1.4345\,\text{respiratoryInfection} + \\
1.00306\,\text{b45} - 0.000677024\,\text{infectiondatefirst mMFatRej} + 0.0101326, \\
0.278871\,\text{bTF respiratoryInfection mMFatRej}^2 + 0.216781\,\text{denovoDSA dR7} + 0.913717\,\text{igG} + \\
0.116766\,\text{infectiondatefirst respiratoryInfection} - 0.268366\,\text{respiratoryInfection} - \\
0.0130661,\ 0.124475\,\sqrt{\text{igG}}\,\text{preDSA}^3 + 0.0236469\,\text{denovoDSA}^2\,\text{dQ8} + \\
0.995796\,\text{bTF respiratoryInfection} + 0.806621\,\text{dQ7 respiratoryInfection} + 0.00420389, \\
0.575809\,\text{bTF coaglationnecrosis respiratoryInfection}^3 - \\
0.460656\,\text{banfi respiratoryInfection} + 0.896879\,\text{respiratoryInfection} +
\end{bmatrix}
$$

$$
\begin{bmatrix}
0.0201515\,\text{denovoDSA} + 0.164078\,\text{antiHLAclass1}\,\text{mMFatRej} - 0.0120314, \\
0.54899\,\text{bTF}\,\text{respiratoryInfection}^3 - 0.490202\,\text{banfi}\,\text{respiratoryInfection} + \\
0.943839\,\text{respiratoryInfection} + 0.0089698\,\text{antiHLAclass1}\,\text{denovoDSA} + \\
0.168239\,\text{antiHLAclass1}\,\text{mMFatRej} - 0.00262751, \\
0.0956233\,\text{respiratoryInfection}^3 + 0.410247\,(\text{bTF} + \text{dQ7})\,\text{mMFatRej}\,\text{respiratoryInfection} + \\
1.\,\text{b45} + 1.7279 \times 10^{-16}\,\text{bTF}\,\text{denovoDSA}\,\text{mMFatRej} + 2.18108 \times 10^{-16}, \\
-0.0154307\,\text{igG}\,\text{denovoDSA}^3 + 0.00775107\,\text{denovoDSA}^3 + 1.03419\,\text{igG} + \\
1.00448\,\text{bTF}\,\text{respiratoryInfection} + 0.93228\,\text{dQ7}\,\text{respiratoryInfection} - 0.00448496, \\
0.00817374\,\text{denovoDSA}^3 + 0.971678\,\text{igG} - 1.95774\,\text{igG}\,\text{respiratoryInfection} - \\
0.602161\,\text{pyrexia}\,\text{respiratoryInfection} + 0.58123\,\sqrt[3]{\text{hDperiod}}\,\text{respiratoryInfection} - \\
0.00437312,\ 0.00343251\,\text{denovoDSA}\,\text{respiratoryInfection}\,\text{mMFatRej}^3 + \\
0.981195\,\text{b45} - 0.917957\,\sqrt{\text{pyrexia}}\,\text{respiratoryInfection} + \\
0.899186\,\text{respiratoryInfection} - \frac{0.00206777}{\text{hDperiod}} + 0.0211992, \\
0.115264\,\text{denovoDSA} + 0.920014\,\text{igG} + 1.02882\,\text{bTF}\,\text{respiratoryInfection} + \\
0.827104\,\text{dQ7}\,\text{respiratoryInfection} - 1.29462\,\text{igG}\,\text{respiratoryInfection} + \\
0.00646175\,\text{respiratoryInfection} - 0.0352777, \\
-0.316917\,\text{respiratoryInfection}\,\text{denovoDSA} + 0.125717\,\text{denovoDSA} + \\
0.845788\,\text{igG} + 0.00604224\,\text{maxWBC} + 1.03539\,\text{bTF}\,\text{respiratoryInfection} + \\
1.32474\,\text{dQ7}\,\text{respiratoryInfection} - 0.112615, \\
-0.0179317\,\text{denovoDSA}\,\text{bTF}^2 - 0.0215515\,\text{bTF} + 0.974871\,\text{b45} + 0.087626\,\text{dQ7} + \\
0.920546\,(\text{bTF} + \text{dQ7})\,\text{respiratoryInfection} + 0.0100239,\ 1.\,\text{bTF}\,\text{respiratoryInfection}^2 + \\
1.\,\text{dQ7}\,\text{respiratoryInfection} - 5.6458 \times 10^{-18}\,\text{respiratoryInfection} + \\
1.\,\text{b45} - 3.5683 \times 10^{-17}\,\text{denovoDSA} - 3.69488 \times 10^{-16}\,\text{dP9} + 1.03072 \times 10^{-16}, \\
5.90088 \times 10^{-17}\,\text{denovoDSA}^2\,\text{mMFatRej}\,\text{respiratoryInfection}^3 + \\
0.775194\,\text{bTF}\,\text{mMFatRej}\,\text{respiratoryInfection}^2 + 1.\,\text{dQ7}\,\text{respiratoryInfection} + \\
1.\,\text{b45} - 8.49623 \times 10^{-16},\ -0.0136751\,\text{mMFatRej}\,\text{polyp}\,\text{infectiondatefirst}^2 + 1.\,\text{b45} - \\
\frac{4.1412\,\text{respiratoryInfection}}{\text{denovoDSA} + \text{infectiondatefirst}} + 1.42695\,\text{respiratoryInfection} + 2.9724 \times 10^{-16}, \\
-0.0936637\,\text{infectiondatefirst}\,\text{mMFatRej}\,\text{respiratoryInfection}\,\text{cNIpostRej}^3 + \\
0.773018\,\text{igG} + 0.027701\,\text{denovoDSA}\,\text{mMFatRej} + 0.103482\,\text{infectiondatefirst} \\
\quad \text{respiratoryInfection} - 0.369174\,\text{respiratoryInfection} - 0.025473, \\
-0.00893139\,\text{infectiondatefirst}\,\text{mMFatRej}\,\text{respiratoryInfection}^2 - \\
\frac{4.92647\,\text{respiratoryInfection}}{\text{denovoDSA} + \text{infectiondatefirst}} + \\
1.65487\,\text{respiratoryInfection} + 1.\,\text{b45} - 5.36888 \times 10^{-16}, \\
0.0399931\,\text{b45}\,\text{denovoDSA}^2 + 0.828942\,\text{igG} + 0.737196\,\text{dR7}\,\text{respiratoryInfection} + \\
0.0870421\,\text{infectiondatefirst}\,\text{respiratoryInfection} - \\
0.0705083\,\text{infectiondatefirst}\,\text{pyrexia}\,\text{respiratoryInfection} + 0.00167761, \\
0.162671\,\text{denovoDSA}\,\text{antiHLAclass1}^2 + 0.67517\,\text{igG} + 0.546237\,(\text{dR10}^3 + \text{antiHLAclass1} + \text{bTF}) \\
\quad \text{respiratoryInfection} + 0.0761179\,\text{respiratoryInfection} + 0.00893057, \\
1.\,\text{b45} - 1.76774 \times 10^{-16}\,\text{denovoDSA} - 1.3488 \times 10^{-16}\,\text{infectiondatefirst} + \\
1.\,\text{dQ6}\,\text{respiratoryInfection} - 0.889076\,\text{bTF}\,\text{cNIpostRej}\,\text{mMFatRej}\,\text{respiratoryInfection} - \\
2.7308 \times 10^{-16}\,\text{respiratoryInfection} + 5.1831 \times 10^{-15}, \\
1.00088\,\text{b45} - 0.00314551\,\text{cNIpostRej} + 0.812106\,\text{igG} - \\
0.0887777\,\text{b59}\,\text{denovoDSA}\,\text{mMFatRej} - 0.342262\,\text{hLADRmm}\,\text{respiratoryInfection} + \\
0.133424\,\text{infectiondatefirst}\,\text{respiratoryInfection} - 0.00386146, \\
-0.544955\,\text{mMFatRej}\,\text{respiratoryInfection}\,\text{cNIpostRej}^3 + 0.0396604\,\text{b45}\,\text{denovoDSA}^2 + \\
0.907485\,\text{igG} + 0.120137\,\text{infectiondatefirst}\,\text{respiratoryInfection} - \\
0.451422\,\text{respiratoryInfection} - 0.0018011, \\
-0.0142758\,\text{respiratoryInfection}\,\text{infectiondatefirst}^2 + \\
0.321984\,\text{respiratoryInfection}\,\text{infectiondatefirst} + 0.0655956\,\text{denovoDSA}
\end{bmatrix}
$$

```
 0.321984 respiratoryInfection infectiondatefirst + 0.0655956 denovoDSA
  dR51 mMFatRej^2 + 1.00482 b45 - 0.775869 respiratoryInfection - 0.00482466,
1.01178 b45 - 0.00622557 denovoDSA + 0.0679847 denovoDSA respiratoryInfection +
 0.0656963 hDperiod respiratoryInfection + 0.283782 mMFatRej respiratoryInfection -
 0.880263 pyrexia respiratoryInfection + 0.0100054,
1. b45 + 0.0528666 denovoDSA respiratoryInfection -
 0.827091 pyrexia respiratoryInfection - 0.445004 respiratoryInfection +
 0.917742 Sqrt[mMFatRej respiratoryInfection] + 1.3447 × 10^-16,
0.465834 bTF respiratoryInfection mMFatRej^3 + 1. b45 + 5.09863 × 10^-17 denovoDSA -
 1.21511 × 10^-16 infectiondatefirst + 1. dQ6 respiratoryInfection +
 1.28125 × 10^-15 respiratoryInfection + 2.8432 × 10^-15,
0.814526 Surd[b45 + igG + 2 respiratoryInfection, 3] antiHLAclass2 -
 0.00362216 denovoDSA + 0.996005 bTF respiratoryInfection + 0.00399537,
0.00817374 denovoDSA^3 + 0.58123 Surd[hDperiod, 3] respiratoryInfection^2 + 0.971678 igG -
 1.95774 igG respiratoryInfection - 0.602161 pyrexia respiratoryInfection -
 0.00437312, 0.984304 b45 - 0.0180016 nS (denovoDSA + maxWBC + pyrexia) +
 0.304932 mMFatRej respiratoryInfection - 0.958991 pyrexia respiratoryInfection +
 0.380685 respiratoryInfection + 0.0156963, 0.000981174 infectionCount^3 -
 0.0603572 infectionCount - 0.00179096 dSAclass1number mMFatRej^2 -
 1.11199 artificialAbortion respiratoryInfection +
 0.626654 antiHLAclass1 Sqrt[denovoDSA] + 0.140807,
0.387512 coaglationnecrosis + 0.21556 antiHLAclass1 denovoDSA +
 0.258672 respiratoryInfection + 0.772547 Surd[(c3 + respiratoryInfection) type2DM, 3] -
 0.0168484, -0.479066 mMFatRej pyrexia respiratoryInfection^2 -
 0.994922 artificialAbortion respiratoryInfection +
 0.375212 denovoDSA mMFatRej pyrexia respiratoryInfection +
 0.994922 respiratoryInfection + 1. a25 - 5.59523 × 10^-17,
0.00788174 denovoDSA^3 - 0.0732254 respiratoryInfection denovoDSA +
 0.971709 igG + 1.00324 bTF respiratoryInfection +
 1.05847 dQ7 respiratoryInfection - 1.64604 igG respiratoryInfection - 0.00323612,
-0.292821 respiratoryInfection banfi^2 + 0.337408 igG + 0.137513 antiHLAclass1 mMFatRej -
 0.102653 denovoDSA respiratoryInfection - 0.916943 gynecology respiratoryInfection +
 1.20951 respiratoryInfection + 0.000251825,
-0.304599 respiratoryInfection banfi^2 + 0.187182 antiHLAclass1 denovoDSA +
 0.774828 igG - 0.197684 denovoDSA respiratoryInfection -
 0.987393 gynecology respiratoryInfection + 1.2932 respiratoryInfection - 0.00120798,
0.870285 Surd[2 b45 + igG + respiratoryInfection, 3] antiHLAclass2 +
 0.0847118 bTF (denovoDSA + 11.7554) respiratoryInfection + 0.00417562,
-0.321129 respiratoryInfection pyrexia^2 - 0.391652 respiratoryInfection pyrexia +
 0.882019 b45 + 0.0389167 denovoDSA + 0.0804726 hDperiod respiratoryInfection +
 0.295459 mMFatRej respiratoryInfection - 0.0182277,
0.0144343 denovoDSA mMFatRej preDSA^3 + 0.0288452 cRPpostRej +
 0.0246125 mMFatRej - 0.909035 artificialAbortion respiratoryInfection -
 0.648247 pyrexia respiratoryInfection + 0.959129 respiratoryInfection - 0.0791036,
0.042321 c4d denovoDSA^2 + 0.928364 anemia igG +
 0.0121641 hDperiod^2 respiratoryInfection - 0.347408 pyrexia^2 respiratoryInfection +
 0.514042 respiratoryInfection - 0.0130064,
1. b45 + 5.81949 × 10^-17 denovoDSA - 2.34174 × 10^-16 mMFatRej + 0.5 denovoDSA pyrexia +
 1. cMV respiratoryInfection - 1. pyrexia respiratoryInfection +
 3.46089 × 10^-16 respiratoryInfection + 4.78397 × 10^-16,
-0.128868 respiratoryInfection banfi^3 + 0.00771568 denovoDSA^3 +
```

$$
\begin{aligned}
&0.973807\ \text{igG} - 0.906143\ \text{gynecology respiratoryInfection} - \\
&1.97328\ \text{igG respiratoryInfection} + 1.03968\ \text{respiratoryInfection} - 0.00466984, \\
&-1.00527 \times 10^{-16}\ \text{bTF denovoDSA mMFatRej b42}^3 + 0.990037\ \text{b45} - \\
&0.135337\ \text{banfi infectiondatefirst respiratoryInfection} + \\
&0.24365\ \text{infectiondatefirst respiratoryInfection} - \\
&0.142629\ \text{respiratoryInfection surgery} + 0.00996278, \\
&0.000907072\ \text{infectionCount}^3 - 0.0519831\ \text{infectionCount} - 0.00838477\ \text{mMFatRej} - \\
&1.07132\ \text{artificialAbortion respiratoryInfection} + 0.243933\ \text{dSAclass1number} \\
&\quad \text{respiratoryInfection} + 0.558999\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} + 0.133061, \\
&0.00791291\ \text{dR7 denovoDSA}^3 - 0.138736\ \text{respiratoryInfection}^2 + 0.939541\ \text{igG} + \\
&0.901191\ \text{dR7 respiratoryInfection} + 0.112634\ \text{infectiondatefirst} \\
&\quad \text{respiratoryInfection} - 0.138736\ \text{respiratoryInfection} + 0.00277089, \\
&0.000922108\ \text{infectionCount}^3 - 0.0559265\ \text{infectionCount} + 0.835915\ \text{antiHLAclass1} + \\
&0.0372152\ \text{denovoDSA} - 1.03142\ \text{artificialAbortion respiratoryInfection} - \\
&\frac{0.07859\ \text{dSAclass1number}}{\text{mMFatRej}^4} + 0.109131, \\
&-0.129632\ \text{respiratoryInfection banfi}^3 + 0.00784294\ \text{denovoDSA}^3 - \\
&0.461405\ \text{gynecology} + 0.928438\ \text{igG} - 0.0151186\ \text{denovoDSA}^3\ \text{respiratoryInfection} + \\
&1.03451\ \text{respiratoryInfection} + 0.00896561, \\
&0.964021\ \text{respiratoryInfection dQ7} + 0.0359789\ \text{dQ7} + 1.\ \text{bTF respiratoryInfection} - \\
&2.21694 \times 10^{-16}\ \text{denovoDSA respiratoryInfection} + \\
&0.00582501\ \text{respiratoryInfection} + 0.166033\ \sqrt[3]{\text{b45}}\ \text{mMFatRej type2DM} - 0.00582501, \\
&0.753817\ \text{igG} + 0.0274769\ \text{denovoDSA mMFatRej} + 1.7883\ \text{respiratoryInfection} - \\
&0.847442\ \text{respiratoryInfection}\left(\text{gynecology} + \text{respiratoryInfection} + \sqrt{\text{igG} + \text{pyrexia}}\right) - \\
&0.028448, 0.0913984\ \text{banfi cNIpostRej}^2\ \text{infectiondatefirst respiratoryInfection}^4 + \\
&0.104964\ \text{infectiondatefirst respiratoryInfection} - 0.406608\ \text{respiratoryInfection} + \\
&0.788862\ \text{igG} + 0.0278183\ \text{denovoDSA mMFatRej} - 0.0262384, \\
&-0.0242436\ \text{pyrexia respiratoryInfection infectiondatefirst}^2 + \\
&0.0891492\ \text{respiratoryInfection infectiondatefirst} - 0.0276037\ \text{denovoDSA} + \\
&1.12579\ \text{b45 dR7} + 0.933315\ \text{igG} + 0.761729\ \text{dR7 respiratoryInfection} + 0.0122285, \\
&0.131567\ \left(\text{antiHLAclass1} + \text{respiratoryInfection} + \text{type2DM}\right)^3 + \\
&0.496502\ \text{coaglationnecrosis} + 0.942318\ \text{dR15 igG} - 0.0107395\ \sqrt[9]{\text{preDSA}} - 0.0622855, \\
&0.00075487\ \text{respiratoryInfection infectiondatefirst}^3 - 0.00462134\ \text{denovoDSA} + \\
&0.949136\ \text{igG} - 0.00624453\ \text{cNIpostRej denovoDSA}^2\ \text{mMFatRej} + \\
&0.761116\ \text{bTF respiratoryInfection} - 0.0185458\ \text{respiratoryInfection} - 0.00149047, \\
&-0.00791981\ \text{dQ7 denovoDSA}^3 + 0.00797112\ \text{denovoDSA}^3 + 1.00399\ \text{igG} + \\
&1.0042\ \text{bTF respiratoryInfection} + 1.00372\ \text{dQ7 respiratoryInfection} - \\
&1.00993\ \text{igG respiratoryInfection} - 0.00419665, 0.0072172\ \text{denovoDSA}^3 + \\
&0.940621\ \text{igG} - 0.863732\left(\text{gynecology} + \text{igG} + \sqrt{\text{igG} + \text{pyrexia}}\right)\ \text{respiratoryInfection} + \\
&0.948481\ \text{respiratoryInfection} - 0.00092296, -0.418625\ \sqrt{\text{nS}}\ \text{respiratoryInfection}^2 - \\
&0.873488\ \text{pyrexia respiratoryInfection} + 0.962079\ \text{b45} + 0.0137282\ \text{denovoDSA} + \\
&0.726521\ \sqrt{\text{mMFatRej respiratoryInfection}} - 0.0101273, \\
&0.0228677\ \text{denovoDSA}^2 + 0.762927\ \text{igG} - 0.892136\left(\text{b45} + \text{gynecology} + \sqrt{\text{igG} + \text{pyrexia}}\right) \\
&\quad \text{respiratoryInfection} + 0.911229\ \text{respiratoryInfection} + 0.00965372, \\
&0.688605\ \text{igG} + 0.451192\ \text{denovoDSA pyrexia} - 0.90195\ \text{pyrexia respiratoryInfection} + \\
&0.885249\ \text{respiratoryInfection} + 0.000160401\ \text{wBCpostKTx} - \\
&0.901612\ \sqrt[3]{\text{enterococcusfaecalis respiratoryInfection}} + 0.0153692, \\
&0.111563\ \sqrt[3]{\text{dR7}}\ \text{denovoDSA} + 0.0778702\ \text{denovoDSA} + 0.1057\ \text{inflammation} + \\
&0.491293\ \text{c3 preDSA} + 0.0847961\ \text{infectiondatefirst respiratoryInfection} + \\
&0.521918\ \sqrt[3]{\text{dR7}}\ \text{respiratoryInfection} - 0.0604563, 0.0272003\left(2\ \text{antiHLAclass2} + \text{bTF}\right)
\end{aligned}
$$

$$\left(\text{b62} + \text{igG} + \text{respiratoryInfection}\right)\left(\text{igG} + \sqrt[3]{\text{denovoDSA}} - 5.57946\right) + 0.00356888,$$

$$0.568769\,\text{banfi}^3\,\text{bTF}\,\text{respiratoryInfection}^3 - 0.486246\,\text{banfi}\,\text{respiratoryInfection} + 0.921698\,\text{respiratoryInfection} + 0.218938\,\text{antiHLAclass1}\,\text{mMFatRej} - 0.00716706\,\text{antiHLAclass1}\,\text{banfi}\,\text{denovoDSA}\,\text{mMFatRej} - 0.00422126,$$

$$-0.00024986\,\text{mMFatRej}\,\text{infectionCount}^3 - \frac{0.000911839\,\text{infectionCount}^3}{\text{mMFatRej}} + 0.00178424\,\text{infectionCount}^3 - 0.0264952\,\text{infectionCount} + 0.535019\,\text{antiHLAclass1}\,\sqrt{\text{denovoDSA}} + 0.0488466,$$

$$0.177257\,\text{antiHLAclass1}\,\text{denovoDSA} + 0.0939523\,\text{dR15} + 0.629642\,\text{igG} + 0.906048\,\text{dR15}\,\text{respiratoryInfection} + 0.665332\left(\text{antiHLAclass1} + \text{bTF} + \text{igG}\right)\text{respiratoryInfection} + 0.00136286\,\text{respiratoryInfection} - 0.00136286,$$

$$0.927885\,\text{b45} + 0.00483121\,\text{denovoDSA}\,\text{mMFatRej} - 0.564112\left(\text{pyrexia} + \frac{1}{\text{mMFatRej}^2} + 2\right)\text{respiratoryInfection} + 2.22099\,\text{respiratoryInfection} + \frac{0.0621056}{\text{mMFatRej}} - 0.0445973,$$

$$0.931353\left(\text{b45} + \text{respiratoryInfection}\right)\text{antiHLAclass2}^2 + 0.42925\,\text{igG} + 0.982914\,\text{bTF}\,\text{respiratoryInfection} - 0.0754318\,\sqrt{\text{denovoDSA} - \sqrt[3]{\text{denovoDSA}}} + 0.0170862,$$

$$0.372057\,\text{mMFatRej}\,\text{respiratoryInfection}^2 - 1.05584\,\text{pyrexia}\,\text{respiratoryInfection} + 0.312251\,\text{respiratoryInfection} + 1.\,\text{b45} - 0.106848\,\text{nS}\left(\text{denovoDSA} + 4\,\text{respiratoryInfection}\right) + 2.03535\times10^{-16},$$

$$0.0175818\,\text{dQ2}\,\text{mMFatRej}\,\text{respiratoryInfection}\,\text{dSAandHSAclass1}^4 + 1.05161\,\text{b45} + 0.0812049\,\text{cNIpostRej} + 0.0847938\,\text{feverOnly} - 0.244861\,\text{feverOnly}\,\text{hLAmm}\,\text{respiratoryInfection} + 1.00794\,\text{respiratoryInfection} - 0.025837,$$

$$-0.000290615\,\text{mMFatRej}\,\text{infectionCount}^3 - \frac{0.000942304\,\text{infectionCount}^3}{\text{mMFatRej}} + 0.00171339\,\text{infectionCount}^3 - 0.199416\,\text{antiHLAclass1}\,\text{denovoDSA} + 0.899552\,\text{antiHLAclass1}\,\sqrt{\text{denovoDSA}} - 0.0373975,$$

$$0.00799511\,\text{b45}^3\,\text{denovoDSA}^3 - 0.120991\,\text{respiratoryInfection}\,\text{denovoDSA} + 0.814134\,\text{igG} - 1.08278\,\text{enterococcusfaecalis}\,\text{respiratoryInfection} - 0.941442\,\sqrt[3]{\text{pyrexia}}\,\text{respiratoryInfection} + 1.07487\,\text{respiratoryInfection} + 0.00790722,$$

$$0.0394244\,\text{anemia}\,\text{denovoDSA}^2 - 0.595924\,\sqrt{\text{pyrexia}}\,\text{respiratoryInfection}^2 + 0.923959\,\text{anemia}\,\text{igG} + 0.176882\left(\text{igG} - \text{banfptc}\right)\text{respiratoryInfection} + 1.03841\,\text{respiratoryInfection} - 0.00280763,$$

$$0.00495564\,\text{denovoDSA}^2\,\text{dQ7}\,\text{mMFatRej}^2\left(\text{pregnancyhistory} + 2\right)\text{respiratoryInfection}^2 + 0.999776\,\text{bTF}\,\text{respiratoryInfection} + 0.316397\,\text{dQ7}\,\text{mMFatRej}\,\text{respiratoryInfection} + 0.999776\,\text{b45} + 0.000224081,$$

$$0.00854043\,\text{mMFatRej}^3\,\text{pyrexia}^3 - 1.06335\,\text{respiratoryInfection}^2\,\text{pyrexia}^3 + 0.997065\,\text{b45} + 0.00218134\,\text{denovoDSA} - 0.993946\,\text{pastanemia}\,\text{respiratoryInfection} + 0.998646\,\text{respiratoryInfection} - 0.00469994,\ -0.0000360477\,\text{mMFatRej}^2\,\text{infectionCount}^3 - \frac{0.000687653\,\text{infectionCount}^3}{\text{mMFatRej}} + 0.00114046\,\text{infectionCount}^3 + 0.287395\,\text{igG} + 0.494889\,\text{antiHLAclass1}\,\sqrt{\text{denovoDSA}} - 0.0391179,$$

$$-0.00790862\,\text{respiratoryInfection}\,\text{denovoDSA}^3 + 0.995084\,\text{respiratoryInfection}^3 - 0.252839\,\text{banfi}^2\,\text{respiratoryInfection}^2 + 0.447252\,\text{antiHLAclass1}\,\text{banfi} - 0.384482\,\text{gynecology} + 0.984471\,\text{igG} + 0.0133599,\ 0.500227\,\text{bTF}\,\text{respiratoryInfection}^2 + 0.121652\,\text{infectiondatefirst}\,\text{respiratoryInfection} - 0.351792\,\text{respiratoryInfection} + 1.\,\text{b45} + 0.350459\,\sqrt{\text{denovoDSA}\,\text{dR51}\,\text{mMFatRej}\,\text{respiratoryInfection}} + 1.77355\times10^{-16},$$

$$-0.000756763\,\text{respiratoryInfection}^{0.12785}\,\text{infectiondatefirst}^3 - 0.0000170892\,\text{denovoDSA}\,\text{mMFatRej}\,\text{respiratoryInfection}\,\text{infectiondatefirst} + 0.223205\,\text{respiratoryInfection}\,\text{infectiondatefirst} - 0.352939\,\text{banfi}\,\text{respiratoryInfection} + 0.995727\,\sqrt{\text{a25}} + 0.00427252$$

0.332939 banfi respiratoryInfection + 0.993727 $\sqrt{\text{a25}}$ + 0.00427252,
−2.44141 pastanemia respiratoryInfection mMFatRej^2 + 1. b45 +
2.31967 × 10^{-16} denovoDSA + 0.351207 pyrexia respiratoryInfection +
1. respiratoryInfection − 1.35121 $\sqrt[3]{\text{pyrexia respiratoryInfection}}$ + 1.52177 × 10^{-16},
1.00284 b45 + 0.00283704 pyrexia + 0.198362 (bTF + mMFatRej + denovoDSA$^{0.344715}$ + 2)
respiratoryInfection − 0.356071 nS respiratoryInfection −
0.783484 pyrexia respiratoryInfection − 0.00283704,
1.0117 b44 dR7^3 + 0.897599 respiratoryInfection dR7 + 1.00452 igG −
0.00147944 infectiondatefirst^3 respiratoryInfection +
0.0254793 infectiondatefirst^2 respiratoryInfection −
0.0582882 denovoDSA respiratoryInfection − 0.0117005,
0.0701339 denovoDSA + 0.150999 dSAandHSAclass1 + 0.234488 igG +
0.923741 bTF respiratoryInfection + 0.116698 respiratoryInfection +
0.754111 dQ7 $\sqrt[3]{(\text{respiratoryInfection} - \text{igG})^2}$ − 0.0404394,
0.0000146933 denovoDSA mMFatRej respiratoryInfection dP5^2 −
0.991172 $\sqrt[27]{\text{pyrexia}}$ respiratoryInfection^2 + 1. a25 −
0.999911 artificialAbortion respiratoryInfection +
0.999911 respiratoryInfection + 2.87823 × 10^{-16},
0.00718101 denovoDSA^2 mMFatRej cNIpostRej^4 + 0.968361 igG + 0.000736936 mMFatRej +
0.000765729 infectiondatefirst^3 respiratoryInfection +
0.760819 bTF respiratoryInfection − 0.0209709 respiratoryInfection − 0.00344367,
−0.00259905 dQ7 denovoDSA^4 + 0.00797471 denovoDSA^3 + 0.993882 igG −
0.356876 igG^2 respiratoryInfection + 1.00499 bTF respiratoryInfection +
0.995549 dQ7 respiratoryInfection − 0.00498871,
−0.036239 respiratoryInfection banfct^3 + 0.0080597 denovoDSA^3 + 0.973844 igG +
0.514547 denovoDSA pyrexia − 1.94598 igG respiratoryInfection −
1.00091 pyrexia respiratoryInfection + 1.007 respiratoryInfection − 0.00608308,
0.0016023 denovoDSA^4 − 0.00873464 $\sqrt[3]{\text{denovoDSA}}$ + 0.99099 igG +
0.998217 bTF respiratoryInfection + 0.968828 dQ7 respiratoryInfection −
1.9481 igG respiratoryInfection + 0.0000887758 respiratoryInfection + 0.00169431,
0.937396 b45 + 0.00500254 mMFatRej + 0.100035 infectiondatefirst respiratoryInfection −
0.615624 $\sqrt{\text{banfi}}$ respiratoryInfection − 0.379637 $\sqrt{\text{hLADRmm}}$ respiratoryInfection +
0.912813 respiratoryInfection + 0.0328095 $\sqrt{\text{denovoDSA}}$ − 0.0259674,
0.0351486 denovoDSA + 0.182358 dSAandHSAclass1 − 0.0404765 dSAandHSAclass2 +
0.98623 bTF respiratoryInfection + 0.0165409 respiratoryInfection +
0.91368 dQ7 $\sqrt[9]{\text{igG} + \text{respiratoryInfection}}$ − 0.00277128,
0.125795 dQ7^2 mMFatRej^2 respiratoryInfection^3 + 0.932726 bTF respiratoryInfection +
0.0840305 $\sqrt[3]{\text{respiratoryInfection}}$ + 0.0218269 denovoDSA^2 +
0.662293 b45 + 0.0253165 dSAandHLAclass1pre − 0.016757,
0.140994 antiHLAclass1 denovoDSA + 0.897893 igG + 0.0184658 $\sqrt{\text{respiratoryInfection}}$ +
0.866784 $\sqrt{(\text{bTF}^3 + \text{antiHLAclass1} + \text{dR15})\ \text{respiratoryInfection}}$ + 0.00195547,
1. dQ8^2 respiratoryInfection^2 + 1. bTF respiratoryInfection +
3.11311 × 10^{-16} respiratoryInfection + 1. b45 −
8.53337 × 10^{-17} $\sqrt{\text{denovoDSA}^2\ \text{mMFatRej respiratoryInfection}}$ + 1.36922 × 10^{-17},
1.01896 b45 − 0.0287982 banfct − 0.275122 nS respiratoryInfection −
1.03568 pyrexia respiratoryInfection + 0.242787 respiratoryInfection
(bTF + mMFatRej + pyrexia + respiratoryInfection + denovoDSA$^{0.344715}$) + 0.00984011,
1.0016 b45 + 0.728088 (−denovoDSA − 10) respiratoryInfection −
0.710027 infectiondatefirst respiratoryInfection +
0.00848883 mMFatRej respiratoryInfection + 4.67913 respiratoryInfection
$\sqrt{\text{denovoDSA} + \text{infectiondatefirst} + \text{respiratoryInfection}}$ − 0.00160392, 0.978306 b45 +

$$0.0527446\ \text{igG} + 0.421512\left(\frac{\text{bTF}}{\text{mMFatRej}} + 2\,\text{bTF} + \text{dQ7} + \sqrt[9]{\text{denovoDSA}}\right)\ \text{respiratoryInfection} - 0.00467848,$$

$$-0.231953\ \text{infectiondatefirst}\ \text{respiratoryInfection}^2\ \text{cNIpostRej}^3 + 0.756901\ \text{respiratoryInfection}\ \text{cNIpostRej} + 0.902617\ \text{igG} + 0.00588394\ \text{denovoDSA}^2\ \text{mMFatRej} + 0.0845281\ \text{infectiondatefirst}\ \text{respiratoryInfection} - 0.250599\ \text{igG}\ \text{mMFatRej}\ \text{respiratoryInfection} - 0.0101752,$$

$$1.\ \text{b45} + 0.185024\ \text{denovoDSA}\ \text{respiratoryInfection} - 0.398152\ \text{banfi}\ \text{mMFatRej}\ \text{respiratoryInfection} + 0.732714\ \text{mMFatRej}\ \text{respiratoryInfection} + 0.816862\ \sqrt{\text{banfi}}\ \text{respiratoryInfection} + 0.780446\ \sqrt{\text{bTF}}\ \text{respiratoryInfection} - 1.02889\ \text{respiratoryInfection} + 4.47206\times 10^{-16},$$

$$0.144176\ \text{infectiondatefirst}\ \text{respiratoryInfection}\ \text{cNIpostRej}^4 + 0.000122067\ \text{denovoDSA}^2\ \text{mMFatRej}^3 + 0.877474\ \text{igG} + 0.114067\ \text{infectiondatefirst}\ \text{respiratoryInfection} + 0.0244454\ \text{denovoDSA}\ \text{mMFatRej}\ \text{respiratoryInfection} - 0.451371\ \text{respiratoryInfection} + 0.000638257,$$

$$-0.041424\left(\text{denovoDSA}^2 + \text{infectiondatefirst}^2\ \text{respiratoryInfection}\right)\ \text{cNIpostRej}^3 + 0.92117\ \text{respiratoryInfection}\ \text{cNIpostRej} + 0.87316\ \text{igG} + 0.060973\ \text{infectiondatefirst}\ \text{respiratoryInfection} + 0.156258\ \text{respiratoryInfection} + 0.00258231,$$

$$-0.0320027\ \text{banfct}^3 + 0.0517983\ \text{denovoDSA}^2 - 0.0634441\ \text{denovoDSA} + 1.07516\ \text{igG} - 1.99332\ \text{igG}\ \text{respiratoryInfection} - 0.916396\ \sqrt[6]{\text{pyrexia}}\ \text{respiratoryInfection} + 0.959732\ \text{respiratoryInfection} + 0.0126972,$$

$$1.55171 - 4.67473\Big/\left(\text{denovoDSA} - \sqrt[3]{\text{denovoDSA}} + 3\,\text{igG} + 7\,\text{bTF}\ \text{respiratoryInfection} + 4.60052\,\text{dQ7}\ \text{respiratoryInfection} + 3\right),$$

$$-0.000275128\ \text{mMFatRej}\ \text{infectionCount}^3 - \frac{0.000896854\ \text{infectionCount}^3}{\text{mMFatRej}} + 0.00178408\ \text{infectionCount}^3 - 0.0257714\ \text{infectionCount} + 1.00076\ \text{antiHLAclass1} + 0.0284504\ \text{denovoDSA} - \frac{0.536249\ \text{antiHLAclass1}}{\text{mMFatRej}} + 0.0347638,$$

$$0.0372646\ \text{denovoDSA}^2 + 0.86048\ \text{igG} - 0.138919\left(\text{denovoDSA} + \text{pyrexia}\right)^2\ \text{respiratoryInfection} + 0.999196\left(\text{bTF} + \text{igG} + \sqrt[3]{\text{denovoDSA}} + 1\right)\ \text{respiratoryInfection} - 0.856933\ \text{respiratoryInfection} - 0.0130682,$$

$$1.06444 - \frac{0.086169}{2\,\text{b45} + \text{igG} + \text{bTF}\ \text{respiratoryInfection} + \text{dQ7}\ \text{respiratoryInfection} + \frac{4}{\text{denovoDSA}+\text{igG}+49}},$$

$$0.709839\ \sqrt[3]{\left(\text{b45} + 2\,\text{bTF} + \text{dQ7} + \frac{\text{denovoDSA}}{\text{mMFatRej}}\right)\left(\text{b45} + \text{respiratoryInfection}\right)} - 0.00265144,$$

$$-8.55971\times 10^{-17}\ \text{pyrexia}^3\ \text{mMFatRej}^3 + 0.00227475\ \text{denovoDSA}\ \text{pyrexia}^2\ \text{mMFatRej}^3 + 1.\ \text{b45} + 2.26152\times 10^{-16}\ \text{denovoDSA} - 1.\ \text{pastanemia}\ \text{respiratoryInfection} - 1.\ \text{pyrexia}\ \text{respiratoryInfection} + 1.\ \text{respiratoryInfection} + 2.40187\times 10^{-15},$$

$$-0.000800041\left(\text{dP11} - \text{birthhistory}\right)\ \text{denovoDSA}^4 + 6.46379\times 10^{-7}\ \text{infectiondatefirst}^3\ \text{respiratoryInfection}^3 + 1.00006\ \text{igG} + 0.99984\ \text{bTF}\ \text{respiratoryInfection} + 0.99922\ \text{dQ7}\ \text{respiratoryInfection} - 0.499236\ \text{igG}\ \text{respiratoryInfection} - 0.0000617723,$$

$$0.9736\ \sqrt{\text{denovoDSA} + \text{infectiondatefirst} + \text{dR7}\ \text{respiratoryInfection}}\ \text{respiratoryInfection}^2 - 0.0979823\ \text{infectiondatefirst}\ \text{respiratoryInfection} + 0.415013\ \text{bTF}\ \text{mMFatRej}\ \text{respiratoryInfection} - 1.42539\ \text{respiratoryInfection} + 1.\ \text{b45} + 5.80469\times 10^{-16},$$

$$0.013688\ \text{antiHLAclass1}^3 - 0.000625433\ \text{artificialAbortion}\ \text{infectionCount}^3 + 0.219828\ \text{infectionCount}\ \text{respiratoryInfection} - 1.57836\ \text{respiratoryInfection} + 0.657917\ \sqrt[3]{\text{antiHLAclass1}\ \text{denovoDSA}} + \frac{0.0000115683\ \text{infectionCount}^3}{} + 0.00434937,$$

$$\begin{aligned}
&\text{mMFatRej}\\
&-0.213072\,\text{pyrexia}^2+0.986253\,\text{b45}+2.55623\,\text{respiratoryInfection}+0.563192\\
&\quad\text{respiratoryInfection}\left(\text{bTF}+\text{respiratoryInfection}+\text{denovoDSA}^{0.344715}-5.65781\right)+\\
&\quad0.19819\,\sqrt{\text{mMFatRej respiratoryInfection}}+0.0137465,\ 1.00735\\
&\quad\sqrt[3]{\left(\text{antiHLAclass2}+\text{bTF}+\text{bTF cNIpostRej preDSA}\right)\sqrt[3]{\text{b62}+\text{igG}+\text{respiratoryInfection}}}+\\
&\quad0.0010498,\ -0.0357949\,\text{respiratoryInfection banfct}^3+0.00815362\,\text{denovoDSA}^3+\\
&\quad0.147697\,\text{pyrexia}^3-0.978517\left(\text{igG}+\text{respiratoryInfection}\right)^2+1.96036\,\text{igG}-\\
&\quad1.09507\,\text{pyrexia respiratoryInfection}+1.98476\,\text{respiratoryInfection}-0.0144526,\\
&1.\,\text{b45}-0.0806294\,\text{mMFatRej pyrexia respiratoryInfection}+\\
&\quad4.42065\,\text{respiratoryInfection}+0.919659\,\text{respiratoryInfection}\\
&\quad\left(\text{bTF}+\text{respiratoryInfection}+\text{denovoDSA}^{0.344715}-5.65781\right)-\\
&\quad0.271304\,\sqrt{\text{denovoDSA respiratoryInfection}}-2.31654\times10^{-18},\\
&-\frac{0.0000767395\,\text{infectionCount}^4}{\text{mMFatRej}}-0.000268173\,\text{mMFatRej infectionCount}^3+\\
&\quad0.00192704\,\text{infectionCount}^3-0.0514032\,\text{infectionCount}+1.01523\,\text{antiHLAclass1}+\\
&\quad0.029332\,\text{denovoDSA}-\frac{0.551305\,\text{antiHLAclass1}}{\text{mMFatRej}}+0.0880795,\\
&1.00706-\frac{8.36163}{\text{denovoDSA}+\text{igG}+8\left(\text{bTF}+\text{igG}+\text{mFImax}\right)\left(\text{b45}+\text{igG}+2\,\text{respiratoryInfection}\right)+8},\\
&1.+1.36189\times10^{-9}\Big/\left(2\,\text{b45}+\text{igG}+\text{bTF respiratoryInfection}+\right.\\
&\qquad\left.\text{dQ7 respiratoryInfection}-\frac{1}{\text{denovoDSA}+\text{respiratoryInfection}+7.34272\times10^8}\right),\\
&0.00860787\,\text{denovoDSA}^2\,\text{mMFatRej cNIpostRej}^4+0.00076238\,\text{cNIpostRej}^3+\\
&\quad0.00116966\,\text{denovoDSA}^2\,\text{mMFatRej cNIpostRej}+0.967525\,\text{igG}+\\
&\quad0.000753932\,\text{infectiondatefirst}^3\,\text{respiratoryInfection}+\\
&\quad0.745934\,\text{bTF respiratoryInfection}-0.00402688,\ -0.00424261\,\text{cNIpostRej}\\
&\quad\text{feverOnly}^3\,\text{mMFatRej}\left(\text{infectionCount}-\text{naturalAbortion}\right)\text{respiratoryInfection}^4-\\
&\quad0.306716\,\text{feverOnly hLAmm respiratoryInfection}+1.02521\,\text{respiratoryInfection}+\\
&\quad0.0000117165\,\text{wBCpeakover5}^3+1.00422\,\text{b45}-0.00591134\,\text{type2DM}+0.00159371,\\
&0.00777797\,\text{denovoDSA}^3-0.20063\,\text{respiratoryInfection denovoDSA}+\\
&\quad0.952518\,\text{igG}-0.0743924\,\text{infectiondatefirst}^2\,\text{respiratoryInfection}+\\
&\quad1.14687\,\text{dR7 respiratoryInfection}+2.34123\,\text{infectiondatefirst respiratoryInfection}-\\
&\quad11.5742\,\sqrt[3]{\text{infectiondatefirst}}\,\text{respiratoryInfection}+\\
&\quad10.3208\,\text{respiratoryInfection}-0.00383362,\ 0.995089\,\text{b45}-\\
&\quad0.152233\left(\text{b45}+\text{banfct}+\text{denovoDSA}\right)\text{nS}-0.946048\,\text{pyrexia respiratoryInfection}+\\
&\quad0.187517\,\text{respiratoryInfection}+0.191141\,\text{respiratoryInfection}\\
&\quad\left(\text{bTF}+\text{mMFatRej}+\text{pyrexia}+\text{respiratoryInfection}+\text{denovoDSA}^{0.344715}\right)+0.00491073,\\
&0.478795\,\text{dR7 respiratoryInfection}^2+0.579818\\
&\quad\sqrt{\text{denovoDSA}+\text{infectiondatefirst}+\text{dR7 respiratoryInfection}}\,\text{respiratoryInfection}^2+\\
&\quad0.371159\,\text{bTF mMFatRej respiratoryInfection}-1.01285\,\text{respiratoryInfection}+\\
&\quad1.\,\text{b45}-1.48554\times10^{-17},\ -0.000208582\,\text{mMFatRej infectionCount}^3-\\
&\quad\frac{0.000854125\,\text{infectionCount}^3}{\text{mMFatRej}}+0.00151527\,\text{infectionCount}^3-\\
&\quad0.00112965\,\text{denovoDSA dSAclass1number}+0.0818555\,\text{igG mMFatRej}-\\
&\quad0.0854259\,\text{pyrexia}+0.478618\,\text{antiHLAclass1}\,\sqrt{\text{denovoDSA}}-0.0319558,\ 0.991407\,\text{b45}-\\
&\quad0.266378\left(\text{b45}+\text{banfct}+\text{denovoDSA}\right)\text{nS}-1.04375\,\text{pyrexia respiratoryInfection}+\\
&\quad0.266025\,\text{respiratoryInfection}+0.218168\,\text{respiratoryInfection}\\
&\quad\left(\text{bTF}+\text{mMFatRej}+\text{pyrexia}+\text{respiratoryInfection}+\text{nS}^{0.172358}\right)+0.00859282,\\
&0.956131\,\sqrt[81]{\left(2\,\text{antiHLAclass2}+\text{bTF}\right)\left(\text{denovoDSA}+16\right)\left(\text{b62}+\text{igG}+\text{respiratoryInfection}\right)}+
\end{aligned}$$

$5.96957 \times 10^{-6}\Big\}, 0.7\Big]$

■ Created standalone model is expressed as PHENOTYE, created function as CREATEDMODEL.

(Predicted values are calculated with CREATEDMODEL @@@ ALLTRAININGDATA)

◆ The created model (expressed as CREATEDMODEL) is as follows.

```
Function[{rMale, rage, infectionCount, feverOnly, pyrexia, inflammation, virusInfection,
  cMV, anemia, heartDisease, respiratoryInfection, upperRespiratoryInfection,
  upperDigestivetract, diarrhea, uTI, wBCinUrine, wBCpeakover10, urology, skin,
  woundInfection, herpesZoster, orthopedics, ascites, surgery, aerobicGPC, aerobicGNR,
  candida, staphylococcusaureus, streptococcusaureus, enterobacteraerogenes,
  enterobactereclacue, enterococcusfaecalis, citobacterdiversus, pseudomonas,
  infectiondatefirst, infectiondatelast, asthma, pastanemia, infarctionhemohorrage,
  calcification, digestiveorgan, appendicitis, polyp, ulcer, gERD, pastheart,
  kidney, pastliverbilialy, hBV, hCV, stone, hypothyroidism, gynecology, ocular,
  allergy, hypertention, type2DM, bTF, timeoftransplantation, regraft, aBOI, hLAABmm,
  hLADRmm, hLAmm, pRAclass1pre, pRAclass2pre, pRAclass1after, pRAclass2after,
  mFImax, twinpeak, dSAclass1, dSAclass1number, dSAclass2, dSAclass2number, preDSA,
  denovoDSA, antiHLAclass1, hSAclass1number, antiHLAclass2, hSAclass2number,
  dSAandHSAclass2, dSAandHSAclass1, dSAandHLAclass2pre, dSAandHLAclass1pre, a23,
  a25, a26, a32, a34, a66, b13, b18, b27, b35, b37, b38, b42, b44, b45, b47, b49,
  b50, b51, b52, b53, b54, b55, b56, b57, b58, b59, b61, b62, b63, b7, b71, b73, b75,
  b77, b78, b8, b82, cw17, cw6, cw9, dP10, dP11, dP13, dP14, dP15, dP17, dP18, dP19,
  dP20, dP3, dP4, dP5, dP6, dP9, dQ11, dQ2, dQ4, dQ5, dQ6, dQ7, dQ8, dQ9, dR1, dR10,
  dR103, dR11, dR12, dR13, dR14, dR15, dR16, dR17, dR18, dR4, dR51, dR52, dR53, dR7,
  dR8, dR9, pregnancyhistory, birthhistory, naturalAbortion, artificialAbortion,
  hDperiod, cGN, igA, nS, hypoplastickidney, malignantHypertention, banfi, banft,
  banfg, banfv, banfci, banfct, banfcv, banfcg, banfptc, banfptcbm, banfah,
  banfaah, interstitialHemorrhage, cellInvasion, lymphinvasion, thrombusformation,
  coaglationnecrosis, •igA, igM, igG, sABC1q, c3, c4d, c5b, bulbarsclerosis,
  cRPpreRej, cRPpostRej, wBCpeakover5, maxCRP, wBCpreRej, wBCpostKTx,
  wBCpeakover9postRej, maxWBC, mMFpostRej, mMFatRej, cNIpostRej, graftLoss},
 MedianAverage[{-0.0363697 + 0.628333 igG + 0.0286076 denovoDSA mMFatRej +
    0.0853686 infectiondatefirst respiratoryInfection, -0.0196015 + 1.0196 b45 +
    0.102837 denovoDSA dR51 mMFatRej + 0.0873113 infectiondatefirst respiratoryInfection,
   0.0412751 + 0.0329453 antiHLAclass1 denovoDSA mMFatRej - 0.420542 pyrexia +
    0.779171 cMV respiratoryInfection, 0.0417812 + 1.11224 b45 + 0.103846 cNIpostRej -
    0.0116545 mMFatRej + 0.0917536 infectiondatefirst respiratoryInfection,
   0.0161709 + 0.0332307 antiHLAclass1 denovoDSA mMFatRej +
    0.883713 cMV respiratoryInfection - 0.599922 pyrexia respiratoryInfection,
   -0.020488 + 1.02049 b45 + 0.0614038 denovoDSA dR51 mMFatRej^2 +
    0.0867739 infectiondatefirst respiratoryInfection,
   -2.39836 × 10^-16 + 1. b45 + 1. antiHLAclass2 respiratoryInfection +
    0.600925 bTF mMFatRej^2 respiratoryInfection, 6.28037 × 10^-17 + 1. b45 +
```

$$
\begin{aligned}
&0.5\ \text{cGN preDSA} + 1.13636\ \text{respiratoryInfection} - 0.5\ \text{banfi respiratoryInfection},\\
&0.0292737 - 0.012514\ \text{denovoDSA} + 0.970726\ \text{bTF respiratoryInfection} +\\
&1.00469\ \text{antiHLAclass2}\ (\text{b45} + \text{respiratoryInfection}),\ 0.026087 + 0.991304\ \text{b45} -\\
&0.0173913\ \text{bTF denovoDSA} + 0.973913\ (\text{bTF} + \text{dQ7})\ \text{respiratoryInfection},\\
&0.0311305 + 1.02934\ \text{b45} + 0.0720363\ \text{cNIpostRej} +\\
&1.03168\ \text{bTF respiratoryInfection} + 0.961704\ \text{dQ8 respiratoryInfection},\\
&-0.0371426 + 0.0900972\ \text{denovoDSA} + 0.116274\ \text{b45 mMFatRej} -\\
&0.0175636\ \text{respiratoryInfection} + 0.0881596\ \text{infectiondatefirst respiratoryInfection},\\
&0.0284206 + 0.971579\ \text{b45} - 0.161864\ \text{nS} + 0.455524\ \text{mMFatRej respiratoryInfection} -\\
&1.05678\ \text{pyrexia respiratoryInfection},\ 0.0241769 + 1.01106\ \text{b45} -\\
&0.0100676\ \text{denovoDSA} + 0.948371\ (0.0480144 + \text{bTF} + \text{dQ7})\ \text{respiratoryInfection},\\
&-3.93615 \times 10^{-16} + 1.\ \text{b45} + 2.24951 \times 10^{-17}\ \text{denovoDSA} +\\
&1.\ \text{antiHLAclass2 respiratoryInfection} + 0.775194\ \text{bTF mMFatRej respiratoryInfection},\\
&0.00826446 + 0.661157\ \text{b45} + 0.330579\ \text{igG preDSA} +\\
&0.991736\ \text{bTF respiratoryInfection} + 0.991736\ \text{dQ7 respiratoryInfection},\\
&-0.0139621 + 0.203788\ \text{dR7} + 0.833252\ \text{igG} + 0.316934\ \text{denovoDSA dR7 respiratoryInfection} +\\
&0.0845852\ \text{infectiondatefirst respiratoryInfection},\\
&-0.00425272 + 0.0263034\ \text{denovoDSA}^2 + 0.475823\ \text{igG preDSA} +\\
&0.719048\ \text{respiratoryInfection} - 0.485298\ \text{pyrexia respiratoryInfection},\\
&3.42622 \times 10^{-17} + 1.\ \text{b45} + 1.41219\ \text{respiratoryInfection} - \frac{0.867208\ \text{respiratoryInfection}}{\text{mMFatRej}} -\\
&0.737523\ \text{pyrexia respiratoryInfection},\ 0.0318371 + 1.00969\ \text{b45} - 0.0118647\ \text{denovoDSA} -\\
&0.0288709\ \text{respiratoryInfection} + 1.02076\ (\text{bTF} + \text{dQ7})\ \text{respiratoryInfection},\\
&0.0499051 + 0.791448\ \text{b45} + 0.0513764\ \text{denovoDSA} - \frac{0.116403}{\text{mMFatRej}} +\\
&0.773279\ \text{respiratoryInfection} - 0.538541\ \text{pyrexia respiratoryInfection},\\
&0.0315023 + 0.178262\ \text{antiHLAclass1 denovoDSA} + 0.71972\ \text{igG} - 0.300664\ \text{pyrexia} +\\
&0.718342\ \text{respiratoryInfection} - 0.164267\ \text{upperRespiratoryInfection},\\
&-0.0123065 + 0.808211\ \text{igG} - 0.0309738\ \text{cNIpostRej denovoDSA mMFatRej} - 0.368291\\
&\quad \text{hLADRmm respiratoryInfection} + 0.136438\ \text{infectiondatefirst respiratoryInfection},\\
&0.284595 + 0.656709\ \text{antiHLAclass1} + 0.0815071\ \text{denovoDSA} +\\
&0.000480324\ \text{infectionCount}^3 - \frac{0.399138}{\text{mMFatRej}} - 0.0567552\ \text{mMFatRej},\\
&-4.07673 \times 10^{-16} + 1.\ \text{b45} + 7.87117 \times 10^{-18}\ \text{denovoDSA} + 1.\ \text{dQ7 respiratoryInfection} +\\
&0.775194\ \text{bTF mMFatRej respiratoryInfection}^2,\ -0.00440546 + 1.00441\ \text{b45} +\\
&0.502203\ \text{cGN dQ7 preDSA} + 0.957178\ (0.0480144 + \text{bTF} + \text{dQ7})\ \text{respiratoryInfection},\\
&0.00146199 + 0.972222\ \text{b45} + 0.0526316\ \text{diarrhea} + 0.945906\ \text{dQ6 respiratoryInfection} +\\
&0.600047\ \text{bTF mMFatRej}^2\ \text{respiratoryInfection},\\
&0.00411837 + 0.154954\ \text{antiHLAclass1 mMFatRej} + 0.990095\ \text{respiratoryInfection} -\\
&0.248875\ \text{banfi}^2\ \text{respiratoryInfection} - 0.745338\ \text{gynecology respiratoryInfection},\\
&-0.0250658 + 0.133065\ \text{denovoDSA} + 0.659137\ \text{dQ7 respiratoryInfection} +\\
&0.615988\ \text{bTF}^2\ \text{mMFatRej}^2\ \text{respiratoryInfection}^2,\\
&-5.73625 \times 10^{-16} + 1.\ \text{b45} - 2.82564 \times 10^{-16}\ \text{denovoDSA} + 2.88317 \times 10^{-17}\ \text{mMFatRej} +\\
&1.\ \text{bTF respiratoryInfection} + 1.\ \text{dQ6 respiratoryInfection},\\
&0.00680474 + 1.02252\ \text{b45} - 0.0122817\ \text{mMFatRej} + 0.982616\ \text{respiratoryInfection} -\\
&0.216916\ \text{feverOnly hLAmm respiratoryInfection} + 0.0205556\ \text{wBCpeakover5},\\
&0.0389581 + 0.224775\ \text{denovoDSA} - 0.252869\ \text{dSAandHSAclass2} + 0.606179\ \text{igG} +\\
&0.961042\ \text{bTF respiratoryInfection} + 0.755511\ \text{dQ7 respiratoryInfection},\\
&-0.00714979 + 0.0776776\ \text{denovoDSA} + 0.784967\ \text{igG} - 0.313078\ \text{respiratoryInfection} +\\
&0.876799\ \text{dR7 respiratoryInfection} + 0.108971\ \text{infectiondatefirst respiratoryInfection},\\
&0.0317228 + 0.981454\ \text{b45} - 0.0263543\ \text{bTF} - 0.0185456\ \text{denovoDSA dP14} +
\end{aligned}
$$

$$
\begin{aligned}
&0.97267\,(\text{bTF}+\text{dQ7})\ \text{respiratoryInfection},\\
&-0.146483+0.0540752\ \text{denovoDSA}+0.142482\ \text{hLADRmm}+0.53671\ \text{igG}+\\
&1.14648\ \text{bTF respiratoryInfection}+0.738382\ \text{dQ7 respiratoryInfection},\\
&-0.0377257+0.119793\ \text{denovoDSA}+0.917933\ \text{igG}+1.05027\ \text{respiratoryInfection}-\\
&0.462159\ \text{banfi respiratoryInfection}-1.52944\ \text{igG respiratoryInfection},\\
&-0.00344358+0.928544\ \text{b45}+0.0674601\ \text{dQ7}+0.0274462\ \text{preDSA}+\\
&0.938078\,(\text{b45}+\text{bTF}+\text{dQ7})\ \text{respiratoryInfection},\ 0.0335996+1.00298\ \text{b45}-\\
&0.0249327\ \text{denovoDSA}+0.0007622\ \text{denovoDSA}^3+0.995687\,(\text{bTF}+\text{dQ8})\ \text{respiratoryInfection},\\
&-0.00110144+0.806982\ \text{b45}+0.0554628\ \text{denovoDSA}-0.371167\ \text{pyrexia}^2+\\
&0.19333\ \text{respiratoryInfection}+0.260229\ \text{mMFatRej respiratoryInfection},\\
&0.0334087+1.01317\ \text{b45}-0.00136018\ \text{antiHLAclass2 mMFatRej}^2+\\
&0.973589\ \text{antiHLAclass2 respiratoryInfection}+\\
&0.966591\ \text{anemia bTF respiratoryInfection},\ 0.00118125+1.00155\ \text{b45}-\\
&0.000476931\ \text{mMFatRej}+1.42709\ \text{respiratoryInfection}-\frac{4.34859\ \text{respiratoryInfection}}{\text{denovoDSA}+\text{infectiondatefirst}},\\
&0.0361496-0.0700156\ \text{denovoDSA}+0.260067\ \text{b63 denovoDSA}+0.617728\ \text{igG}+\\
&0.96385\ \text{bTF respiratoryInfection}+1.00834\ \text{dQ7 respiratoryInfection},\\
&0.00443196+0.906183\ \text{b45}+0.17877\ \text{igG}-0.478786\ \text{denovoDSA nS}+\\
&0.488197\ \text{mMFatRej respiratoryInfection}-1.11523\ \text{pyrexia respiratoryInfection},\\
&-0.000747252+0.860577\ \text{igG}-0.00609955\ \text{cNIpostRej denovoDSA}^2\ \text{mMFatRej}-\\
&0.334801\ \text{respiratoryInfection}+0.127585\ \text{infectiondatefirst respiratoryInfection}^3,\\
&0.0406532-0.0356691\ \text{banfi}+0.173334\ \text{antiHLAclass1 mMFatRej}+\\
&0.085608\ \text{respiratoryInfection}+0.909408\ \text{bTF respiratoryInfection}+\\
&0.203255\ \text{denovoDSA respiratoryInfection},\ 9.17754\times10^{-17}+\\
&0.0555556\ \text{antiHLAclass2}+0.0625\ \text{bTF}\,(16+\text{denovoDSA})\ \text{respiratoryInfection}+\\
&0.944444\ \text{antiHLAclass2}\,(\text{b13}+\text{respiratoryInfection}),\\
&0.027027+0.121622\ \sqrt{\text{igG}}\ \text{preDSA}^3-0.027027\ \text{respiratoryInfection}+\\
&1.\ \text{bTF respiratoryInfection}+1.\ \text{dQ7 respiratoryInfection},\ 2.41509\times10^{-16}+\\
&1.\ \text{b45}-2.27029\times10^{-16}\ \text{bTF mMFatRej}+1.05188\times10^{-15}\ \text{respiratoryInfection}+\\
&1.\ \text{bTF respiratoryInfection}+1.\ \text{dQ7 respiratoryInfection},\\
&0.00886708+0.117614\ \text{antiHLAclass2}-0.101971\ \text{denovoDSA}^{1/3}+0.991133\ \text{bTF}\\
&\quad\text{respiratoryInfection}+1.01019\ \text{antiHLAclass2}\,(\text{b13}+\text{respiratoryInfection}),\\
&-0.038908+0.461524\ \text{igG preDSA}^{1/3}+0.185504\ \text{respiratoryInfection}+\\
&0.10165\,(\text{antiHLAclass1}+\text{respiratoryInfection}+\text{type2DM})^3,\\
&1.83631\times10^{-15}+1.\ \text{b45}-5.69481\times10^{-17}\ \text{antiHLAclass2 denovoDSA mMFatRej}^2+\\
&1.\ \text{antiHLAclass2 respiratoryInfection}+1.\ \text{anemia bTF respiratoryInfection},\\
&-0.00533134+0.341888\ \text{b45 preDSA}+0.0183866\ \text{denovoDSA mMFatRej preDSA}+\\
&1.00533\ \text{dQ7 respiratoryInfection}+1.00533\ \text{bTF respiratoryInfection}^3,\\
&3.38615\times10^{-17}+1.\ \text{b45}+0.303739\ \text{denovoDSA pyrexia}+1.48166\ \text{respiratoryInfection}-\\
&0.945837\left(\frac{1}{\text{mMFatRej}}+\text{pyrexia}\right)\text{respiratoryInfection},\\
&0.000312672+0.999687\ \text{b45}+0.00260968\ \text{aerobicGNR cNIpostRej feverOnly}^3\ \text{mMFatRej}+\\
&0.965759\ \text{respiratoryInfection}-0.216892\ \text{feverOnly hLAmm respiratoryInfection},\\
&0.0206192+1.00651\ \text{b45}+0.10474\ \text{cNIpostRej}+0.0294182\ \text{dSAandHSAclass1}-0.00222161\\
&\quad\text{mMFatRej}+0.850634\ \text{respiratoryInfection}-0.815271\ \text{aerobicGNR respiratoryInfection},\\
&2.94218\times10^{-17}+1.\ \text{a25}+0.104384\ \text{denovoDSA mMFatRej pyrexia}+1.\ \text{respiratoryInfection}-\\
&1.\ \text{artificialAbortion respiratoryInfection}-1.\ \text{pyrexia respiratoryInfection},\\
&-0.00202064+0.986361\ \text{b45}+0.00447427\ \text{denovoDSA}+0.985874\ \text{respiratoryInfection}-\\
&1.53727\ \text{mMFatRej pastanemia respiratoryInfection}-\\
&0.264397\ \text{infectiondatefirst pyrexia respiratoryInfection},\\
&-0.00766761+1.00767\ \text{b45}-0.141151\ \text{hLAmm respiratoryInfection}+
\end{aligned}
$$

$$0.137433\ \text{infectiondatefirst}\ \text{respiratoryInfection} + 0.0538096\ \text{denovoDSA}\ \text{mMFatRej}\ (\text{dR11} + \text{respiratoryInfection}),\ 0.00558751 + 0.994412\ \text{b45} - 0.443287\ \text{denovoDSA}\ \text{nS} + 0.0386213\ \text{denovoDSA}\ \text{respiratoryInfection} + 0.463271\ \text{mMFatRej}\ \text{respiratoryInfection} - 1.07208\ \text{pyrexia}\ \text{respiratoryInfection},$$

$$0.03125 + 0.96875\ \text{b45} + 0.968041\ \text{respiratoryInfection} - 0.999291\ \text{pastanemia}\ \text{respiratoryInfection} - 1.36251\ \text{pyrexia}\ \text{respiratoryInfection} + 0.179694\ \text{mMFatRej}\ \text{pyrexia}\ \text{respiratoryInfection},$$

$$-0.0149977 + 0.00887254\ \sqrt{\text{denovoDSA}}\ \text{mMFatRej}^2 + 0.951927\ \text{dQ7}\ \text{respiratoryInfection} + 0.609938\ \text{bTF}\ \text{mMFatRej}^2\ \text{respiratoryInfection}^3,\ 0.03125 + 0.96875\ \text{b45} - 0.03125\ \text{respiratoryInfection} + 1.\ \text{dQ7}\ (\text{bTF} + \text{dQ7})\ \text{respiratoryInfection} + 0.775194\ \text{bTF}\ \text{mMFatRej}\ \text{respiratoryInfection},\ 0.0105753 + 0.895059\ \text{b45} + 0.00650802\ \text{denovoDSA}^2 + 0.478099\ \text{mMFatRej}\ \text{respiratoryInfection} - 0.38875\ \text{nS}\ \text{respiratoryInfection} - 1.09849\ \text{pyrexia}\ \text{respiratoryInfection},$$

$$-0.0108891 + 0.18886\ \text{anemia}\ \text{denovoDSA} + 0.768036\ \text{igG} + 1.83255\ \text{respiratoryInfection} - 0.981009\ \text{pyrexia}^{1/3}\ \text{respiratoryInfection} - 0.0224501\ \text{rage}\ \text{respiratoryInfection},$$

$$-5.58773 \times 10^{-15} + 1.\ \text{b45} - 0.305643\ \text{respiratoryInfection} + 0.152006\ (\text{denovoDSA} + \text{infectiondatefirst})\ \text{respiratoryInfection} - 0.00189856\ \text{infectiondatefirst}^2\ \text{mMFatRej}\ \text{respiratoryInfection},$$

$$5.37953 \times 10^{-16} + 1.\ \text{b45} - 0.678805\ \text{pyrexia}\ \text{respiratoryInfection} + 0.675051\ \text{respiratoryInfection}^2 + 0.0299124\ \text{denovoDSA}\ \text{mMFatRej}^2\ \text{respiratoryInfection}^3,$$

$$-0.0107574 + 0.927388\ \text{b45} + 0.02382\ \text{denovoDSA} + 0.964796\ \text{respiratoryInfection} - \frac{0.248901\ \text{respiratoryInfection}}{\text{mMFatRej}^3} - 0.632568\ \text{pyrexia}\ \text{respiratoryInfection},$$

$$-0.041876 + 0.14214\ \text{denovoDSA} - 0.0659741\ \text{denovoDSA}^2\ \text{dQ7} + 1.00508\ \text{igG} + 0.981537\ (0.0480144 + \text{bTF} + \text{dQ7})\ \text{respiratoryInfection},$$

$$-0.00223067 + 0.447165\ \text{b44}^3 + 0.0379339\ \sqrt{\text{denovoDSA}} + 0.526727\ \text{igG} + 1.00223\ \text{bTF}\ \text{respiratoryInfection} + 0.840877\ \text{dQ8}\ \text{respiratoryInfection},$$

$$-4.67308 \times 10^{-16} + 1.\ \text{b45} + 4.42318 \times 10^{-16}\ \text{banf t} - 6.28656 \times 10^{-17}\ \text{bTF}\ \text{denovoDSA}\ \text{mMFatRej} + 1.\ (\text{bTF} + \text{dQ7})^3\ \text{respiratoryInfection},\ -0.00758409 + 0.925089\ \text{b45} + 0.02357\ \text{denovoDSA} + 0.206992\ \text{infectiondatefirst}\ \text{respiratoryInfection} - 0.116528\ \text{banfi}\ \text{infectiondatefirst}\ \text{respiratoryInfection} + 0.290183\ \text{bTF}\ \text{mMFatRej}\ \text{respiratoryInfection},$$

$$-1.69742 \times 10^{-16} + 0.666667\ \text{b63} + 2.63492 \times 10^{-16}\ \text{respiratoryInfection} + 1.\ \text{bTF}\ \text{respiratoryInfection} + 1.\ \text{dQ7}\ \text{respiratoryInfection} - 2.23829 \times 10^{-17}\ \text{banfptcbm}\ \text{denovoDSA}\ \text{mMFatRej}\ \text{respiratoryInfection},$$

$$0.0157136 + 0.218667\left(2\ \text{bTF} + \text{denovoDSA} + \text{dQ7} + \frac{\text{bTF}}{\text{mMFatRej}}\right)(\text{b45} + \text{respiratoryInfection}),$$

$$0.00494959 + 0.152674\ \text{antiHLAclass1}\ \text{mMFatRej} + 1.14726\ \text{respiratoryInfection} - 0.284953\ \text{banfi}^2\ \text{respiratoryInfection} - 0.0482142\ \text{denovoDSA}\ \text{respiratoryInfection} - 0.867255\ \text{gynecology}\ \text{respiratoryInfection},\ 0.0128333 + 0.987167\ \text{b45} + 0.00220114\ \text{denovoDSA}^3\ \text{respiratoryInfection} + 0.470095\ \text{mMFatRej}\ \text{respiratoryInfection} - 0.374207\ \text{nS}\ \text{respiratoryInfection} - 1.08032\ \text{pyrexia}\ \text{respiratoryInfection},$$

$$-0.0022604 - 0.00124288\ \text{denovoDSA}^{1/3} + 0.199786\ \text{dSAandHSAclass1} + 1.00226\ \text{bTF}\ \text{respiratoryInfection} + 0.900825\ \text{dQ7}\ (\text{igG} + \text{respiratoryInfection})^{1/3},$$

$$0.0101326 + 1.00306\ \text{b45} - 0.000677024\ \text{infectiondatefirst}\ \text{mMFatRej} + 1.4345\ \text{respiratoryInfection} - \frac{4.39312\ \text{respiratoryInfection}^3}{\text{denovoDSA} + \text{infectiondatefirst}},$$

$$-0.0130661 + 0.216781\ \text{denovoDSA}\ \text{dR7} + 0.913717\ \text{igG} - 0.268366\ \text{respiratoryInfection} + 0.116766\ \text{infectiondatefirst}\ \text{respiratoryInfection} + 0.278871\ \text{bTF}\ \text{mMFatRej}^2\ \text{respiratoryInfection},$$

$$0.00420389 + 0.0236469\ \text{denovoDSA}^2\ \text{dQ8} + 0.124475\ \sqrt{\text{igG}}\ \text{preDSA}^3 +$$

$$
\begin{aligned}
&0.995796\,\text{bTF respiratoryInfection} + 0.806621\,\text{dQ7 respiratoryInfection},\\
&-0.0120314 + 0.0201515\,\text{denovoDSA} + 0.164078\,\text{antiHLAclass1 mMFatRej} +\\
&0.896879\,\text{respiratoryInfection} - 0.460656\,\text{banfi respiratoryInfection} +\\
&0.575809\,\text{bTF coaglationnecrosis respiratoryInfection}^3,\\
&-0.00262751 + 0.0089698\,\text{antiHLAclass1 denovoDSA} +\\
&0.168239\,\text{antiHLAclass1 mMFatRej} + 0.943839\,\text{respiratoryInfection} -\\
&0.490202\,\text{banfi respiratoryInfection} + 0.54899\,\text{bTF respiratoryInfection}^3,\\
&2.18108\times10^{-16} + 1.\,\text{b45} + 1.7279\times10^{-16}\,\text{bTF denovoDSA mMFatRej} +\\
&0.410247\,(\text{bTF} + \text{dQ7})\,\text{mMFatRej respiratoryInfection} + 0.0956233\,\text{respiratoryInfection}^3,\\
&-0.00448496 + 0.00775107\,\text{denovoDSA}^3 + 1.03419\,\text{igG} - 0.0154307\,\text{denovoDSA}^3\,\text{igG} +\\
&1.00448\,\text{bTF respiratoryInfection} + 0.93228\,\text{dQ7 respiratoryInfection}, -0.00437312 +\\
&0.00817374\,\text{denovoDSA}^3 + 0.971678\,\text{igG} + 0.58123\,\text{hDperiod}^{1/3}\,\text{respiratoryInfection} -\\
&1.95774\,\text{igG respiratoryInfection} - 0.602161\,\text{pyrexia respiratoryInfection},\\
&0.0211992 + 0.981195\,\text{b45} - \frac{0.00206777}{\text{hDperiod}} + 0.899186\,\text{respiratoryInfection} +\\
&0.00343251\,\text{denovoDSA mMFatRej}^3\,\text{respiratoryInfection} -\\
&0.917957\,\sqrt{\text{pyrexia}}\,\text{respiratoryInfection}, -0.0352777 + 0.115264\,\text{denovoDSA} +\\
&0.920014\,\text{igG} + 0.00646175\,\text{respiratoryInfection} + 1.02882\,\text{bTF respiratoryInfection} +\\
&0.827104\,\text{dQ7 respiratoryInfection} - 1.29462\,\text{igG respiratoryInfection},\\
&-0.112615 + 0.125717\,\text{denovoDSA} + 0.845788\,\text{igG} + 0.00604224\,\text{maxWBC} +\\
&1.03539\,\text{bTF respiratoryInfection} - 0.316917\,\text{denovoDSA respiratoryInfection} +\\
&1.32474\,\text{dQ7 respiratoryInfection}, 0.0100239 + 0.974871\,\text{b45} - 0.0215515\,\text{bTF} -\\
&0.0179317\,\text{bTF}^2\,\text{denovoDSA} + 0.087626\,\text{dQ7} + 0.920546\,(\text{bTF} + \text{dQ7})\,\text{respiratoryInfection},\\
&1.03072\times10^{-16} + 1.\,\text{b45} - 3.5683\times10^{-17}\,\text{denovoDSA} - 3.69488\times10^{-16}\,\text{dP9} -\\
&5.6458\times10^{-18}\,\text{respiratoryInfection} + 1.\,\text{dQ7 respiratoryInfection} +\\
&1.\,\text{bTF respiratoryInfection}^2, -8.49623\times10^{-16} + 1.\,\text{b45} +\\
&1.\,\text{dQ7 respiratoryInfection} + 0.775194\,\text{bTF mMFatRej respiratoryInfection}^2 +\\
&5.90088\times10^{-17}\,\text{denovoDSA}^2\,\text{mMFatRej respiratoryInfection}^3,\\
&2.9724\times10^{-16} + 1.\,\text{b45} - 0.0136751\,\text{infectiondatefirst}^2\,\text{mMFatRej polyp} +\\
&1.42695\,\text{respiratoryInfection} - \frac{4.1412\,\text{respiratoryInfection}}{\text{denovoDSA} + \text{infectiondatefirst}},\\
&-0.025473 + 0.773018\,\text{igG} + 0.027701\,\text{denovoDSA mMFatRej} - 0.369174\,\text{respiratoryInfection} +\\
&0.103482\,\text{infectiondatefirst respiratoryInfection} -\\
&0.0936637\,\text{cNIpostRej}^3\,\text{infectiondatefirst mMFatRej respiratoryInfection},\\
&-5.36888\times10^{-16} + 1.\,\text{b45} + 1.65487\,\text{respiratoryInfection} -\\
&\frac{4.92647\,\text{respiratoryInfection}}{\text{denovoDSA} + \text{infectiondatefirst}} -\\
&0.00893139\,\text{infectiondatefirst mMFatRej respiratoryInfection}^2,\\
&0.00167761 + 0.0399931\,\text{b45 denovoDSA}^2 + 0.828942\,\text{igG} + 0.737196\,\text{dR7}\\
&\quad\text{respiratoryInfection} + 0.0870421\,\text{infectiondatefirst respiratoryInfection} -\\
&0.0705083\,\text{infectiondatefirst pyrexia respiratoryInfection}, 0.00893057 +\\
&0.162671\,\text{antiHLAclass1}^2\,\text{denovoDSA} + 0.67517\,\text{igG} + 0.0761179\,\text{respiratoryInfection} +\\
&0.546237\,(\text{antiHLAclass1} + \text{bTF} + \text{dR10}^3)\,\text{respiratoryInfection},\\
&5.1831\times10^{-15} + 1.\,\text{b45} - 1.76774\times10^{-16}\,\text{denovoDSA} - 1.3488\times10^{-16}\,\text{infectiondatefirst} -\\
&2.7308\times10^{-16}\,\text{respiratoryInfection} + 1.\,\text{dQ6 respiratoryInfection} -\\
&0.889076\,\text{bTF cNIpostRej mMFatRej respiratoryInfection},\\
&-0.00386146 + 1.00088\,\text{b45} - 0.00314551\,\text{cNIpostRej} + 0.812106\,\text{igG} -\\
&0.0887777\,\text{b59 denovoDSA mMFatRej} - 0.342262\,\text{hLADRmm respiratoryInfection} +\\
&0.133424\,\text{infectiondatefirst respiratoryInfection},\\
&-0.0018011 + 0.0396604\,\text{b45 denovoDSA}^2 + 0.907485\,\text{igG} - 0.451422\,\text{respiratoryInfection} +\\
&0.120137\,\text{infectiondatefirst respiratoryInfection} -
\end{aligned}
$$

$$
\begin{aligned}
&0.544955\ \text{cNIpostRej}^3\ \text{mMFatRej respiratoryInfection},\\
&-0.00482466 + 1.00482\ \text{b45} + 0.0655956\ \text{denovoDSA dR51 mMFatRej}^2 -\\
&0.775869\ \text{respiratoryInfection} + 0.321984\ \text{infectiondatefirst respiratoryInfection} -\\
&0.0142758\ \text{infectiondatefirst}^2\ \text{respiratoryInfection}, 0.0100054 + 1.01178\ \text{b45} -\\
&0.00622557\ \text{denovoDSA} + 0.0679847\ \text{denovoDSA respiratoryInfection} +\\
&0.0656963\ \text{hDperiod respiratoryInfection} + 0.283782\ \text{mMFatRej respiratoryInfection} -\\
&0.880263\ \text{pyrexia respiratoryInfection}, 1.3447 \times 10^{-16} + 1.\ \text{b45} -\\
&0.445004\ \text{respiratoryInfection} + 0.0528666\ \text{denovoDSA respiratoryInfection} -\\
&0.827091\ \text{pyrexia respiratoryInfection} + 0.917742\ \sqrt{\text{mMFatRej respiratoryInfection}},\\
&2.8432 \times 10^{-15} + 1.\ \text{b45} + 5.09863 \times 10^{-17}\ \text{denovoDSA} - 1.21511 \times 10^{-16}\ \text{infectiondatefirst} +\\
&1.28125 \times 10^{-15}\ \text{respiratoryInfection} + 1.\ \text{dQ6 respiratoryInfection} +\\
&0.465834\ \text{bTF mMFatRej}^3\ \text{respiratoryInfection},\\
&0.00399537 - 0.00362216\ \text{denovoDSA} + 0.996005\ \text{bTF respiratoryInfection} +\\
&0.814526\ \text{antiHLAclass2}\ \left(\text{b45} + \text{igG} + 2\ \text{respiratoryInfection}\right)^{1/3},\\
&-0.00437312 + 0.00817374\ \text{denovoDSA}^3 + 0.971678\ \text{igG} - 1.95774\ \text{igG respiratoryInfection} -\\
&0.602161\ \text{pyrexia respiratoryInfection} + 0.58123\ \text{hDperiod}^{1/3}\ \text{respiratoryInfection}^2,\\
&0.0156963 + 0.984304\ \text{b45} - 0.0180016\ \text{nS}\ \left(\text{denovoDSA} + \text{maxWBC} + \text{pyrexia}\right) +\\
&0.380685\ \text{respiratoryInfection} + 0.304932\ \text{mMFatRej respiratoryInfection} -\\
&0.958991\ \text{pyrexia respiratoryInfection},\\
&0.140807 + 0.626654\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} - 0.0603572\ \text{infectionCount} +\\
&0.000981174\ \text{infectionCount}^3 - 0.00179096\ \text{dSAclass1number mMFatRej}^2 -\\
&1.11199\ \text{artificialAbortion respiratoryInfection},\\
&-0.0168484 + 0.387512\ \text{coaglationnecrosis} + 0.21556\ \text{antiHLAclass1 denovoDSA} +\\
&0.258672\ \text{respiratoryInfection} + 0.772547\ \left(\left(\text{c3} + \text{respiratoryInfection}\right)\ \text{type2DM}\right)^{1/3},\\
&-5.59523 \times 10^{-17} + 1.\ \text{a25} + 0.994922\ \text{respiratoryInfection} -\\
&0.994922\ \text{artificialAbortion respiratoryInfection} + 0.375212\ \text{denovoDSA mMFatRej}\\
&\quad\text{pyrexia respiratoryInfection} - 0.479066\ \text{mMFatRej pyrexia respiratoryInfection}^2,\\
&-0.00323612 + 0.00788174\ \text{denovoDSA}^3 + 0.971709\ \text{igG} + 1.00324\ \text{bTF respiratoryInfection} -\\
&0.0732254\ \text{denovoDSA respiratoryInfection} +\\
&1.05847\ \text{dQ7 respiratoryInfection} - 1.64604\ \text{igG respiratoryInfection},\\
&0.000251825 + 0.337408\ \text{igG} + 0.137513\ \text{antiHLAclass1 mMFatRej} +\\
&1.20951\ \text{respiratoryInfection} - 0.292821\ \text{banfi}^2\ \text{respiratoryInfection} -\\
&0.102653\ \text{denovoDSA respiratoryInfection} - 0.916943\ \text{gynecology respiratoryInfection},\\
&-0.00120798 + 0.187182\ \text{antiHLAclass1 denovoDSA} + 0.774828\ \text{igG} +\\
&1.2932\ \text{respiratoryInfection} - 0.304599\ \text{banfi}^2\ \text{respiratoryInfection} -\\
&0.197684\ \text{denovoDSA respiratoryInfection} - 0.987393\ \text{gynecology respiratoryInfection},\\
&0.00417562 + 0.0847118\ \text{bTF}\ \left(11.7554 + \text{denovoDSA}\right)\ \text{respiratoryInfection} +\\
&0.870285\ \text{antiHLAclass2}\ \left(2\ \text{b45} + \text{igG} + \text{respiratoryInfection}\right)^{1/3},\\
&-0.0182277 + 0.882019\ \text{b45} + 0.0389167\ \text{denovoDSA} +\\
&0.0804726\ \text{hDperiod respiratoryInfection} + 0.295459\ \text{mMFatRej respiratoryInfection} -\\
&0.391652\ \text{pyrexia respiratoryInfection} - 0.321129\ \text{pyrexia}^2\ \text{respiratoryInfection},\\
&-0.0791036 + 0.0288452\ \text{cRPpostRej} + 0.0246125\ \text{mMFatRej} +\\
&0.0144343\ \text{denovoDSA mMFatRej preDSA}^3 + 0.959129\ \text{respiratoryInfection} -\\
&0.909035\ \text{artificialAbortion respiratoryInfection} -\\
&0.648247\ \text{pyrexia respiratoryInfection}, -0.0130064 + 0.042321\ \text{c4d denovoDSA}^2 +\\
&0.928364\ \text{anemia igG} + 0.514042\ \text{respiratoryInfection} +\\
&0.0121641\ \text{hDperiod}^2\ \text{respiratoryInfection} - 0.347408\ \text{pyrexia}^2\ \text{respiratoryInfection},\\
&4.78397 \times 10^{-16} + 1.\ \text{b45} + 5.81949 \times 10^{-17}\ \text{denovoDSA} - 2.34174 \times 10^{-16}\ \text{mMFatRej} +\\
&0.5\ \text{denovoDSA pyrexia} + 3.46089 \times 10^{-16}\ \text{respiratoryInfection} +\\
&1.\ \text{cMV respiratoryInfection} - 1.\ \text{pyrexia respiratoryInfection},\\
&-0.00466984 + 0.00771568\ \text{denovoDSA}^3 + 0.973807\ \text{igG} +
\end{aligned}
$$

$$1.03968\ \text{respiratoryInfection} - 0.128868\ \text{banfi}^3\ \text{respiratoryInfection} - 0.906143\ \text{gynecology respiratoryInfection} - 1.97328\ \text{igG respiratoryInfection},$$

$$0.00996278 + 0.990037\ \text{b45} - 1.00527 \times 10^{-16}\ \text{b42}^3\ \text{bTF denovoDSA mMFatRej} + 0.24365\ \text{infectiondatefirst respiratoryInfection} - 0.135337\ \text{banfi infectiondatefirst respiratoryInfection} - 0.142629\ \text{respiratoryInfection surgery},$$

$$0.133061 + 0.558999\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} - 0.0519831\ \text{infectionCount} + 0.000907072\ \text{infectionCount}^3 - 0.00838477\ \text{mMFatRej} - 1.07132\ \text{artificialAbortion respiratoryInfection} + 0.243933\ \text{dSAclass1number respiratoryInfection},$$

$$0.00277089 + 0.00791291\ \text{denovoDSA}^3\ \text{dR7} + 0.939541\ \text{igG} - 0.138736\ \text{respiratoryInfection} + 0.901191\ \text{dR7 respiratoryInfection} + 0.112634\ \text{infectiondatefirst respiratoryInfection} - 0.138736\ \text{respiratoryInfection}^2,$$

$$0.109131 + 0.835915\ \text{antiHLAclass1} + 0.0372152\ \text{denovoDSA} - 0.0559265\ \text{infectionCount} + 0.000922108\ \text{infectionCount}^3 - \frac{0.07859\ \text{dSAclass1number}}{\text{mMFatRej}^4} - 1.03142\ \text{artificialAbortion respiratoryInfection},$$

$$0.00896561 + 0.00784294\ \text{denovoDSA}^3 - 0.461405\ \text{gynecology} + 0.928438\ \text{igG} + 1.03451\ \text{respiratoryInfection} - 0.129632\ \text{banfi}^3\ \text{respiratoryInfection} - 0.0151186\ \text{denovoDSA}^3\ \text{respiratoryInfection},$$

$$-0.00582501 + 0.0359789\ \text{dQ7} + 0.00582501\ \text{respiratoryInfection} + 1.\ \text{bTF respiratoryInfection} - 2.21694 \times 10^{-16}\ \text{denovoDSA respiratoryInfection} + 0.964021\ \text{dQ7 respiratoryInfection} + 0.166033\ \text{b45}^{1/3}\ \text{mMFatRej type2DM},$$

$$-0.028448 + 0.753817\ \text{igG} + 0.0274769\ \text{denovoDSA mMFatRej} + 1.7883\ \text{respiratoryInfection} - 0.847442\ \text{respiratoryInfection}\left(\text{gynecology} + \sqrt{\text{igG} + \text{pyrexia}} + \text{respiratoryInfection}\right),$$

$$-0.0262384 + 0.788862\ \text{igG} + 0.0278183\ \text{denovoDSA mMFatRej} - 0.406608\ \text{respiratoryInfection} + 0.104964\ \text{infectiondatefirst respiratoryInfection} + 0.0913984\ \text{banfi cNIpostRej}^2\ \text{infectiondatefirst respiratoryInfection}^4,$$

$$0.0122285 - 0.0276037\ \text{denovoDSA} + 1.12579\ \text{b45 dR7} + 0.933315\ \text{igG} + 0.761729\ \text{dR7 respiratoryInfection} + 0.0891492\ \text{infectiondatefirst respiratoryInfection} - 0.0242436\ \text{infectiondatefirst}^2\ \text{pyrexia respiratoryInfection},$$

$$-0.0622855 + 0.496502\ \text{coaglationnecrosis} + 0.942318\ \text{dR15 igG} - 0.0107395\ \text{preDSA}^{1/9} + 0.131567\left(\text{antiHLAclass1} + \text{respiratoryInfection} + \text{type2DM}\right)^3, -0.00149047 - 0.00462134\ \text{denovoDSA} + 0.949136\ \text{igG} - 0.00624453\ \text{cNIpostRej denovoDSA}^2\ \text{mMFatRej} - 0.0185458\ \text{respiratoryInfection} + 0.761116\ \text{bTF respiratoryInfection} + 0.00075487\ \text{infectiondatefirst}^3\ \text{respiratoryInfection},$$

$$-0.00419665 + 0.00797112\ \text{denovoDSA}^3 - 0.00791981\ \text{denovoDSA}^3\ \text{dQ7} + 1.00399\ \text{igG} + 1.0042\ \text{bTF respiratoryInfection} + 1.00372\ \text{dQ7 respiratoryInfection} - 1.00993\ \text{igG respiratoryInfection},$$

$$-0.00092296 + 0.0072172\ \text{denovoDSA}^3 + 0.940621\ \text{igG} + 0.948481\ \text{respiratoryInfection} - 0.863732\left(\text{gynecology} + \text{igG} + \sqrt{\text{igG} + \text{pyrexia}}\right)\ \text{respiratoryInfection},$$

$$-0.0101273 + 0.962079\ \text{b45} + 0.0137282\ \text{denovoDSA} - 0.873488\ \text{pyrexia respiratoryInfection} - 0.418625\ \sqrt{\text{nS}}\ \text{respiratoryInfection}^2 + 0.726521\ \sqrt{\text{mMFatRej respiratoryInfection}},$$

$$0.00965372 + 0.0228677\ \text{denovoDSA}^2 + 0.762927\ \text{igG} + 0.911229\ \text{respiratoryInfection} - 0.892136\left(\text{b45} + \text{gynecology} + \sqrt{\text{igG} + \text{pyrexia}}\right)\ \text{respiratoryInfection},$$

$$0.0153692 + 0.688605\ \text{igG} + 0.451192\ \text{denovoDSA pyrexia} + 0.885249\ \text{respiratoryInfection} - 0.90195\ \text{pyrexia respiratoryInfection} - 0.901612\left(\text{enterococcusfaecalis respiratoryInfection}\right)^{1/3} + 0.000160401\ \text{wBCpostKTx},$$

$$-0.0604563 + 0.0778702\ \text{denovoDSA} + 0.111563\ \text{denovoDSA dR7}^{1/3} + 0.1057\ \text{inflammation} + 0.491293\ \text{c3 preDSA} + 0.521918\ \text{dR7}^{1/3}\ \text{respiratoryInfection} + 0.0847961\ \text{infectiondatefirst respiratoryInfection},$$

$$0.00356888 + 0.0272003\left(2\ \text{antiHLAclass2} + \text{bTF}\right)\left(-5.57946 + \text{denovoDSA}^{1/3} + \text{igG}\right)^2\left(\text{b62} + \text{igG} + \text{respiratoryInfection}\right), -0.00422126 + 0.218938\ \text{antiHLAclass1 mMFatRej} -$$

$$0.00716706\ \text{antiHLAclass1}\ \text{banfi}\ \text{denovoDSA}\ \text{mMFatRej} + 0.921698\ \text{respiratoryInfection} - 0.486246\ \text{banfi}\ \text{respiratoryInfection} + 0.568769\ \text{banfi}^3\ \text{bTF}\ \text{respiratoryInfection}^3,$$

$$0.0488466 + 0.535019\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} - 0.0264952\ \text{infectionCount} + 0.00178424\ \text{infectionCount}^3 - \frac{0.000911839\ \text{infectionCount}^3}{\text{mMFatRej}} - 0.00024986\ \text{infectionCount}^3\ \text{mMFatRej},$$

$$-0.00136286 + 0.177257\ \text{antiHLAclass1}\ \text{denovoDSA} + 0.0939523\ \text{dR15} + 0.629642\ \text{igG} + 0.00136286\ \text{respiratoryInfection} + 0.906048\ \text{dR15}\ \text{respiratoryInfection} + 0.665332\ (\text{antiHLAclass1} + \text{bTF} + \text{igG})\ \text{respiratoryInfection},$$

$$-0.0445973 + 0.927885\ \text{b45} + \frac{0.0621056}{\text{mMFatRej}} + 0.00483121\ \text{denovoDSA}\ \text{mMFatRej} + 2.22099\ \text{respiratoryInfection} - 0.564112\left(2 + \frac{1}{\text{mMFatRej}^2} + \text{pyrexia}\right)\text{respiratoryInfection},$$

$$0.0170862 - 0.0754318\ \sqrt{-\text{denovoDSA}^{1/3} + \text{denovoDSA}} + 0.42925\ \text{igG} + 0.982914\ \text{bTF}\ \text{respiratoryInfection} + 0.931353\ \text{antiHLAclass2}^2\ (\text{b45} + \text{respiratoryInfection}),$$

$$2.03535 \times 10^{-16} + 1.\ \text{b45} + 0.312251\ \text{respiratoryInfection} - 1.05584\ \text{pyrexia}\ \text{respiratoryInfection} + 0.372057\ \text{mMFatRej}\ \text{respiratoryInfection}^2 - 0.106848\ \text{nS}\ (\text{denovoDSA} + 4\ \text{respiratoryInfection}),$$

$$-0.025837 + 1.05161\ \text{b45} + 0.0812049\ \text{cNIpostRej} + 0.0847938\ \text{feverOnly} + 1.00794\ \text{respiratoryInfection} - 0.244861\ \text{feverOnly}\ \text{hLAmm}\ \text{respiratoryInfection} + 0.0175818\ \text{dQ2}\ \text{dSAandHSAclass1}^4\ \text{mMFatRej}\ \text{respiratoryInfection},$$

$$-0.0373975 + 0.899552\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} - 0.199416\ \text{antiHLAclass1}\ \text{denovoDSA} + 0.00171339\ \text{infectionCount}^3 - \frac{0.000942304\ \text{infectionCount}^3}{\text{mMFatRej}} - 0.000290615\ \text{infectionCount}^3\ \text{mMFatRej},$$

$$0.00790722 + 0.00799511\ \text{b45}^3\ \text{denovoDSA}^3 + 0.814134\ \text{igG} + 1.07487\ \text{respiratoryInfection} - 0.120991\ \text{denovoDSA}\ \text{respiratoryInfection} - 1.08278\ \text{enterococcusfaecalis}\ \text{respiratoryInfection} - 0.941442\ \text{pyrexia}^{1/3}\ \text{respiratoryInfection},$$

$$-0.00280763 + 0.0394244\ \text{anemia}\ \text{denovoDSA}^2 + 0.923959\ \text{anemia}\ \text{igG} + 1.03841\ \text{respiratoryInfection} + 0.176882\ (-\text{banfptc} + \text{igG})\ \text{respiratoryInfection} - 0.595924\ \sqrt{\text{pyrexia}}\ \text{respiratoryInfection}^2,\ 0.000224081 + 0.999776\ \text{b45} + 0.999776\ \text{bTF}\ \text{respiratoryInfection} + 0.316397\ \text{dQ7}\ \text{mMFatRej}\ \text{respiratoryInfection} + 0.00495564\ \text{denovoDSA}^2\ \text{dQ7}\ \text{mMFatRej}^2\ (2 + \text{pregnancyhistory})\ \text{respiratoryInfection}^2,$$

$$-0.00469994 + 0.997065\ \text{b45} + 0.00218134\ \text{denovoDSA} + 0.00854043\ \text{mMFatRej}^3\ \text{pyrexia}^3 + 0.998646\ \text{respiratoryInfection} - 0.993946\ \text{pastanemia}\ \text{respiratoryInfection} - 1.06335\ \text{pyrexia}^3\ \text{respiratoryInfection}^2,\ -0.0391179 + 0.494889\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} + 0.287395\ \text{igG} + 0.00114046\ \text{infectionCount}^3 - \frac{0.000687653\ \text{infectionCount}^3}{\text{mMFatRej}} - 0.0000360477\ \text{infectionCount}^3\ \text{mMFatRej}^2,$$

$$0.0133599 + 0.447252\ \text{antiHLAclass1}\ \text{banfi} - 0.384482\ \text{gynecology} + 0.984471\ \text{igG} - 0.00790862\ \text{denovoDSA}^3\ \text{respiratoryInfection} - 0.252839\ \text{banfi}^2\ \text{respiratoryInfection}^2 + 0.995084\ \text{respiratoryInfection}^3,$$

$$1.77355 \times 10^{-16} + 1.\ \text{b45} - 0.351792\ \text{respiratoryInfection} + 0.121652\ \text{infectiondatefirst}\ \text{respiratoryInfection} + 0.500227\ \text{bTF}\ \text{respiratoryInfection}^2 + 0.350459\ \sqrt{\text{denovoDSA}\ \text{dR51}\ \text{mMFatRej}\ \text{respiratoryInfection}},\ 0.00427252 + 0.995727\ \sqrt{\text{a25}} - 0.000756763\ \text{infectiondatefirst}^3\ \text{respiratoryInfection}^{0.12785} - 0.352939\ \text{banfi}\ \text{respiratoryInfection} + 0.223205\ \text{infectiondatefirst}\ \text{respiratoryInfection} - 0.0000170892\ \text{denovoDSA}\ \text{infectiondatefirst}\ \text{mMFatRej}\ \text{respiratoryInfection},$$

$$1.52177 \times 10^{-16} + 1.\ \text{b45} + 2.31967 \times 10^{-16}\ \text{denovoDSA} + 1.\ \text{respiratoryInfection} - 2.44141\ \text{mMFatRej}^2\ \text{pastanemia}\ \text{respiratoryInfection} +$$

$$0.351207\ \text{pyrexia}\ \text{respiratoryInfection} - 1.35121\ \left(\text{pyrexia}\ \text{respiratoryInfection}\right)^{1/3},$$

$$-0.00283704 + 1.00284\ \text{b45} + 0.00283704\ \text{pyrexia} + 0.198362\ \left(2 + \text{bTF} + \text{denovoDSA}^{0.344715} + \text{mMFatRej}\right)\ \text{respiratoryInfection} - 0.356071\ \text{nS}\ \text{respiratoryInfection} - 0.783484\ \text{pyrexia}\ \text{respiratoryInfection},$$

$$-0.0117005 + 1.0117\ \text{b44}\ \text{dR7}^3 + 1.00452\ \text{igG} - 0.0582882\ \text{denovoDSA}\ \text{respiratoryInfection} + 0.897599\ \text{dR7}\ \text{respiratoryInfection} + 0.0254793\ \text{infectiondatefirst}^2\ \text{respiratoryInfection} - 0.00147944\ \text{infectiondatefirst}^3\ \text{respiratoryInfection},$$

$$-0.0404394 + 0.0701339\ \text{denovoDSA} + 0.150999\ \text{dSAandHSAclass1} + 0.234488\ \text{igG} + 0.116698\ \text{respiratoryInfection} + 0.923741\ \text{bTF}\ \text{respiratoryInfection} + 0.754111\ \text{dQ7}\ \left(\left(-\text{igG} + \text{respiratoryInfection}\right)^2\right)^{1/3},\ 2.87823 \times 10^{-16} + 1.\ \text{a25} + 0.999911\ \text{respiratoryInfection} - 0.999911\ \text{artificialAbortion}\ \text{respiratoryInfection} + 0.0000146933\ \text{denovoDSA}\ \text{dP5}^2\ \text{mMFatRej}\ \text{respiratoryInfection} - 0.991172\ \text{pyrexia}^{1/27}\ \text{respiratoryInfection}^2,\ -0.00344367 + 0.968361\ \text{igG} + 0.000736936\ \text{mMFatRej} + 0.00718101\ \text{cNIpostRej}^4\ \text{denovoDSA}^2\ \text{mMFatRej} - 0.0209709\ \text{respiratoryInfection} + 0.760819\ \text{bTF}\ \text{respiratoryInfection} + 0.000765729\ \text{infectiondatefirst}^3\ \text{respiratoryInfection},$$

$$-0.00498871 + 0.00797471\ \text{denovoDSA}^3 - 0.00259905\ \text{denovoDSA}^4\ \text{dQ7} + 0.993882\ \text{igG} + 1.00499\ \text{bTF}\ \text{respiratoryInfection} + 0.995549\ \text{dQ7}\ \text{respiratoryInfection} - 0.356876\ \text{igG}^2\ \text{respiratoryInfection},$$

$$-0.00608308 + 0.0080597\ \text{denovoDSA}^3 + 0.973844\ \text{igG} + 0.514547\ \text{denovoDSA}\ \text{pyrexia} + 1.007\ \text{respiratoryInfection} - 0.036239\ \text{banfct}^3\ \text{respiratoryInfection} - 1.94598\ \text{igG}\ \text{respiratoryInfection} - 1.00091\ \text{pyrexia}\ \text{respiratoryInfection},$$

$$0.00169431 - 0.00873464\ \text{denovoDSA}^{1/3} + 0.0016023\ \text{denovoDSA}^4 + 0.99099\ \text{igG} + 0.0000887758\ \text{respiratoryInfection} + 0.998217\ \text{bTF}\ \text{respiratoryInfection} + 0.968828\ \text{dQ7}\ \text{respiratoryInfection} - 1.9481\ \text{igG}\ \text{respiratoryInfection},$$

$$-0.0259674 + 0.937396\ \text{b45} + 0.0328095\ \sqrt{\text{denovoDSA}} + 0.00500254\ \text{mMFatRej} + 0.912813\ \text{respiratoryInfection} - 0.615624\ \sqrt{\text{banfi}}\ \text{respiratoryInfection} - 0.379637\ \sqrt{\text{hLADRmm}}\ \text{respiratoryInfection} + 0.100035\ \text{infectiondatefirst}\ \text{respiratoryInfection},$$

$$-0.00277128 + 0.0351486\ \text{denovoDSA} + 0.182358\ \text{dSAandHSAclass1} - 0.0404765\ \text{dSAandHSAclass2} + 0.0165409\ \text{respiratoryInfection} + 0.98623\ \text{bTF}\ \text{respiratoryInfection} + 0.91368\ \text{dQ7}\ \left(\text{igG} + \text{respiratoryInfection}\right)^{1/9},$$

$$-0.016757 + 0.662293\ \text{b45} + 0.0218269\ \text{denovoDSA}^2 + 0.0253165\ \text{dSAandHLAclass1pre} + 0.0840305\ \text{respiratoryInfection}^{1/3} + 0.932726\ \text{bTF}\ \text{respiratoryInfection} + 0.125795\ \text{dQ7}^2\ \text{mMFatRej}^2\ \text{respiratoryInfection}^3,\ 0.00195547 + 0.140994\ \text{antiHLAclass1}\ \text{denovoDSA} + 0.897893\ \text{igG} + 0.0184658\ \sqrt{\text{respiratoryInfection}} + 0.866784\ \sqrt{\left(\text{antiHLAclass1} + \text{bTF}^3 + \text{dR15}\right)\ \text{respiratoryInfection}},$$

$$1.36922 \times 10^{-17} + 1.\ \text{b45} + 3.11311 \times 10^{-16}\ \text{respiratoryInfection} + 1.\ \text{bTF}\ \text{respiratoryInfection} + 1.\ \text{dQ8}^2\ \text{respiratoryInfection}^2 - 8.53337 \times 10^{-17}\ \sqrt{\text{denovoDSA}^2\ \text{mMFatRej}\ \text{respiratoryInfection}},$$

$$0.00984011 + 1.01896\ \text{b45} - 0.0287982\ \text{banfct} - 0.275122\ \text{nS}\ \text{respiratoryInfection} - 1.03568\ \text{pyrexia}\ \text{respiratoryInfection} + 0.242787\ \text{respiratoryInfection}\ \left(\text{bTF} + \text{denovoDSA}^{0.344715} + \text{mMFatRej} + \text{pyrexia} + \text{respiratoryInfection}\right),$$

$$-0.00160392 + 1.0016\ \text{b45} + 0.728088\ \left(-10 - \text{denovoDSA}\right)\ \text{respiratoryInfection} - 0.710027\ \text{infectiondatefirst}\ \text{respiratoryInfection} + 0.00848883\ \text{mMFatRej}\ \text{respiratoryInfection} + 4.67913\ \text{respiratoryInfection}\ \sqrt{\text{denovoDSA} + \text{infectiondatefirst} + \text{respiratoryInfection}},$$

$$-0.00467848 + 0.978306\ \text{b45} + 0.0527446\ \text{igG} + 0.421512\ \left(2\ \text{bTF} + \text{denovoDSA}^{1/9} + \text{dQ7} + \frac{\text{bTF}}{\text{mMFatRej}}\right)\ \text{respiratoryInfection},$$

$$-0.0101752 + 0.902617\ \text{igG} + 0.00588394\ \text{denovoDSA}^2\ \text{mMFatRej} + 0.756901\ \text{cNIpostRej respiratoryInfection} + 0.0845281\ \text{infectiondatefirst respiratoryInfection} - 0.250599\ \text{igG mMFatRej respiratoryInfection} - 0.231953\ \text{cNIpostRej}^3\ \text{infectiondatefirst respiratoryInfection}^2,$$

$$4.47206 \times 10^{-16} + 1.\ \text{b45} - 1.02889\ \text{respiratoryInfection} + 0.816862\ \sqrt{\text{banfi}}\ \text{respiratoryInfection} + 0.780446\ \sqrt{\text{bTF}}\ \text{respiratoryInfection} + 0.185024\ \text{denovoDSA respiratoryInfection} + 0.732714\ \text{mMFatRej respiratoryInfection} - 0.398152\ \text{banfi mMFatRej respiratoryInfection},$$

$$0.000638257 + 0.877474\ \text{igG} + 0.000122067\ \text{denovoDSA}^2\ \text{mMFatRej}^3 - 0.451371\ \text{respiratoryInfection} + 0.114067\ \text{infectiondatefirst respiratoryInfection} + 0.144176\ \text{cNIpostRej}^4\ \text{infectiondatefirst respiratoryInfection} + 0.0244454\ \text{denovoDSA mMFatRej respiratoryInfection},\ 0.00258231 + 0.87316\ \text{igG} + 0.156258\ \text{respiratoryInfection} + 0.92117\ \text{cNIpostRej respiratoryInfection} + 0.060973\ \text{infectiondatefirst respiratoryInfection} - 0.041424\ \text{cNIpostRej}^3\ \left(\text{denovoDSA}^2 + \text{infectiondatefirst}^2\ \text{respiratoryInfection}\right),$$

$$0.0126972 - 0.0320027\ \text{banfct}^3 - 0.0634441\ \text{denovoDSA} + 0.0517983\ \text{denovoDSA}^2 + 1.07516\ \text{igG} + 0.959732\ \text{respiratoryInfection} - 1.99332\ \text{igG respiratoryInfection} - 0.916396\ \text{pyrexia}^{1/6}\ \text{respiratoryInfection},$$

$$1.55171 - 4.67473 \Big/ \left(3 - \text{denovoDSA}^{1/3} + \text{denovoDSA} + 3\ \text{igG} + 7\ \text{bTF respiratoryInfection} + 4.60052\ \text{dQ7 respiratoryInfection}\right),$$

$$0.0347638 + 1.00076\ \text{antiHLAclass1} + 0.0284504\ \text{denovoDSA} - 0.0257714\ \text{infectionCount} + 0.00178408\ \text{infectionCount}^3 - \frac{0.536249\ \text{antiHLAclass1}}{\text{mMFatRej}} - \frac{0.000896854\ \text{infectionCount}^3}{\text{mMFatRej}} - 0.000275128\ \text{infectionCount}^3\ \text{mMFatRej},$$

$$-0.0130682 + 0.0372646\ \text{denovoDSA}^2 + 0.86048\ \text{igG} - 0.856933\ \text{respiratoryInfection} + 0.999196\ \left(1 + \text{bTF} + \text{denovoDSA}^{1/3} + \text{igG}\right)\ \text{respiratoryInfection} - 0.138919\ \left(\text{denovoDSA} + \text{pyrexia}\right)^2\ \text{respiratoryInfection},\ 1.06444 - \frac{0.086169}{2\ \text{b45} + \text{igG} + \frac{4}{49 + \text{denovoDSA} + \text{igG}} + \text{bTF respiratoryInfection} + \text{dQ7 respiratoryInfection}},$$

$$-0.00265144 + 0.709839\ \left(\left(\text{b45} + 2\ \text{bTF} + \text{dQ7} + \frac{\text{denovoDSA}}{\text{mMFatRej}}\right)\ \left(\text{b45} + \text{respiratoryInfection}\right)\right)^{1/3},$$

$$2.40187 \times 10^{-15} + 1.\ \text{b45} + 2.26152 \times 10^{-16}\ \text{denovoDSA} + 0.00227475\ \text{denovoDSA mMFatRej}^3\ \text{pyrexia}^2 - 8.55971 \times 10^{-17}\ \text{mMFatRej}^3\ \text{pyrexia}^3 + 1.\ \text{respiratoryInfection} - 1.\ \text{pastanemia respiratoryInfection} - 1.\ \text{pyrexia respiratoryInfection},$$

$$-0.0000617723 - 0.000800041\ \text{denovoDSA}^4\ \left(-\text{birthhistory} + \text{dP11}\right) + 1.00006\ \text{igG} + 0.99984\ \text{bTF respiratoryInfection} + 0.99922\ \text{dQ7 respiratoryInfection} - 0.499236\ \text{igG respiratoryInfection} + 6.46379 \times 10^{-7}\ \text{infectiondatefirst}^3\ \text{respiratoryInfection}^3,$$

$$5.80469 \times 10^{-16} + 1.\ \text{b45} - 1.42539\ \text{respiratoryInfection} - 0.0979823\ \text{infectiondatefirst respiratoryInfection} + 0.415013\ \text{bTF mMFatRej respiratoryInfection} + 0.9736\ \text{respiratoryInfection}^2\ \sqrt{\text{denovoDSA} + \text{infectiondatefirst} + \text{dR7 respiratoryInfection}},$$

$$0.00434937 + 0.013688\ \text{antiHLAclass1}^3 + 0.657917\ \left(\text{antiHLAclass1 denovoDSA}\right)^{1/3} - 0.000625433\ \text{artificialAbortion infectionCount}^3 + \frac{0.0000115683\ \text{infectionCount}^3}{\text{mMFatRej}} - 1.57836\ \text{respiratoryInfection} + 0.219828\ \text{infectionCount respiratoryInfection},$$

$$0.0137465 + 0.986253\ \text{b45} - 0.213072\ \text{pyrexia}^2 + 2.55623\ \text{respiratoryInfection} + 0.19819\ \sqrt{\text{mMFatRej respiratoryInfection}} + 0.563192\ \text{respiratoryInfection}\ \left(-5.65781 + \text{bTF} + \text{denovoDSA}^{0.344715} + \text{respiratoryInfection}\right),$$

$$0.0010498 + 1.00735\ \left(\left(\text{antiHLAclass2} + \text{bTF} + \text{bTF cNIpostRej preDSA}\right)\left(\text{b62} + \text{igG} + \text{respiratoryInfection}\right)^{1/3}\right)^{1/3},$$

$$-0.0144526 + 0.00815362\ \text{denovoDSA}^3 + 1.96036\ \text{igG} + 0.147697\ \text{pyrexia}^3 + 1.98476\ \text{respiratoryInfection} - 0.0357949\ \text{banfct}^3\ \text{respiratoryInfection} - 1.09507\ \text{pyrexia respiratoryInfection} - 0.978517\ \left(\text{igG} + \text{respiratoryInfection}\right)^2,$$

$$-2.31654 \times 10^{-18} + 1.\ \text{b45} + 4.42065\ \text{respiratoryInfection} - 0.0806294\ \text{mMFatRej pyrexia respiratoryInfection} - 0.271304\ \sqrt{\text{denovoDSA respiratoryInfection}} + 0.919659\ \text{respiratoryInfection}\left(-5.65781 + \text{bTF} + \text{denovoDSA}^{0.344715} + \text{respiratoryInfection}\right),$$

$$0.0880795 + 1.01523\ \text{antiHLAclass1} + 0.029332\ \text{denovoDSA} - 0.0514032\ \text{infectionCount} + 0.00192704\ \text{infectionCount}^3 - \frac{0.551305\ \text{antiHLAclass1}}{\text{mMFatRej}} - \frac{0.0000767395\ \text{infectionCount}^4}{\text{mMFatRej}} - 0.000268173\ \text{infectionCount}^3\ \text{mMFatRej},$$

$$1.00706 - \frac{8.36163}{8 + \text{denovoDSA} + \text{igG} + 8\ \left(\text{bTF} + \text{igG} + \text{mFImax}\right)\ \left(\text{b45} + \text{igG} + 2\ \text{respiratoryInfection}\right)},$$

$$1. + 1.36189 \times 10^{-9} \Big/ \left(2\ \text{b45} + \text{igG} + \text{bTF respiratoryInfection} + \text{dQ7 respiratoryInfection} - \frac{1}{7.34272 \times 10^8 + \text{denovoDSA} + \text{respiratoryInfection}}\right), -0.00402688 + 0.00076238\ \text{cNIpostRej}^3 + 0.967525\ \text{igG} + 0.00116966\ \text{cNIpostRej denovoDSA}^2\ \text{mMFatRej} + 0.00860787\ \text{cNIpostRej}^4\ \text{denovoDSA}^2\ \text{mMFatRej} + 0.745934\ \text{bTF respiratoryInfection} + 0.000753932\ \text{infectiondatefirst}^3\ \text{respiratoryInfection}, 0.00159371 + 1.00422\ \text{b45} + 1.02521\ \text{respiratoryInfection} - 0.306716\ \text{feverOnly hLAmm respiratoryInfection} - 0.00424261\ \text{cNIpostRej feverOnly}^3\ \text{mMFatRej}\ \left(\text{infectionCount} - \text{naturalAbortion}\right)\ \text{respiratoryInfection}^4 - 0.00591134\ \text{type2DM} + 0.0000117165\ \text{wBCpeakover5}^3,$$

$$-0.00383362 + 0.00777797\ \text{denovoDSA}^3 + 0.952518\ \text{igG} + 10.3208\ \text{respiratoryInfection} - 0.20063\ \text{denovoDSA respiratoryInfection} + 1.14687\ \text{dR7 respiratoryInfection} - 11.5742\ \text{infectiondatefirst}^{1/3}\ \text{respiratoryInfection} + 2.34123\ \text{infectiondatefirst respiratoryInfection} - 0.0743924\ \text{infectiondatefirst}^2\ \text{respiratoryInfection}, 0.00491073 + 0.995089\ \text{b45} - 0.152233\ \left(\text{b45} + \text{banfct} + \text{denovoDSA}\right)\ \text{nS} + 0.187517\ \text{respiratoryInfection} - 0.946048\ \text{pyrexia respiratoryInfection} + 0.191141\ \text{respiratoryInfection}\left(\text{bTF} + \text{denovoDSA}^{0.344715} + \text{mMFatRej} + \text{pyrexia} + \text{respiratoryInfection}\right),$$

$$-1.48554 \times 10^{-17} + 1.\ \text{b45} - 1.01285\ \text{respiratoryInfection} + 0.371159\ \text{bTF mMFatRej}\ \text{respiratoryInfection} + 0.478795\ \text{dR7 respiratoryInfection}^2 + 0.579818\ \text{respiratoryInfection}^2\ \sqrt{\text{denovoDSA} + \text{infectiondatefirst} + \text{dR7 respiratoryInfection}},$$

$$-0.0319558 + 0.478618\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} - 0.00112965\ \text{denovoDSA}\ \text{dSAclass1number} + 0.00151527\ \text{infectionCount}^3 - \frac{0.000854125\ \text{infectionCount}^3}{\text{mMFatRej}} + 0.0818555\ \text{igG mMFatRej} - 0.000208582\ \text{infectionCount}^3\ \text{mMFatRej} - 0.0854259\ \text{pyrexia},$$

$$0.00859282 + 0.991407\ \text{b45} - 0.266378\ \left(\text{b45} + \text{banfct} + \text{denovoDSA}\right)\ \text{nS} + 0.266025\ \text{respiratoryInfection} - 1.04375\ \text{pyrexia respiratoryInfection} + 0.218168\ \text{respiratoryInfection}\left(\text{bTF} + \text{mMFatRej} + \text{nS}^{0.172358} + \text{pyrexia} + \text{respiratoryInfection}\right),$$

$$5.96957 \times 10^{-6} + 0.956131\ \left(\left(2\ \text{antiHLAclass2} + \text{bTF}\right)\ \left(16 + \text{denovoDSA}\right)\left(\text{b62} + \text{igG} + \text{respiratoryInfection}\right)\right)^{1/81}\Big\},\ 0.7\Big]\Big]$$

◆ 6. Test of creaed Models with ANOVA

◇ Test Results for each Approximate Function with ANOVA

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	Complexity	$1-R^2$	Variables	ModelBasisSet	Model Expression	ANOVA T…			
							DF	SS	MS
1	33	0.140511	respiratoryInfection infectiondatefirst denovoDSA igG mMFatRej	igG denovoDSA mMFatRej infectiondatefirst respiratoryInfection	$-(3.64\times10^{-2})+0.63\,\text{igG}+(2.86\times10^{-2})\,\text{denovoDSA}\,\text{mMFatRej}+(8.54\times10^{-2})\,\text{infectiondatefirst}\,\text{respiratoryInfection}$	igG	1	1.389-68	1.38 68
						denovoDSA mMFatRej	1	1.000-74	1.00 74
						infectiondatefirst respiratoryInfection	1	3.206-26	3.20 26
						Error	39	0.914-953	0.02 46 3
						Total	42	6.511-63	
							DF	SS	MS
2	36	0.0793913	respiratoryInfection infectiondatefirst denovoDSA b45 dR51 mMFatRej	b45 denovoDSA dR51 mMFatRej infectiondatefirst respiratoryInfection	$-(1.96\times10^{-2})+(8.73\times10^{-2})\,\text{infectiondatefirst}\,\text{respiratoryInfection}+1.02\,b_{45}+0.10\,\text{denovoDSA}\,\text{mMFatRej}\,dR_{51}$	b45	1	1.389-68	1.38 68
						denovoDSA dR51 mMFatRej	1	1.357-71	1.35 71
						infectiondatefirst respiratoryInfection	1	3.247-28	3.24 28
						Error	39	0.516-967	0.01 25 6
						Total	42	6.511-63	
							DF	SS	MS
						antiHLAclass1 den-	1	1.465-93	1.46 93

3	36	0.19333	pyrexia cMV respiratoryInfection denovoDSA antiHLAclass1 mMFatRej	antiHLAclass1 denovoDSA mMFatRej pyrexia cMV respiratoryInfection	$4.13 \times 10^{-2} - 0.42$ pyrexia $+ 0.78$ cMV respiratoryInfection $+ (3.29 \times 10^{-2})$ denovoDSA mMFatRej antiHLAclass$_1$	ovo-DSA mM-Fat-Rej			
						pyrexia	1	0.105-086	0.10 08
						cMV	1	3.681-72	3.68 72
						resp-irato-ryInf-ecti-on			
						Error	39	1.258-89	0.03 27 2
						Total	42	6.511-63	
							DF	SS	MS
4	38	0.155908	respiratoryInfection infectiondatefirst b45 mMFatRej cNIpostRej	b45 cNIpostRej mMFatRej infectiondatefirst respiratoryInfection	$4.18 \times 10^{-2} + 0.10$ cNIpostRej $- (1.17 \times 10^{-2})$ mMFatRej $+ (9.18 \times 10^{-2})$ infectiondatefirst respiratoryInfection $+ 1.11$ b$_{45}$	b45	1	1.376-19	1.37 19
						cNIpo-stRe-j	1	0.486-323	0.48 32
						mMFa-tRej	1	0.048-831	0.04 83
						infecti-ond-atefi-rst	1	3.555-16	3.55 16
						resp-irato-ryInf-ecti-on			
						Error	37	1.009-69	0.02 28 9
						Total	41	6.476-19	
							DF	SS	MS
5	39	0.125534	pyrexia cMV respiratoryInfection denovoDSA antiHLAclass1 mMFatRej	antiHLAclass1 denovoDSA mMFatRej cMV respiratoryInfection pyrexia respiratoryInfection	$1.62 \times 10^{-2} + 0.88$ cMV respiratoryInfection $- 0.60$ pyrexia respiratoryInfection $+ (3.32 \times 10^{-2})$ denovoDSA mMFatRej antiHLAclass$_1$	antiHL-Acla-ss1 den-ovo-DSA mM-Fat-Rej	1	1.465-93	1.46 93
						cMV	1	2.7133	2.71
						resp-irato-ryInf-ecti-on			
						pyrexia	1	1.514-96	1.51 96
						resp-irato-ryInf-ecti-on			
						Error	39	0.817-	0.02

								43	95 7
						Total	42	6.511-63	
							DF	SS	MS
						b45	1	1.389-68	1.38 68
						denovoDSA dR51	1	1.457-57	1.45 57
						mMFatRej^2			
6	40	0.0712901	respiratoryInfection infectiondatefirst denovoDSA b45 dR51 mMFatRej	b45 denovoDSA dR51 mMFatRej^2 infectiondatefirst respiratoryInfection	$-(2.05\times10^{-2})+(8.68\times10^{-2})$ infectiondatefirst respiratoryInfection $+1.02\,b_{45}+(6.14\times10^{-2})$ denovoDSA mMFatRej^2 dR_{51}	infectiondatefirst respiratoryInfection	1	3.200-16	3.20 16
						Error	39	0.464-214	0.01 90 9
						Total	42	6.511-63	
							DF	SS	MS
						b45	1	1.389-68	1.38 68
						antiHLAclass2 respiratoryInfection	1	3.230-06	3.23 06
7	40	0.149306	respiratoryInfection bTF antiHLAclass2 b45 mMFatRej	b45 antiHLAclass2 respiratoryInfection bTF mMFatRej^2 respiratoryInfection	$-(2.40\times10^{-16})+0.60$ bTF mMFatRej^2 respiratoryInfection $+1.00$ respiratoryInfection $antiHLAclass_2+1.00\,b_{45}$	bTF mMFatRej^2 respiratoryInfection	1	0.919-67	0.91 67
						Error	39	0.972-222	0.02 92 8
						Total	42	6.511-63	
							DF	SS	MS
						b45	1	1.333-33	1.33 33
						cGN preDSA	1	0.709-22	0.70 22
					$6.28\times10^{-17}+$	respir-	1	3.411-	3.41

8	41	0.130682	respiratoryInfection preDSA b45 cGN banfi	b45 cGN preDSA respiratoryInfection banfi respiratoryInfection	$0.50\,cGN\,preDSA + 1.14\,respiratoryInfection - 0.50\,banfi\,respiratoryInfection + 1.00\,b_{45}$	ator- yInf- ecti- on		99	99
						banfi resp- irato- ryInf- ecti- on	1	1.5	1.5
						Error	45	1.045- 45	0.02 23 3
						Total	49	8.	
							DF	SS	MS
9	41	0.132127	respiratoryInfection bTF denovoDSA antiHLAclass2 b45	denovoDSA bTF respiratoryInfection antiHLAclass2 (b45 + respiratoryInfe- ction)	$2.93 \times 10^{-2} - (1.25 \times 10^{-2})\,denovoDSA + 0.97\,bTF\,respiratoryInfection + 1.00\,antiHLAclass_2\,(respiratoryInfection + b_{45})$	denov- oDS- A	1	2.469- 39	2.46 39
						bTF resp- irato- ryInf- ecti- on	1	0.941- 877	0.94 87
						antiHL- ACla- ss2 (b45 + resp- irato- ryInf- ecti- on)	1	2.964- 95	2.96 95
						Error	45	0.970- 726	0.02 57 7
						Total	48	7.346- 94	
							DF	SS	MS
10	41	0.13256	respiratoryInfection bTF denovoDSA b45 dQ7	b45 bTF denovoDSA (bTF + dQ7) respiratoryInfection	$2.61 \times 10^{-2} - (1.74 \times 10^{-2})\,bTF\,denovoDSA + 0.99\,b_{45} + 0.97\,respiratoryInfection\,(bTF + dQ_7)$	b45	1	1.389- 49	1.38 49
						bTF den- ovo- DSA	1	0.062- 71	0.06 71
						(bTF + dQ7) resp- irato- ryInf- ecti- on	1	4.920- 82	4.92 82
						Error	45	0.973- 913	0.02 64 5
						Total	48	7.346- 94	
							DF	SS	MS
						b45	1	1.377- 72	1.37 72
						cNIpo-	1	0.790-	0.79

						stRe-j		143	14
11	41	0.141656	respiratoryInfection bTF b45 dQ8 cNIpostRej	b45 cNIpostRej bTF respiratoryInfection dQ8 respiratoryInfection	$3.11\times10^{-2}+(7.20\times10^{-2})$ cNIpostRej + 1.03 bTF respiratoryInfection + 1.03 b_{45} + 0.96 respiratoryInfection dQ_8	bTF respiratoryInfection	1	0.919-241	0.91 24
						dQ8 respiratoryInfection	1	3.306-15	3.30 15
						Error	43	0.919-25	0.02 37 9
						Total	47	7.3125	
							DF	SS	MS
						denovoDSA	1	2.280-86	2.28 86
						b45 mMFatRej	1	0.151-918	0.15 91
					$-(3.71\times10^{-2})+(9.01\times10^{-2})$ denovoDSA $-(1.76\times10^{-2})$ respiratoryInfection + (8.82×10^{-2}) infectiondatefirst respiratoryInfection + 0.12 mMFatRej b_{45}	respiratoryInfection	1	1.908-13	1.90 13
12	41	0.15958	respiratoryInfection infectiondatefirst denovoDSA b45 mMFatRej	denovoDSA b45 mMFatRej respiratoryInfection infectiondatefirst respiratoryInfection		infectiondatefirst respiratoryInfection	1	1.131-59	1.13 59
						Error	38	1.039-13	0.02 34 5
						Total	42	6.511-63	
							DF	SS	MS
						b45	1	1.325-76	1.32 76
						nS	1	0.006-306-31	0.00 30 31
						mMFatRej	1	1.539-96	1.53 96
13	41	0.192141	pyrexia respiratoryInfection b45 nS mMFatRej	b45 nS mMFatRej respiratoryInfection pyrexia respiratoryInfection	$2.84\times10^{-2}-0.16$ nS + 0.46 mMFatRej respiratoryInfection − 1.06 pyrexia respiratoryInfection + 0.97 b_{45}	respiratoryInfection			
						pyrexia	1	2.916-73	2.91 73
						respiratoryInfection			

						Error	39	1.370-34	0.03 13
						Total	43	7.159-09	
							DF	SS	MS
						b45	1	1.389-49	1.38 49
						denovoDSA	1	1.282-03	1.28 03
						(0.0480144 + bTF + dQ7) respiratoryInfection	1	3.687-28	3.68 28
						Error	45	0.988-137	0.02 95 6
						Total	48	7.346-94	
							DF	SS	MS
						b45	1	1.458-33	1.45 33
						denovoDSA	1	1.317-16	1.31 16
						antiHLAclass2 respiratoryInfection	1	2.0923	2.09
						bTF mMFatRej respiratoryInfection	1	0.965-545	0.96 54
						Error	37	2.465-49 × 10^{-31}	6.66 49 10
						Total	41	5.833-33	
							DF	SS	MS
						b45	1	1.389-49	1.38 49
						igG pre-DSA	1	0.489-821	0.48 82
						bTF resp-	1	0.761-744	0.76 74

14	42	0.134497	respiratoryInfection bTF denovoDSA b45 dQ7	b45 denovoDSA (0.0480144 + bTF + dQ7) respiratoryInfection	$2.42 \times 10^{-2} - (1.01 \times 10^{-2})$ denovoDSA + 1.01 b_{45} + 0.95 respiratoryInfection $(4.80 \times 10^{-2} + bTF + dQ_7)$
15	44	0.	respiratoryInfection bTF denovoDSA antiHLAclass2 b45 mMFatRej	b45 denovoDSA antiHLAclass2 respiratoryInfection bTF mMFatRej respiratoryInfection	$-(3.94 \times 10^{-16}) + (2.25 \times 10^{-17})$ denovoDSA + 0.78 bTF mMFatRej respiratoryInfection + 1.00 respiratoryInfection $antiHLAclass_2$ + 1.00 b_{45}

16	44	0.0449954	respiratoryInfection bTF preDSA b45 dQ7 igG	b45 igG preDSA bTF respiratoryInfection dQ7 respiratoryInfection	0.33 igG preDSA + 0.99 bTF respiratoryInfection + 0.66 b_{45} + 0.99 respiratoryInfection dQ_7	irato- ryInf- ecti- on dQ7 resp- irato- ryInf- ecti- on Error Total	DF 1 44 48	SS 4.3753 0.330- 579 7.346- 94	MS 4.37 0.00 51 15
17	44	0.184435	respiratoryInfection infectiondatefirst denovoDSA dR7 igG	dR7 igG denovoDSA dR7 respiratoryInfection infectiondatefirst respiratoryInfection	$-(1.40 \times 10^{-2}) +$ 0.83 igG + (8.46×10^{-2}) infectiondatefirst respiratoryInfection + 0.20 dR_7 + 0.32 denovoDSA respiratoryInfection dR_7	dR7 igG denovoD- SA dR7 respirat- oryInf- ectio- n infectiond- atefirst respirat- oryInf- ectio- n Error Total	DF 1 1 1 1 45 49	SS 0.655- 827 1.834- 46 0.947- 316 3.086- 91 1.475- 48 8.	MS 0.6 8 1.8 4 0.9 3 3.0 9 0.0 7 4
18	45	0.16137	pyrexia respiratoryInfection preDSA denovoDSA igG	denovoDSA^2 igG preDSA respiratoryInfection pyrexia respiratoryInfection	$-(4.25 \times 10^{-3}) +$ (2.63×10^{-2}) denovoDSA^2 + 0.48 igG preDSA + 0.72 respiratoryInfection − 0.49 pyrexia respiratoryInfection	denov- oDS- A^2 igG pre- DSA respir- ator- yInf- ecti- on pyrexia resp- irato- ryInf- ecti- on Error Total	DF 1 1 1 1 45 49	SS 2.096- 18 1.303- 58 2.271- 58 1.0377 1.290- 96 8.	MS 2.09 18 1.30 58 2.27 58 1.03 0.02 68
						b45	DF 1	SS 1.325- 76	MS 1.32 76

19	45	0.177824	pyrexia respiratoryInfection b45 mMFatRej	b45 respiratoryInfection $\frac{\text{respiratoryInfection}}{\text{mMFatRej}}$ pyrexia respiratoryInfection	$3.43 \times 10^{-17} + 1.41$ respiratoryInfection $- \frac{0.87\ \text{respiratoryInfection}}{\text{mMFatRej}} -$ 0.74 pyrexia respiratoryInfection $+ 1.00\ b_{45}$	respiratoryInfection respiratoryInfection / mMFatRej pyrexia respiratoryInfection Error Total	1 1 1 39 43	2.464-58 0.113-588 1.985-33 1.269-83 7.159-09	2.4658 0.11158 1.9833 0.03557
							DF	SS	MS
20	46	0.131778	respiratoryInfection bTF denovoDSA b45 dQ7	b45 denovoDSA respiratoryInfection (bTF + dQ7) respiratoryInfection	$3.18 \times 10^{-2} - (1.19 \times 10^{-2})$ denovoDSA $- (2.89 \times 10^{-2})$ respiratoryInfection $+$ 1.01 b_{45} + 1.02 respiratoryInfection (bTF + dQ_7)	b45 denovoDSA respiratoryInfection (bTF + dQ7) respiratoryInfection Error Total	1 1 1 1 44 48	1.389-49 1.282-03 1.649-25 2.058-01 0.968-163 7.346-94	1.3849 1.2803 1.6425 2.0501 0.02007
							DF	SS	MS
21	46	0.13332	pyrexia respiratoryInfection denovoDSA b45 mMFatRej	b45 denovoDSA $\frac{1}{\text{mMFatRej}}$ respiratoryInfection pyrexia	$4.99 \times 10^{-2} + (5.14 \times 10^{-2})$ denovoDSA $- \frac{0.12}{\text{mMFatRej}} + 0.77$ respiratoryInfection $-$ 0.54 pyrexia	b45 denovoDSA 1 / mMFatRej respiratoryInfection	1 1 1 1	1.389-68 1.125-13 0.012-470-5 1.9398	1.3868 1.1213 0.01475 1.93

				respiratoryInfection	0.54 pyrexia respiratoryInfection + 0.79 b_{45}	pyrexia	1	1.176-42	1.17 42
						respiratoryInfection			
						Error	37	0.868-128	0.02 46 9
						Total	42	6.511-63	
							DF	SS	MS
						antiHLAclass1 denovoDSA	1	1.992-46	1.99 46
						igG	1	1.593-92	1.59 92
22	46	0.190267	pyrexia respiratoryInfection upperRespiratoryInfection denovoDSA antiHLAclass1 igG	antiHLAclass1 denovoDSA igG pyrexia respiratoryInfection upperRespiratoryInfection	$3.15 \times 10^{-2} + 0.72$ igG − 0.30 pyrexia + 0.72 respiratoryInfection − 0.16 upperRespiratoryInfection + 0.18 denovoDSA antiHLAclass$_1$	pyrexia	1	0.055-418-4	0.05 41 4
						respiratoryInfection	1	2.730-25	2.73 25
						upperRespiratoryInfection	1	0.105-82	0.10 82
						Error	44	1.522-14	0.03 59
						Total	49	8.	
							DF	SS	MS
						igG	1	1.4459	1.44
						cNIpostRej denovoDSA mMFatRej	1	0.789-899	0.78 89
23	47	0.0156968	respiratoryInfection infectiondatefirst hLADRmm denovoDSA igG mMFatRej cNIpostRej	igG cNIpostRej denovoDSA mMFatRej hLADRmm respiratoryInfection infectiondatefirst respiratoryInfection	$-(1.23 \times 10^{-2}) + 0.81$ igG − (3.10×10^{-2}) cNIpostRej denovoDSA mMFatRej − 0.37 hLADRmm respiratoryInfection + 0.14 infectiondatefirst respiratoryInfection	hLADRmm respiratoryInfection	1	1.425-37	1.42 37
						infectiondatefirst respiratoryInfection	1	2.052-59	2.05 59

						irato-ryInf-ecti-on			
						Error	36	0.091-118-1	0.00 53 06
						Total	40	5.804-88	
							DF	SS	MS
24	47	0.184735	infectionCount denovoDSA antiHLAclass1 mMFatRej	antiHLAclass1 denovoDSA infectionCount^3 $\frac{1}{\text{mMFatRej}}$ mMFatRej	$0.28+(8.15\times10^{-2})$ denovoDSA + (4.80×10^{-4}) infectionCount^3 − $\frac{0.40}{\text{mMFatRej}}$ − (5.68×10^{-2}) mMFatRej + 0.66 antiHLAclass$_1$	antiHL-Acla-ss1	1	2.132-68	2.13 68
						denov-oDS-A	1	0.946-651	0.94 65
						infecti-onC-ount^3	1	1.781-64	1.78 64
						1 / mM-Fat-Rej	1	0.240-506	0.24 50
						mMFa-tRej	1	0.266-871	0.26 87
						Error	37	1.143-28	0.03 89 5
						Total	42	6.511-63	
							DF	SS	MS
25	48	0.	respiratoryInfection bTF denovoDSA b45 dQ7 mMFatRej	b45 denovoDSA dQ7 respiratoryInfection bTF mMFatRej respiratoryInfectio-n^2	$-(4.08\times10^{-16})+(7.87\times10^{-18})$ denovoDSA + 0.78 bTF mMFatRej respiratoryInfectio-n^2 + 1.00 b$_{45}$ + 1.00 respiratoryInfection dQ$_7$	b45	1	1.458-33	1.45 33
						denov-oDS-A	1	1.317-16	1.31 16
						dQ7	1	2.0923	2.09
						resp-irato-ryInf-ecti-on			
						bTF mM-Fat-Rej	1	0.965-545	0.96 54
						resp-irato-ryInf-ecti-on^2			
						Error	37	2.465-49 × 10^{-31}	6.66 49 10
						Total	41	5.833-33	

◇ Test Result for the Whole Approximate Function with ANOVA

DF	SS	MS	F-Statistic	P-Value

MedianAverage[	1	5.06815	21376.3	1.02173×10^{-52}

$$\{-0.0363697 + 0.628333\ \text{igG} + 0.0286076\ \text{denovoDSA mMFatRej} + 0.0853686\ \text{infectiondatefirst respiratoryInfection},$$
$$-0.0196015 + 1.0196\ \text{b45} + 0.102837\ \text{denovoDSA dR51 mMFatRej} + 0.0873113\ \text{infectiondatefirst respiratoryInfection},$$
$$0.0412751 + 0.0329453\ \text{antiHLAclass1 denovoDSA mMFatRej} - 0.420542\ \text{pyrexia} + 0.779171\ \text{cMV respiratoryInfection},\ 0.0417812 + 1.11224\ \text{b45} + 0.103846\ \text{cNIpostRej} - 0.0116545\ \text{mMFatRej} + 0.0917536\ \text{infectiondatefirst respiratoryInfection},$$
$$0.0161709 + 0.0332307\ \text{antiHLAclass1 denovoDSA mMFatRej} + 0.883713\ \text{cMV respiratoryInfection} - 0.599922\ \text{pyrexia respiratoryInfection},$$
$$-0.020488 + 1.02049\ \text{b45} + 0.0614038\ \text{denovoDSA dR51 mMFatRej}^2 + 0.0867739\ \text{infectiondatefirst respiratoryInfection},$$
$$-2.39836 \times 10^{-16} + 1.\ \text{b45} + 1.\ \text{antiHLAclass2 respiratoryInfection} + 0.600925\ \text{bTF mMFatRej}^2\ \text{respiratoryInfection},$$
$$6.28037 \times 10^{-17} + 1.\ \text{b45} + 0.5\ \text{cGN preDSA} + 1.13636\ \text{respiratoryInfection} - 0.5\ \text{banfi respiratoryInfection},$$
$$0.0292737 - 0.012514\ \text{denovoDSA} + 0.970726\ \text{bTF respiratoryInfection} + 1.00469\ \text{antiHLAclass2}\ (\text{b45} + \text{respiratoryInfection}),$$
$$0.026087 + 0.991304\ \text{b45} - 0.0173913\ \text{bTF denovoDSA} + 0.973913\ (\text{bTF} + \text{dQ7})\ \text{respiratoryInfection},$$
$$0.0311305 + 1.02934\ \text{b45} + 0.0720363\ \text{cNIpostRej} + 1.03168\ \text{bTF respiratoryInfection} + 0.961704\ \text{dQ8 respiratoryInfection},$$
$$-0.0371426 + 0.0900972\ \text{denovoDSA} + 0.116274\ \text{b45 mMFatRej} - 0.0175636\ \text{respiratoryInfection} + 0.0881596\ \text{infectiondatefirst respiratoryInfection},$$
$$0.0284206 + 0.971579\ \text{b45} - 0.161864\ \text{nS} + 0.455524\ \text{mMFatRej respiratoryInfection} - 1.05678\ \text{pyrexia respiratoryInfection},$$
$$0.0241769 + 1.01106\ \text{b45} - 0.0100676\ \text{denovoDSA} + 0.948371\ (0.0480144 + \text{bTF} + \text{dQ7})\ \text{respiratoryInfection},$$
$$-3.93615 \times 10^{-16} + 1.\ \text{b45} + 2.24951 \times 10^{-17}\ \text{denovoDSA} + 1.\ \text{antiHLAclass2 respiratoryInfection} + 0.775194\ \text{bTF mMFatRej respiratoryInfection},$$
$$0.00826446 + 0.661157\ \text{b45} + 0.330579\ \text{igG preDSA} + 0.991736\ \text{bTF respiratoryInfection} + 0.991736\ \text{dQ7 respiratoryInfection},$$
$$-0.0139621 + 0.203788\ \text{dR7} + 0.833252\ \text{igG} + 0.316934\ \text{denovoDSA dR7 respiratoryInfection} + 0.0845852\ \text{infectiondatefirst respiratoryInfection},$$
$$-0.00425272 + 0.0263034\ \text{denovoDSA}^2 + 0.475823\ \text{igG preDSA} + 0.719048\ \text{respiratoryInfection} - 0.485298\ \text{pyrexia respiratoryInfection},$$
$$3.42622 \times 10^{-17} + 1.\ \text{b45} + 1.41219\ \text{respiratoryInfection} - \frac{0.867208\ \text{respiratoryInfection}}{\text{mMFatRej}} - 0.737523\ \text{pyrexia respiratoryInfection},$$
$$0.0318371 + 1.00969\ \text{b45} - 0.0118647\ \text{denovoDSA} - 0.0288709\ \text{respiratoryInfection} + 1.02076\ (\text{bTF} + \text{dQ7})\ \text{respiratoryInfection},$$
$$0.0499051 + 0.791448\ \text{b45} + 0.0513764\ \text{denovoDSA} - \frac{0.116403}{\text{mMFatRej}} + 0.773279\ \text{respiratoryInfection} - 0.538541\ \text{pyrexia respiratoryInfection},$$
$$0.0315023 + 0.178262\ \text{antiHLAclass1 denovoDSA} + 0.71972\ \text{igG} - 0.300664\ \text{pyrexia} + 0.718342\ \text{respiratoryInfection} - 0.164267\ \text{upperRespiratoryInfection},\ -0.0123065 + 0.808211\ \text{igG} - 0.0309738\ \text{cNIpostRej denovoDSA mMFatRej} - 0.368291\ \text{hLADRmm respiratoryInfection} + 0.136438\ \text{infectiondatefirst respiratoryInfection},$$
$$0.284595 + 0.656709\ \text{antiHLAclass1} + 0.0815071\ \text{denovoDSA} + 0.000480324\ \text{infectionCount}^3 - \frac{0.399138}{\text{mMFatRej}} - 0.0567552\ \text{mMFatRej},$$
$$-4.07673 \times 10^{-16} + 1.\ \text{b45} + 7.87117 \times 10^{-18}\ \text{denovoDSA} + 1.\ \text{dQ7 respiratoryInfection} + 0.775194\ \text{bTF mMFatRej respiratoryInfection}^2,$$
$$-0.00440546 + 1.00441\ \text{b45} + 0.502203\ \text{cGN dQ7 preDSA} + 0.957178\ (0.0480144 + \text{bTF} + \text{dQ7})\ \text{respiratoryInfection},$$
$$0.00146199 + 0.972222\ \text{b45} + 0.0526316\ \text{diarrhea} + 0.945906\ \text{dQ6 respiratoryInfection} + 0.600047\ \text{bTF mMFatRej}^2\ \text{respiratoryInfection},$$
$$0.00411837 + 0.154954\ \text{antiHLAclass1 mMFatRej} + 0.990095\ \text{respiratoryInfection} - 0.248875\ \text{banfi}^2\ \text{respiratoryInfection} - 0.745338\ \text{gynecology respiratoryInfection},\ -0.0250658 + 0.133065\ \text{denovoDSA} + 0.659137\ \text{dQ7 respiratoryInfection} + 0.615988\ \text{bTF}^2\ \text{mMFatRej}^2\ \text{respiratoryInfection}^2,$$

$-5.73625 \times 10^{-16} + 1.\ b45 - 2.82564 \times 10^{-16}$ denovoDSA +
2.88317 × 10^{-17} mMFatRej + 1. bTF respiratoryInfection +
1. dQ6 respiratoryInfection, 0.00680474 + 1.02252 b45 −
0.0122817 mMFatRej + 0.982616 respiratoryInfection −
0.216916 feverOnly hLAmm respiratoryInfection +
0.0205556 wBCpeakover5, 0.0389581 + 0.224775 denovoDSA −
0.252869 dSAandHSAclass2 + 0.606179 igG +
0.961042 bTF respiratoryInfection + 0.755511 dQ7 respiratoryInfection,
−0.00714979 + 0.0776776 denovoDSA + 0.784967 igG −
0.313078 respiratoryInfection + 0.876799 dR7 respiratoryInfection +
0.108971 infectiondatefirst respiratoryInfection,
0.0317228 + 0.981454 b45 − 0.0263543 bTF − 0.0185456
denovoDSA dP14 + 0.97267 (bTF + dQ7) respiratoryInfection,
−0.146483 + 0.0540752 denovoDSA + 0.142482 hLADRmm +
0.53671 igG + 1.14648 bTF respiratoryInfection +
0.738382 dQ7 respiratoryInfection, −0.0377257 +
0.119793 denovoDSA + 0.917933 igG + 1.05027 respiratoryInfection −
0.462159 banfi respiratoryInfection − 1.52944 igG respiratoryInfection,
−0.00344358 + 0.928544 b45 + 0.0674601 dQ7 + 0.0274462 preDSA +
0.938078 (b45 + bTF + dQ7) respiratoryInfection,
0.0335996 + 1.00298 b45 − 0.0249327 denovoDSA +
0.0007622 denovoDSA^3 + 0.995687 (bTF + dQ8) respiratoryInfection,
−0.00110144 + 0.806982 b45 + 0.0554628 denovoDSA −
0.371167 pyrexia^2 + 0.19333 respiratoryInfection +
0.260229 mMFatRej respiratoryInfection,
0.0334087 + 1.01317 b45 − 0.00136018 antiHLAclass2 mMFatRej^2 +
0.973589 antiHLAclass2 respiratoryInfection +
0.966591 anemia bTF respiratoryInfection,
0.00118125 + 1.00155 b45 − 0.000476931 mMFatRej +
1.42709 respiratoryInfection − $\frac{4.34859\ \text{respiratoryInfection}}{\text{denovoDSA+infectiondatefirst}}$,
0.0361496 − 0.0700156 denovoDSA + 0.260067 b63 denovoDSA +
0.617728 igG + 0.96385 bTF respiratoryInfection +
1.00834 dQ7 respiratoryInfection,
0.00443196 + 0.906183 b45 + 0.17877 igG − 0.478786 denovoDSA nS +
0.488197 mMFatRej respiratoryInfection −
1.11523 pyrexia respiratoryInfection,
−0.000747252 + 0.860577 igG − 0.00609955 cNIpostRej
denovoDSA^2 mMFatRej − 0.334801 respiratoryInfection +
0.127585 infectiondatefirst respiratoryInfection^3,
0.0406532 − 0.0356691 banfi + 0.173334 antiHLAclass1 mMFatRej +
0.085608 respiratoryInfection + 0.909408 bTF respiratoryInfection +
0.203255 denovoDSA respiratoryInfection,
9.17754 × 10^{-17} + 0.0555556 antiHLAclass2 +
0.0625 bTF (16 + denovoDSA) respiratoryInfection +
0.944444 antiHLAclass2 (b13 + respiratoryInfection),
0.027027 + 0.121622 $\sqrt{\text{igG}}$ preDSA^3 − 0.027027 respiratoryInfection +
1. bTF respiratoryInfection + 1. dQ7 respiratoryInfection,
2.41509 × 10^{-16} + 1. b45 − 2.27029 × 10^{-16} bTF mMFatRej +
1.05188 × 10^{-15} respiratoryInfection + 1. bTF respiratoryInfection +
1. dQ7 respiratoryInfection, 0.00886708 + 0.117614 antiHLAclass2 −
0.101971 denovoDSA$^{1/3}$ + 0.991133 bTF respiratoryInfection +
1.01019 antiHLAclass2 (b13 + respiratoryInfection),
−0.038908 + 0.461524 igG preDSA$^{1/3}$ + 0.185504 respiratoryInfection +
0.10165 (antiHLAclass1 + respiratoryInfection + type2DM)^3,
1.83631 × 10^{-15} + 1. b45 − 5.69481 × 10^{-17} antiHLAclass2
denovoDSA mMFatRej^2 + 1. antiHLAclass2 respiratoryInfection +
1. anemia bTF respiratoryInfection, −0.00533134 +
0.341888 b45 preDSA + 0.0183866 denovoDSA mMFatRej preDSA +
1.00533 dQ7 respiratoryInfection + 1.00533 bTF respiratoryInfection^3,
3.38615 × 10^{-17} + 1. b45 + 0.303739 denovoDSA pyrexia +
1.48166 respiratoryInfection −
0.945837 $\left(\frac{1}{\text{mMFatRej}} + \text{pyrexia}\right)$ respiratoryInfection,
0.000312672 + 0.999687 b45 + 0.00260968 aerobicGNR cNIpostRej
feverOnly^3 mMFatRej + 0.965759 respiratoryInfection −
0.216892 feverOnly hLAmm respiratoryInfection, 0.0206192 +
1.00651 b45 + 0.10474 cNIpostRej + 0.0294182 dSAandHSAclass1 −
0.00222161 mMFatRej + 0.850634 respiratoryInfection −
0.815271 aerobicGNR respiratoryInfection,
2.94218 × 10^{-17} + 1. a25 + 0.104384 denovoDSA mMFatRej pyrexia +

1. respiratoryInfection – 1. artificialAbortion respiratoryInfection –
1. pyrexia respiratoryInfection, $-0.00202064 + 0.986361$ b45 +
0.00447427 denovoDSA + 0.985874 respiratoryInfection –
1.53727 mMFatRej pastanemia respiratoryInfection –
0.264397 infectiondatefirst pyrexia respiratoryInfection,
$-0.00766761 + 1.00767$ b45 – 0.141151 hLAmm respiratoryInfection +
0.137433 infectiondatefirst respiratoryInfection +
0.0538096 denovoDSA mMFatRej (dR11 + respiratoryInfection),
$0.00558751 + 0.994412$ b45 – 0.443287 denovoDSA nS +
0.0386213 denovoDSA respiratoryInfection +
0.463271 mMFatRej respiratoryInfection –
1.07208 pyrexia respiratoryInfection,
$0.03125 + 0.96875$ b45 + 0.968041 respiratoryInfection –
0.999291 pastanemia respiratoryInfection –
1.36251 pyrexia respiratoryInfection +
0.179694 mMFatRej pyrexia respiratoryInfection,
$-0.0149977 + 0.00887254\ \sqrt{\text{denovoDSA}}\ \text{mMFatRej}^2 +$
0.951927 dQ7 respiratoryInfection +
0.609938 bTF mMFatRej^2 $\text{respiratoryInfection}^3$,
$0.03125 + 0.96875$ b45 – 0.03125 respiratoryInfection +
1. dQ7 (bTF + dQ7) respiratoryInfection +
0.775194 bTF mMFatRej respiratoryInfection,
$0.0105753 + 0.895059$ b45 + 0.00650802 denovoDSA^2 +
0.478099 mMFatRej respiratoryInfection –
0.38875 nS respiratoryInfection – 1.09849 pyrexia respiratoryInfection,
$-0.0108891 + 0.18886$ anemia denovoDSA + 0.768036 igG +
1.83255 respiratoryInfection – $0.981009\ \text{pyrexia}^{1/3}$
respiratoryInfection – 0.0224501 rage respiratoryInfection,
$-5.58773 \times 10^{-15} + 1.$ b45 – 0.305643 respiratoryInfection +
0.152006 (denovoDSA + infectiondatefirst) respiratoryInfection –
0.00189856 $\text{infectiondatefirst}^2$ mMFatRej respiratoryInfection,
$5.37953 \times 10^{-16} + 1.$ b45 – 0.678805 pyrexia respiratoryInfection +
0.675051 $\text{respiratoryInfection}^2$ +
0.0299124 denovoDSA mMFatRej^2 $\text{respiratoryInfection}^3$,
$-0.0107574 + 0.927388$ b45 + 0.02382 denovoDSA +
$0.964796\ \text{respiratoryInfection} - \frac{0.248901\ \text{respiratoryInfection}}{\text{mMFatRej}^3} -$
0.632568 pyrexia respiratoryInfection,
$-0.041876 + 0.14214$ denovoDSA – 0.0659741 denovoDSA^2 dQ7 +
1.00508 igG + 0.981537 (0.0480144 + bTF + dQ7) respiratoryInfection,
$-0.00223067 + 0.447165\ \text{b44}^3 + 0.0379339\ \sqrt{\text{denovoDSA}}$ +
0.526727 igG + 1.00223 bTF respiratoryInfection +
0.840877 dQ8 respiratoryInfection,
$-4.67308 \times 10^{-16} + 1.$ b45 + 4.42318×10^{-16} banf t –
6.28656×10^{-17} bTF denovoDSA mMFatRej +
$1.\ (\text{bTF} + \text{dQ7})^3$ respiratoryInfection,
$-0.00758409 + 0.925089$ b45 + 0.02357 denovoDSA +
0.206992 infectiondatefirst respiratoryInfection –
0.116528 banfi infectiondatefirst respiratoryInfection +
0.290183 bTF mMFatRej respiratoryInfection,
$-1.69742 \times 10^{-16} + 0.666667$ b63 + 2.63492×10^{-16} respiratoryInfection +
1. bTF respiratoryInfection + 1. dQ7 respiratoryInfection –
2.23829×10^{-17} banfptcbm denovoDSA mMFatRej respiratoryInfection,
$0.0157136 + 0.218667\left(2\,\text{bTF} + \text{denovoDSA} + \text{dQ7} + \frac{\text{bTF}}{\text{mMFatRej}}\right)$
(b45 + respiratoryInfection),
$0.00494959 + 0.152674$ antiHLAclass1 mMFatRej +
1.14726 respiratoryInfection – 0.284953 banfi^2 respiratoryInfection –
0.0482142 denovoDSA respiratoryInfection –
0.867255 gynecology respiratoryInfection, 0.0128333 +
0.987167 b45 + 0.00220114 denovoDSA^3 respiratoryInfection +
0.470095 mMFatRej respiratoryInfection –
0.374207 nS respiratoryInfection – 1.08032 pyrexia respiratoryInfection,
$-0.0022604 - 0.00124288\ \text{denovoDSA}^{1/3} +$
0.199786 dSAandHSAclass1 + 1.00226 bTF respiratoryInfection +
$0.900825\ \text{dQ7}\ (\text{igG} + \text{respiratoryInfection})^{1/3}$,
$0.0101326 + 1.00306$ b45 – 0.000677024 infectiondatefirst mMFatRej +
$1.4345\ \text{respiratoryInfection} - \frac{4.39312\ \text{respiratoryInfection}^3}{\text{denovoDSA} + \text{infectiondatefirst}}$,
$-0.0130661 + 0.216781$ denovoDSA dR7 +
0.913717 igG – 0.268366 respiratoryInfection +
0.116766 infectiondatefirst respiratoryInfection +

0.278871 bTF mMFatRej^2 respiratoryInfection,

$0.00420389 + 0.0236469$ denovoDSA^2 dQ8 $+ 0.124475\ \sqrt{\text{igG}}$ preDSA^3 +
0.995796 bTF respiratoryInfection + 0.806621 dQ7 respiratoryInfection,

$-0.0120314 + 0.0201515$ denovoDSA +
0.164078 antiHLAclass1 mMFatRej +
0.896879 respiratoryInfection − 0.460656 banfi respiratoryInfection +
0.575809 bTF coaglationnecrosis respiratoryInfection^3,

$-0.00262751 + 0.0089698$ antiHLAclass1 denovoDSA +
0.168239 antiHLAclass1 mMFatRej + 0.943839 respiratoryInfection −
0.490202 banfi respiratoryInfection + 0.54899 bTF respiratoryInfection^3,

$2.18108 \times 10^{-16} + 1.$ b45 $+ 1.7279 \times 10^{-16}$ bTF denovoDSA mMFatRej +
0.410247 (bTF + dQ7) mMFatRej respiratoryInfection +
0.0956233 respiratoryInfection^3,

$-0.00448496 + 0.00775107$ denovoDSA$^3 + 1.03419$ igG −
0.0154307 denovoDSA^3 igG + 1.00448 bTF respiratoryInfection +
0.93228 dQ7 respiratoryInfection,

$-0.00437312 + 0.00817374$ denovoDSA$^3 + 0.971678$ igG +
0.58123 hDperiod$^{1/3}$ respiratoryInfection − 1.95774 igG
respiratoryInfection − 0.602161 pyrexia respiratoryInfection,

$0.0211992 + 0.981195$ b45 $- \frac{0.00206777}{\text{hDperiod}} + 0.899186$ respiratoryInfection +
0.00343251 denovoDSA mMFatRej^3 respiratoryInfection −
$0.917957\ \sqrt{\text{pyrexia}}$ respiratoryInfection,

$-0.0352777 + 0.115264$ denovoDSA $+ 0.920014$ igG +
0.00646175 respiratoryInfection + 1.02882 bTF respiratoryInfection +
0.827104 dQ7 respiratoryInfection − 1.29462 igG respiratoryInfection,

$-0.112615 + 0.125717$ denovoDSA $+ 0.845788$ igG +
0.00604224 maxWBC + 1.03539 bTF respiratoryInfection −
0.316917 denovoDSA respiratoryInfection +
1.32474 dQ7 respiratoryInfection, $0.0100239 + 0.974871$ b45 −
0.0215515 bTF − 0.0179317 bTF^2 denovoDSA +
0.087626 dQ7 + 0.920546 (bTF + dQ7) respiratoryInfection,

$1.03072 \times 10^{-16} + 1.$ b45 $- 3.5683 \times 10^{-17}$ denovoDSA −
3.69488×10^{-16} dP9 $- 5.6458 \times 10^{-18}$ respiratoryInfection +
1. dQ7 respiratoryInfection + 1. bTF respiratoryInfection^2,

$-8.49623 \times 10^{-16} + 1.$ b45 $+ 1.$ dQ7 respiratoryInfection +
0.775194 bTF mMFatRej respiratoryInfection^2 +
5.90088×10^{-17} denovoDSA^2 mMFatRej respiratoryInfection^3,

$2.9724 \times 10^{-16} + 1.$ b45 $- 0.0136751$ infectiondatefirst^2 mMFatRej polyp +
1.42695 respiratoryInfection $- \frac{4.1412\ \text{respiratoryInfection}}{\text{denovoDSA+infectiondatefirst}}$,

$-0.025473 + 0.773018$ igG $+ 0.027701$ denovoDSA mMFatRej −
0.369174 respiratoryInfection +
0.103482 infectiondatefirst respiratoryInfection − 0.0936637
cNIpostRej^3 infectiondatefirst mMFatRej respiratoryInfection,

$-5.36888 \times 10^{-16} + 1.$ b45 $+ 1.65487$ respiratoryInfection −
$\frac{4.92647\ \text{respiratoryInfection}}{\text{denovoDSA+infectiondatefirst}}$ −
0.00893139 infectiondatefirst mMFatRej respiratoryInfection^2,

$0.00167761 + 0.0399931$ b45 denovoDSA^2 +
0.828942 igG + 0.737196 dR7 respiratoryInfection +
0.0870421 infectiondatefirst respiratoryInfection −
0.0705083 infectiondatefirst pyrexia respiratoryInfection,

$0.00893057 + 0.162671$ antiHLAclass1^2 denovoDSA +
0.67517 igG + 0.0761179 respiratoryInfection +
0.546237 $\left(\text{antiHLAclass1} + \text{bTF} + \text{dR10}^3\right)$ respiratoryInfection,

$5.1831 \times 10^{-15} + 1.$ b45 $- 1.76774 \times 10^{-16}$ denovoDSA −
1.3488×10^{-16} infectiondatefirst −
2.7308×10^{-16} respiratoryInfection + 1. dQ6 respiratoryInfection −
0.889076 bTF cNIpostRej mMFatRej respiratoryInfection,

$-0.00386146 + 1.00088$ b45 $- 0.00314551$ cNIpostRej +
0.812106 igG − 0.0887777 b59 denovoDSA mMFatRej −
0.342262 hLADRmm respiratoryInfection +
0.133424 infectiondatefirst respiratoryInfection,

$-0.0018011 + 0.0396604$ b45 denovoDSA^2 +
0.907485 igG − 0.451422 respiratoryInfection +
0.120137 infectiondatefirst respiratoryInfection −
0.544955 cNIpostRej^3 mMFatRej respiratoryInfection,

$-0.00482466 + 1.00482$ b45 $+ 0.0655956$ denovoDSA dR51 mMFatRej^2 −
0.775869 respiratoryInfection +
0.321984 infectiondatefirst respiratoryInfection −

0.0142758 infectiondatefirst^2 respiratoryInfection,
0.0100054 + 1.01178 b45 – 0.00622557 denovoDSA +
0.0679847 denovoDSA respiratoryInfection +
0.0656963 hDperiod respiratoryInfection +
0.283782 mMFatRej respiratoryInfection –
0.880263 pyrexia respiratoryInfection,
1.3447×10^{-16} + 1. b45 – 0.445004 respiratoryInfection +
0.0528666 denovoDSA respiratoryInfection –
0.827091 pyrexia respiratoryInfection +
0.917742 $\sqrt{\text{mMFatRej respiratoryInfection}}$,
2.8432×10^{-15} + 1. b45 + 5.09863×10^{-17} denovoDSA –
1.21511×10^{-16} infectiondatefirst +
1.28125×10^{-15} respiratoryInfection + 1. dQ6 respiratoryInfection +
0.465834 bTF mMFatRej^3 respiratoryInfection, 0.00399537 –
0.00362216 denovoDSA + 0.996005 bTF respiratoryInfection +
0.814526 antiHLAclass2 (b45 + igG + 2 respiratoryInfection)$^{1/3}$,
–0.00437312 + 0.00817374 denovoDSA^3 +
0.971678 igG – 1.95774 igG respiratoryInfection –
0.602161 pyrexia respiratoryInfection +
0.58123 hDperiod$^{1/3}$ respiratoryInfection^2, 0.0156963 +
0.984304 b45 – 0.0180016 nS (denovoDSA + maxWBC + pyrexia) +
0.380685 respiratoryInfection + 0.304932 mMFatRej
respiratoryInfection – 0.958991 pyrexia respiratoryInfection,
0.140807 + 0.626654 antiHLAclass1 $\sqrt{\text{denovoDSA}}$ –
0.0603572 infectionCount + 0.000981174 infectionCount^3 –
0.00179096 dSAclass1number mMFatRej^2 –
1.11199 artificialAbortion respiratoryInfection,
–0.0168484 + 0.387512 coaglationnecrosis +
0.21556 antiHLAclass1 denovoDSA + 0.258672 respiratoryInfection +
0.772547 ((c3 + respiratoryInfection) type2DM)$^{1/3}$,
-5.59523×10^{-17} + 1. a25 + 0.994922 respiratoryInfection –
0.994922 artificialAbortion respiratoryInfection +
0.375212 denovoDSA mMFatRej pyrexia respiratoryInfection –
0.479066 mMFatRej pyrexia respiratoryInfection^2,
–0.00323612 + 0.00788174 denovoDSA^3 + 0.971709 igG +
1.00324 bTF respiratoryInfection –
0.0732254 denovoDSA respiratoryInfection +
1.05847 dQ7 respiratoryInfection – 1.64604 igG respiratoryInfection,
0.000251825 + 0.337408 igG + 0.137513 antiHLAclass1 mMFatRej +
1.20951 respiratoryInfection – 0.292821 banfi^2 respiratoryInfection –
0.102653 denovoDSA respiratoryInfection –
0.916943 gynecology respiratoryInfection,
–0.00120798 + 0.187182 antiHLAclass1 denovoDSA + 0.774828 igG +
1.2932 respiratoryInfection – 0.304599 banfi^2 respiratoryInfection –
0.197684 denovoDSA respiratoryInfection –
0.987393 gynecology respiratoryInfection, 0.00417562 +
0.0847118 bTF (11.7554 + denovoDSA) respiratoryInfection +
0.870285 antiHLAclass2 (2 b45 + igG + respiratoryInfection)$^{1/3}$,
–0.0182277 + 0.882019 b45 + 0.0389167 denovoDSA +
0.0804726 hDperiod respiratoryInfection +
0.295459 mMFatRej respiratoryInfection –
0.391652 pyrexia respiratoryInfection –
0.321129 pyrexia^2 respiratoryInfection,
–0.0791036 + 0.0288452 cRPpostRej + 0.0246125 mMFatRej +
0.0144343 denovoDSA mMFatRej preDSA^3 +
0.959129 respiratoryInfection – 0.909035 artificialAbortion
respiratoryInfection – 0.648247 pyrexia respiratoryInfection,
–0.0130064 + 0.042321 c4d denovoDSA^2 + 0.928364 anemia igG +
0.514042 respiratoryInfection + 0.0121641 hDperiod^2
respiratoryInfection – 0.347408 pyrexia^2 respiratoryInfection,
4.78397×10^{-16} + 1. b45 + 5.81949×10^{-17} denovoDSA –
2.34174×10^{-16} mMFatRej + 0.5 denovoDSA pyrexia +
3.46089×10^{-16} respiratoryInfection +
1. cMV respiratoryInfection – 1. pyrexia respiratoryInfection,
–0.00466984 + 0.00771568 denovoDSA^3 + 0.973807 igG +
1.03968 respiratoryInfection – 0.128868 banfi^3 respiratoryInfection –
0.906143 gynecology respiratoryInfection –
1.97328 igG respiratoryInfection, 0.00996278 + 0.990037 b45 –
1.00527×10^{-16} b42^3 bTF denovoDSA mMFatRej +
0.24365 infectiondatefirst respiratoryInfection –

0.135337 banfi infectiondatefirst respiratoryInfection –
0.142629 respiratoryInfection surgery, 0.133061 +
0.558999 antiHLAclass1 $\sqrt{\text{denovoDSA}}$ – 0.0519831 infectionCount +
0.000907072 infectionCount^3 – 0.00838477 mMFatRej –
1.07132 artificialAbortion respiratoryInfection +
0.243933 dSAclass1number respiratoryInfection,

0.00277089 + 0.00791291 denovoDSA^3 dR7 + 0.939541 igG –
0.138736 respiratoryInfection + 0.901191 dR7 respiratoryInfection +
0.112634 infectiondatefirst respiratoryInfection –
0.138736 respiratoryInfection^2,

0.109131 + 0.835915 antiHLAclass1 + 0.0372152 denovoDSA –
0.0559265 infectionCount + 0.000922108 infectionCount^3 –
$\frac{0.07859\ \text{dSAclass1number}}{\text{mMFatRej}^4}$ – 1.03142 artificialAbortion respiratoryInfection,

0.00896561 + 0.00784294 denovoDSA^3 – 0.461405 gynecology +
0.928438 igG + 1.03451 respiratoryInfection –
0.129632 banfi^3 respiratoryInfection –
0.0151186 denovoDSA^3 respiratoryInfection,

–0.00582501 + 0.0359789 dQ7 + 0.00582501 respiratoryInfection +
1. bTF respiratoryInfection – 2.21694 × 10^{-16} denovoDSA
respiratoryInfection + 0.964021 dQ7 respiratoryInfection +
0.166033 b45$^{1/3}$ mMFatRej type2DM,

–0.028448 + 0.753817 igG + 0.0274769 denovoDSA mMFatRej +
1.7883 respiratoryInfection – 0.847442 respiratoryInfection
$\left(\text{gynecology} + \sqrt{\text{igG} + \text{pyrexia}} + \text{respiratoryInfection}\right)$,

–0.0262384 + 0.788862 igG + 0.0278183 denovoDSA mMFatRej –
0.406608 respiratoryInfection +
0.104964 infectiondatefirst respiratoryInfection +
0.0913984 banfi cNIpostRej^2 infectiondatefirst respiratoryInfection^4,

0.0122285 – 0.0276037 denovoDSA + 1.12579 b45 dR7 +
0.933315 igG + 0.761729 dR7 respiratoryInfection +
0.0891492 infectiondatefirst respiratoryInfection –
0.0242436 infectiondatefirst^2 pyrexia respiratoryInfection,

–0.0622855 + 0.496502 coaglationnecrosis +
0.942318 dR15 igG – 0.0107395 preDSA$^{1/9}$ +
0.131567 (antiHLAclass1 + respiratoryInfection + type2DM)^3,

–0.00149047 – 0.00462134 denovoDSA + 0.949136 igG –
0.00624453 cNIpostRej denovoDSA^2 mMFatRej –
0.0185458 respiratoryInfection + 0.761116 bTF respiratoryInfection +
0.00075487 infectiondatefirst^3 respiratoryInfection, –0.00419665 +
0.00797112 denovoDSA^3 – 0.00791981 denovoDSA^3 dQ7 +
1.00399 igG + 1.0042 bTF respiratoryInfection +
1.00372 dQ7 respiratoryInfection – 1.00993 igG respiratoryInfection,

–0.00092296 + 0.0072172 denovoDSA^3 +
0.940621 igG + 0.948481 respiratoryInfection –
0.863732 $\left(\text{gynecology} + \text{igG} + \sqrt{\text{igG} + \text{pyrexia}}\right)$ respiratoryInfection,

–0.0101273 + 0.962079 b45 + 0.0137282 denovoDSA –
0.873488 pyrexia respiratoryInfection –
0.418625 $\sqrt{\text{nS}}$ respiratoryInfection^2 +
0.726521 $\sqrt{\text{mMFatRej respiratoryInfection}}$,

0.00965372 + 0.0228677 denovoDSA^2 + 0.762927 igG +
0.911229 respiratoryInfection –
0.892136 $\left(\text{b45} + \text{gynecology} + \sqrt{\text{igG} + \text{pyrexia}}\right)$ respiratoryInfection,

0.0153692 + 0.688605 igG + 0.451192 denovoDSA pyrexia +
0.885249 respiratoryInfection – 0.90195 pyrexia respiratoryInfection –
0.901612 (enterococcusfaecalis respiratoryInfection)$^{1/3}$ +
0.000160401 wBCpostKTx, –0.0604563 + 0.0778702 denovoDSA +
0.111563 denovoDSA dR7$^{1/3}$ + 0.1057 inflammation +
0.491293 c3 preDSA + 0.521918 dR7$^{1/3}$ respiratoryInfection +
0.0847961 infectiondatefirst respiratoryInfection,

0.00356888 + 0.0272003 (2 antiHLAclass2 + bTF)
$\left(-5.57946 + \text{denovoDSA}^{1/3} + \text{igG}\right)^2$ (b62 + igG + respiratoryInfection),

–0.00422126 + 0.218938 antiHLAclass1 mMFatRej –
0.00716706 antiHLAclass1 banfi denovoDSA mMFatRej +
0.921698 respiratoryInfection – 0.486246 banfi respiratoryInfection +
0.568769 banfi^3 bTF respiratoryInfection^3,

0.0488466 + 0.535019 antiHLAclass1 $\sqrt{\text{denovoDSA}}$ –
0.0264952 infectionCount + 0.00178424 infectionCount^3 –
0.000911839 infectionCount^3

$$\frac{0.0003\ldots\ \text{infectionCount}^3}{\text{mMFatRej}} - 0.00024986\ \text{infectionCount}^3\ \text{mMFatRej},$$

$$-0.00136286 + 0.177257\ \text{antiHLAclass1 denovoDSA} + 0.0939523\ \text{dR15} + 0.629642\ \text{igG} + 0.00136286\ \text{respiratoryInfection} + 0.906048\ \text{dR15 respiratoryInfection} + 0.665332\ (\text{antiHLAclass1} + \text{bTF} + \text{igG})\ \text{respiratoryInfection},$$

$$-0.0445973 + 0.927885\ \text{b45} + \frac{0.0621056}{\text{mMFatRej}} + 0.00483121\ \text{denovoDSA mMFatRej} + 2.22099\ \text{respiratoryInfection} - 0.564112\left(2 + \frac{1}{\text{mMFatRej}^2} + \text{pyrexia}\right)\text{respiratoryInfection},$$

$$0.0170862 - 0.0754318\ \sqrt{-\text{denovoDSA}^{1/3} + \text{denovoDSA}} + 0.42925\ \text{igG} + 0.982914\ \text{bTF respiratoryInfection} + 0.931353\ \text{antiHLAclass2}^2\ (\text{b45} + \text{respiratoryInfection}),$$

$$2.03535 \times 10^{-16} + 1.\ \text{b45} + 0.312251\ \text{respiratoryInfection} - 1.05584\ \text{pyrexia respiratoryInfection} + 0.372057\ \text{mMFatRej respiratoryInfection}^2 - 0.106848\ \text{nS}\ (\text{denovoDSA} + 4\ \text{respiratoryInfection}),$$

$$-0.025837 + 1.05161\ \text{b45} + 0.0812049\ \text{cNIpostRej} + 0.0847938\ \text{feverOnly} + 1.00794\ \text{respiratoryInfection} - 0.244861\ \text{feverOnly hLAmm respiratoryInfection} + 0.0175818\ \text{dQ2 dSAandHSAclass1}^4\ \text{mMFatRej respiratoryInfection},$$

$$-0.0373975 + 0.899552\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} - 0.199416\ \text{antiHLAclass1 denovoDSA} + 0.00171339\ \text{infectionCount}^3 - \frac{0.000942304\ \text{infectionCount}^3}{\text{mMFatRej}} - 0.000290615\ \text{infectionCount}^3\ \text{mMFatRej},$$

$$0.00790722 + 0.00799511\ \text{b45}^3\ \text{denovoDSA}^3 + 0.814134\ \text{igG} + 1.07487\ \text{respiratoryInfection} - 0.120991\ \text{denovoDSA respiratoryInfection} - 1.08278\ \text{enterococcusfaecalis respiratoryInfection} - 0.941442\ \text{pyrexia}^{1/3}\ \text{respiratoryInfection},$$

$$-0.00280763 + 0.0394244\ \text{anemia denovoDSA}^2 + 0.923959\ \text{anemia igG} + 1.03841\ \text{respiratoryInfection} + 0.176882\ (-\text{banfptc} + \text{igG})\ \text{respiratoryInfection} - 0.595924\ \sqrt{\text{pyrexia}}\ \text{respiratoryInfection}^2,$$

$$0.000224081 + 0.999776\ \text{b45} + 0.999776\ \text{bTF respiratoryInfection} + 0.316397\ \text{dQ7 mMFatRej respiratoryInfection} + 0.00495564\ \text{denovoDSA}^2\ \text{dQ7 mMFatRej}^2\ (2 + \text{pregnancyhistory})\ \text{respiratoryInfection}^2,$$

$$-0.00469994 + 0.997065\ \text{b45} + 0.00218134\ \text{denovoDSA} + 0.00854043\ \text{mMFatRej}^3\ \text{pyrexia}^3 + 0.998646\ \text{respiratoryInfection} - 0.993946\ \text{pastanemia respiratoryInfection} - 1.06335\ \text{pyrexia}^3\ \text{respiratoryInfection}^2,$$

$$-0.0391179 + 0.494889\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} + 0.287395\ \text{igG} + 0.00114046\ \text{infectionCount}^3 - \frac{0.000687653\ \text{infectionCount}^3}{\text{mMFatRej}} - 0.0000360477\ \text{infectionCount}^3\ \text{mMFatRej}^2,$$

$$0.0133599 + 0.447252\ \text{antiHLAclass1 banfi} - 0.384482\ \text{gynecology} + 0.984471\ \text{igG} - 0.00790862\ \text{denovoDSA}^3\ \text{respiratoryInfection} - 0.252839\ \text{banfi}^2\ \text{respiratoryInfection}^2 + 0.995084\ \text{respiratoryInfection}^3,$$

$$1.77355 \times 10^{-16} + 1.\ \text{b45} - 0.351792\ \text{respiratoryInfection} + 0.121652\ \text{infectiondatefirst respiratoryInfection} + 0.500227\ \text{bTF respiratoryInfection}^2 + 0.350459\ \sqrt{\text{denovoDSA dR51 mMFatRej respiratoryInfection}},$$

$$0.00427252 + 0.995727\ \sqrt{\text{a25}} - 0.000756763\ \text{infectiondatefirst}^3\ \text{respiratoryInfection}^{0.12785} - 0.352939\ \text{banfi respiratoryInfection} + 0.223205\ \text{infectiondatefirst respiratoryInfection} - 0.0000170892\ \text{denovoDSA infectiondatefirst mMFatRej respiratoryInfection},$$

$$1.52177 \times 10^{-16} + 1.\ \text{b45} + 2.31967 \times 10^{-16}\ \text{denovoDSA} + 1.\ \text{respiratoryInfection} - 2.44141\ \text{mMFatRej}^2\ \text{pastanemia respiratoryInfection} + 0.351207\ \text{pyrexia respiratoryInfection} - 1.35121\ (\text{pyrexia respiratoryInfection})^{1/3},$$

$$-0.00283704 + 1.00284\ \text{b45} + 0.00283704\ \text{pyrexia} + 0.198362\left(2 + \text{bTF} + \text{denovoDSA}^{0.344715} + \text{mMFatRej}\right)\ \text{respiratoryInfection} - 0.356071\ \text{nS respiratoryInfection} - 0.783484\ \text{pyrexia respiratoryInfection},\ -0.0117005 + 1.0117\ \text{b44 dR7}^3 + 1.00452\ \text{igG} - 0.0582882\ \text{denovoDSA respiratoryInfection} + 0.897599\ \text{dR7 respiratoryInfection} + 0.0254793\ \text{infectiondatefirst}^2\ \text{respiratoryInfection} - 0.00147944\ \text{infectiondatefirst}^3\ \text{respiratoryInfection},$$

$$-0.0404394 + 0.0701339\ \text{denovoDSA} + 0.150999\ \text{dSAandHSAclass1} + 0.234488\ \text{igG} + 0.116698\ \text{respiratoryInfection} +$$

$$
\begin{aligned}
&0.923741\ \text{bTF respiratoryInfection} + \\
&0.754111\ \text{dQ7}\left((-\text{igG} + \text{respiratoryInfection})^2\right)^{1/3}, \\
&2.87823\times 10^{-16} + 1.\ \text{a25} + 0.999911\ \text{respiratoryInfection} - \\
&0.999911\ \text{artificialAbortion respiratoryInfection} + \\
&0.0000146933\ \text{denovoDSA dP5}^2\ \text{mMFatRej respiratoryInfection} - \\
&0.991172\ \text{pyrexia}^{1/27}\ \text{respiratoryInfection}^2, \\
&-0.00344367 + 0.968361\ \text{igG} + 0.000736936\ \text{mMFatRej} + \\
&0.00718101\ \text{cNIpostRej}^4\ \text{denovoDSA}^2\ \text{mMFatRej} - \\
&0.0209709\ \text{respiratoryInfection} + 0.760819\ \text{bTF respiratoryInfection} + \\
&0.000765729\ \text{infectiondatefirst}^3\ \text{respiratoryInfection}, \\
&-0.00498871 + 0.00797471\ \text{denovoDSA}^3 - \\
&0.00259905\ \text{denovoDSA}^4\ \text{dQ7} + 0.993882\ \text{igG} + \\
&1.00499\ \text{bTF respiratoryInfection} + 0.995549\ \text{dQ7 respiratoryInfection} - \\
&0.356876\ \text{igG}^2\ \text{respiratoryInfection}, \\
&-0.00608308 + 0.0080597\ \text{denovoDSA}^3 + 0.973844\ \text{igG} + \\
&0.514547\ \text{denovoDSA pyrexia} + 1.007\ \text{respiratoryInfection} - \\
&0.036239\ \text{banfct}^3\ \text{respiratoryInfection} - \\
&1.94598\ \text{igG respiratoryInfection} - 1.00091\ \text{pyrexia respiratoryInfection}, \\
&0.00169431 - 0.00873464\ \text{denovoDSA}^{1/3} + 0.0016023\ \text{denovoDSA}^4 + \\
&0.99099\ \text{igG} + 0.0000887758\ \text{respiratoryInfection} + \\
&0.998217\ \text{bTF respiratoryInfection} + \\
&0.968828\ \text{dQ7 respiratoryInfection} - 1.9481\ \text{igG respiratoryInfection}, \\
&-0.0259674 + 0.937396\ \text{b45} + 0.0328095\ \sqrt{\text{denovoDSA}} + \\
&0.00500254\ \text{mMFatRej} + 0.912813\ \text{respiratoryInfection} - \\
&0.615624\ \sqrt{\text{banfi}}\ \text{respiratoryInfection} - \\
&0.379637\ \sqrt{\text{hLADRmm}}\ \text{respiratoryInfection} + \\
&0.100035\ \text{infectiondatefirst respiratoryInfection}, \\
&-0.00277128 + 0.0351486\ \text{denovoDSA} + \\
&0.182358\ \text{dSAandHSAclass1} - 0.0404765\ \text{dSAandHSAclass2} + \\
&0.0165409\ \text{respiratoryInfection} + 0.98623\ \text{bTF respiratoryInfection} + \\
&0.91368\ \text{dQ7}\ (\text{igG} + \text{respiratoryInfection})^{1/9}, \\
&-0.016757 + 0.662293\ \text{b45} + 0.0218269\ \text{denovoDSA}^2 + \\
&0.0253165\ \text{dSAandHLAclass1pre} + 0.0840305\ \text{respiratoryInfection}^{1/3} + \\
&0.932726\ \text{bTF respiratoryInfection} + \\
&0.125795\ \text{dQ7}^2\ \text{mMFatRej}^2\ \text{respiratoryInfection}^3, \\
&0.00195547 + 0.140994\ \text{antiHLAclass1 denovoDSA} + \\
&0.897893\ \text{igG} + 0.0184658\ \sqrt{\text{respiratoryInfection}} + \\
&0.866784\ \sqrt{(\text{antiHLAclass1} + \text{bTF}^3 + \text{dR15})\ \text{respiratoryInfection}}, \\
&1.36922\times 10^{-17} + 1.\ \text{b45} + 3.11311\times 10^{-16}\ \text{respiratoryInfection} + \\
&1.\ \text{bTF respiratoryInfection} + 1.\ \text{dQ8}^2\ \text{respiratoryInfection}^2 - \\
&8.53337\times 10^{-17}\ \sqrt{\text{denovoDSA}^2\ \text{mMFatRej respiratoryInfection}}, \\
&0.00984011 + 1.01896\ \text{b45} - 0.0287982\ \text{banfct} - 0.275122\ \text{nS} \\
&\quad \text{respiratoryInfection} - 1.03568\ \text{pyrexia respiratoryInfection} + \\
&0.242787\ \text{respiratoryInfection}\left(\text{bTF} + \text{denovoDSA}^{0.344715} + \right. \\
&\qquad \left. \text{mMFatRej} + \text{pyrexia} + \text{respiratoryInfection}\right), -0.00160392 + \\
&1.0016\ \text{b45} + 0.728088\ (-10 - \text{denovoDSA})\ \text{respiratoryInfection} - \\
&0.710027\ \text{infectiondatefirst respiratoryInfection} + \\
&0.00848883\ \text{mMFatRej respiratoryInfection} + \\
&4.67913\ \text{respiratoryInfection} \\
&\quad \sqrt{\text{denovoDSA} + \text{infectiondatefirst} + \text{respiratoryInfection}}, \\
&-0.00467848 + 0.978306\ \text{b45} + 0.0527446\ \text{igG} + \\
&0.421512\left(2\,\text{bTF} + \text{denovoDSA}^{1/9} + \text{dQ7} + \frac{\text{bTF}}{\text{mMFatRej}}\right)\text{respiratoryInfection}, \\
&-0.0101752 + 0.902617\ \text{igG} + 0.00588394\ \text{denovoDSA}^2\ \text{mMFatRej} + \\
&0.756901\ \text{cNIpostRej respiratoryInfection} + \\
&0.0845281\ \text{infectiondatefirst respiratoryInfection} - \\
&0.250599\ \text{igG mMFatRej respiratoryInfection} - \\
&0.231953\ \text{cNIpostRej}^3\ \text{infectiondatefirst respiratoryInfection}^2, \\
&4.47206\times 10^{-16} + 1.\ \text{b45} - 1.02889\ \text{respiratoryInfection} + \\
&0.816862\ \sqrt{\text{banfi}}\ \text{respiratoryInfection} + \\
&0.780446\ \sqrt{\text{bTF}}\ \text{respiratoryInfection} + \\
&0.185024\ \text{denovoDSA respiratoryInfection} + \\
&0.732714\ \text{mMFatRej respiratoryInfection} - \\
&0.398152\ \text{banfi mMFatRej respiratoryInfection}, \\
&0.000638257 + 0.877474\ \text{igG} + 0.000122067\ \text{denovoDSA}^2\ \text{mMFatRej}^3 - \\
&0.451371\ \text{respiratoryInfection} + \\
&0.114067\ \text{infectiondatefirst respiratoryInfection} + \\
&0.144176\ \text{cNIpostRej}^4\ \text{infectiondatefirst respiratoryInfection} + \\
&0.0244454\ \text{denovoDSA mMFatRej respiratoryInfection},
\end{aligned}
$$

$$0.00258231 + 0.87316\,\text{igG} + 0.156258\,\text{respiratoryInfection} + 0.92117\,\text{cNIpostRej respiratoryInfection} + 0.060973\,\text{infectiondatefirst respiratoryInfection} - 0.041424\,\text{cNIpostRej}^3\left(\text{denovoDSA}^2 + \text{infectiondatefirst}^2\,\text{respiratoryInfection}\right),$$

$$0.0126972 - 0.0320027\,\text{banfct}^3 - 0.0634441\,\text{denovoDSA} + 0.0517983\,\text{denovoDSA}^2 + 1.07516\,\text{igG} + 0.959732\,\text{respiratoryInfection} - 1.99332\,\text{igG respiratoryInfection} - 0.916396\,\text{pyrexia}^{1/6}\,\text{respiratoryInfection},\ 1.55171 - \frac{4.67473}{3-\text{denovoDSA}^{1/3}+\text{denovoDSA}+3\,\text{igG}+7\,\text{bTF respiratoryInfection}+4.60052\,\text{dQ7 respiratoryInfection}},\ 0.0347638 + 1.00076\,\text{antiHLAclass1} + 0.0284504\,\text{denovoDSA} - 0.0257714\,\text{infectionCount} + 0.00178408\,\text{infectionCount}^3 - \frac{0.536249\,\text{antiHLAclass1}}{\text{mMFatRej}} - \frac{0.000896854\,\text{infectionCount}^3}{\text{mMFatRej}} - 0.000275128\,\text{infectionCount}^3\,\text{mMFatRej},$$

$$-0.0130682 + 0.0372646\,\text{denovoDSA}^2 + 0.86048\,\text{igG} - 0.856933\,\text{respiratoryInfection} + 0.999196\left(1 + \text{bTF} + \text{denovoDSA}^{1/3} + \text{igG}\right)\text{respiratoryInfection} - 0.138919\,(\text{denovoDSA} + \text{pyrexia})^2\,\text{respiratoryInfection},$$

$$1.06444 - \frac{0.086169}{2\,\text{b45}+\text{igG}+\frac{4}{49+\text{denovoDSA}+\text{igG}}+\text{bTF respiratoryInfection}+\text{dQ7 respiratoryInfection}},$$

$$-0.00265144 + 0.709839\left(\left(\text{b45} + 2\,\text{bTF} + \text{dQ7} + \frac{\text{denovoDSA}}{\text{mMFatRej}}\right)(\text{b45} + \text{respiratoryInfection})\right)^{1/3},$$

$$2.40187\times10^{-15} + 1.\,\text{b45} + 2.26152\times10^{-16}\,\text{denovoDSA} + 0.00227475\,\text{denovoDSA mMFatRej}^3\,\text{pyrexia}^2 - 8.55971\times10^{-17}\,\text{mMFatRej}^3\,\text{pyrexia}^3 + 1.\,\text{respiratoryInfection} - 1.\,\text{pastanemia respiratoryInfection} - 1.\,\text{pyrexia respiratoryInfection},$$

$$-0.0000617723 - 0.000800041\,\text{denovoDSA}^4\,(-\text{birthhistory} + \text{dP11}) + 1.00006\,\text{igG} + 0.99984\,\text{bTF respiratoryInfection} + 0.99922\,\text{dQ7 respiratoryInfection} - 0.499236\,\text{igG respiratoryInfection} + 6.46379\times10^{-7}\,\text{infectiondatefirst}^3\,\text{respiratoryInfection}^3,$$

$$5.80469\times10^{-16} + 1.\,\text{b45} - 1.42539\,\text{respiratoryInfection} - 0.0979823\,\text{infectiondatefirst respiratoryInfection} + 0.415013\,\text{bTF mMFatRej respiratoryInfection} + 0.9736\,\text{respiratoryInfection}^2\sqrt{\text{denovoDSA} + \text{infectiondatefirst} + \text{dR7 respiratoryInfection}},$$

$$0.00434937 + 0.013688\,\text{antiHLAclass1}^3 + 0.657917\,(\text{antiHLAclass1 denovoDSA})^{1/3} - 0.000625433\,\text{artificialAbortion infectionCount}^3 + \frac{0.0000115683\,\text{infectionCount}^3}{\text{mMFatRej}} - 1.57836\,\text{respiratoryInfection} + 0.219828\,\text{infectionCount respiratoryInfection},$$

$$0.0137465 + 0.986253\,\text{b45} - 0.213072\,\text{pyrexia}^2 + 2.55623\,\text{respiratoryInfection} + 0.19819\sqrt{\text{mMFatRej respiratoryInfection}} + 0.563192\,\text{respiratoryInfection}\left(-5.65781 + \text{bTF} + \text{denovoDSA}^{0.344715} + \text{respiratoryInfection}\right),$$

$$0.0010498 + 1.00735\left((\text{antiHLAclass2} + \text{bTF} + \text{bTF cNIpostRej preDSA})(\text{b62} + \text{igG} + \text{respiratoryInfection})^{1/3}\right)^{1/3},$$

$$-0.0144526 + 0.00815362\,\text{denovoDSA}^3 + 1.96036\,\text{igG} + 0.147697\,\text{pyrexia}^3 + 1.98476\,\text{respiratoryInfection} - 0.0357949\,\text{banfct}^3\,\text{respiratoryInfection} - 1.09507\,\text{pyrexia respiratoryInfection} - 0.978517\,(\text{igG} + \text{respiratoryInfection})^2,$$

$$-2.31654\times10^{-18} + 1.\,\text{b45} + 4.42065\,\text{respiratoryInfection} - 0.0806294\,\text{mMFatRej pyrexia respiratoryInfection} - 0.271304\,\sqrt{\text{denovoDSA respiratoryInfection}} + 0.919659\,\text{respiratoryInfection}\left(-5.65781 + \text{bTF} + \text{denovoDSA}^{0.344715} + \text{respiratoryInfection}\right),$$

$$0.0880795 + 1.01523\,\text{antiHLAclass1} + 0.029332\,\text{denovoDSA} - 0.0514032\,\text{infectionCount} + 0.00192704\,\text{infectionCount}^3 - \frac{0.551305\,\text{antiHLAclass1}}{\text{mMFatRej}} - \frac{0.0000767395\,\text{infectionCount}^4}{\text{mMFatRej}} - 0.000268173\,\text{infectionCount}^3\,\text{mMFatRej},$$

$$1.00706 - \frac{8.36163}{8+\text{denovoDSA}+\text{igG}+8\,(\text{bTF}+\text{igG}+\text{mFImax})\,(\text{b45}+\text{igG}+2\,\text{respiratoryInfection})},\ 1. + \frac{1.36189\times10^{-9}}{2\,\text{b45}+\text{igG}+\text{bTF respiratoryInfection}+\text{dQ7 respiratoryInfection}-\frac{1}{7.34272\times10^{8}+\text{denovoDSA}+\text{respiratoryInfection}}},$$

$$-0.00402688 + 0.00076238\,\text{cNIpostRej}^3 + 0.967525\,\text{igG} + 0.00116966\,\text{cNIpostRej denovoDSA}^2\,\text{mMFatRej} + 0.00860787\,\text{cNIpostRej}^4\,\text{denovoDSA}^2\,\text{mMFatRej} + 0.745934\,\text{bTF respiratoryInfection} +$$

$$\begin{array}{l}
\quad 0.000753932\ \text{infectiondatefirst}^3\ \text{respiratoryInfection},\\
0.00159371 + 1.00422\ \text{b45} + 1.02521\ \text{respiratoryInfection} -\\
\quad 0.306716\ \text{feverOnly hLAmm respiratoryInfection} -\\
\quad 0.00424261\ \text{cNIpostRej feverOnly}^3\ \text{mMFatRej}\\
\qquad (\text{infectionCount} - \text{naturalAbortion})\ \text{respiratoryInfection}^4 -\\
\quad 0.00591134\ \text{type2DM} + 0.0000117165\ \text{wBCpeakover5}^3,\\
-0.00383362 + 0.00777797\ \text{denovoDSA}^3 + 0.952518\ \text{igG} +\\
\quad 10.3208\ \text{respiratoryInfection} - 0.20063\ \text{denovoDSA}\\
\qquad \text{respiratoryInfection} + 1.14687\ \text{dR7 respiratoryInfection} -\\
\quad 11.5742\ \text{infectiondatefirst}^{1/3}\ \text{respiratoryInfection} +\\
\quad 2.34123\ \text{infectiondatefirst respiratoryInfection} -\\
\quad 0.0743924\ \text{infectiondatefirst}^2\ \text{respiratoryInfection},\\
0.00491073 + 0.995089\ \text{b45} - 0.152233\ (\text{b45} + \text{banfct} + \text{denovoDSA})\ \text{nS} +\\
\quad 0.187517\ \text{respiratoryInfection} - 0.946048\ \text{pyrexia respiratoryInfection} +\\
\quad 0.191141\ \text{respiratoryInfection}\ \left(\text{bTF} + \text{denovoDSA}^{0.344715} +\right.\\
\qquad \left.\text{mMFatRej} + \text{pyrexia} + \text{respiratoryInfection}\right),\\
-1.48554 \times 10^{-17} + 1.\ \text{b45} - 1.01285\ \text{respiratoryInfection} +\\
\quad 0.371159\ \text{bTF mMFatRej respiratoryInfection} +\\
\quad 0.478795\ \text{dR7 respiratoryInfection}^2 + 0.579818\ \text{respiratoryInfection}^2\\
\qquad \sqrt{\text{denovoDSA} + \text{infectiondatefirst} + \text{dR7 respiratoryInfection}}\ ,\\
-0.0319558 + 0.478618\ \text{antiHLAclass1}\ \sqrt{\text{denovoDSA}} -\\
\quad 0.00112965\ \text{denovoDSA dSAclass1number} +\\
\quad 0.00151527\ \text{infectionCount}^3 -\\
\qquad \frac{0.000854125\ \text{infectionCount}^3}{\text{mMFatRej}} + 0.0818555\ \text{igG mMFatRej} -\\
\quad 0.000208582\ \text{infectionCount}^3\ \text{mMFatRej} - 0.0854259\ \text{pyrexia},\\
0.00859282 + 0.991407\ \text{b45} - 0.266378\ (\text{b45} + \text{banfct} + \text{denovoDSA})\ \text{nS} +\\
\quad 0.266025\ \text{respiratoryInfection} -\\
\quad 1.04375\ \text{pyrexia respiratoryInfection} + 0.218168\ \text{respiratoryInfection}\\
\qquad (\text{bTF} + \text{mMFatRej} + \text{nS}^{0.172358} + \text{pyrexia} + \text{respiratoryInfection}),\\
5.96957 \times 10^{-6} + 0.956131\ ((2\ \text{antiHLAclass2} + \text{bTF})\ (16 + \text{denovoDSA})\\
\qquad (\text{b62} + \text{igG} + \text{respiratoryInfection}))^{1/81}\Big\},\ 0.7\Big]
\end{array}$$

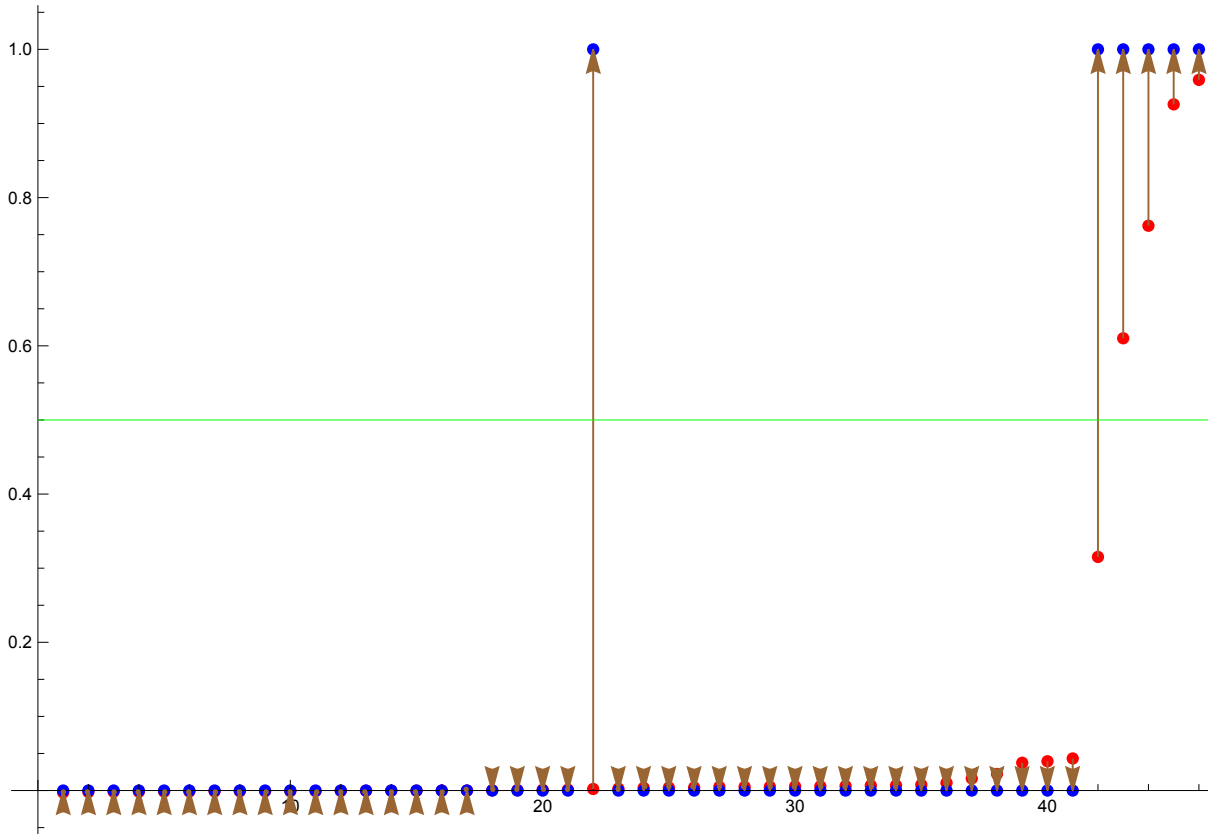
Error	37	0.00877239	0.000237092
Total	38	5.07692	

□Phase 7 Verification of Prediction according to Observation

◆ 1. Comparison Between Predicted values(Red) and Observed ones(Blue)

◇ Non-numeric cells were replaced with median values of the row.

◆ The 14 empty cells in the training data were replaced with appropriate numbers.



	1 Observed	0 Observed	Total
1 Predicted	9	0	9
0 Predicted	2	40	42
Total	11	40	51

◇ **Precision 100.%、Recall 81.82%**

◇ **Accuracy 96.08%**

◆ **c-Statistics = 0.9568 (95.68 %)**

◆ **2. Training Data File**
with Predicted values and Observed values

□ **The ANALYZED training data with PREDICTED values and OBSERVED targeted values are exported as BuildModelData2018728192443.xlsx.**

◇ The ANALYZED training data with PREDICTED values and OBSERVED targeted values are expressed as JOINEDDATA and JOINEDITEMS.

◆ The end of the whole analysis

Epoch 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10: Final Result with quality box values: {50, 0.1}

Retrieval from all models created with complexity < 50 and error < 0.1

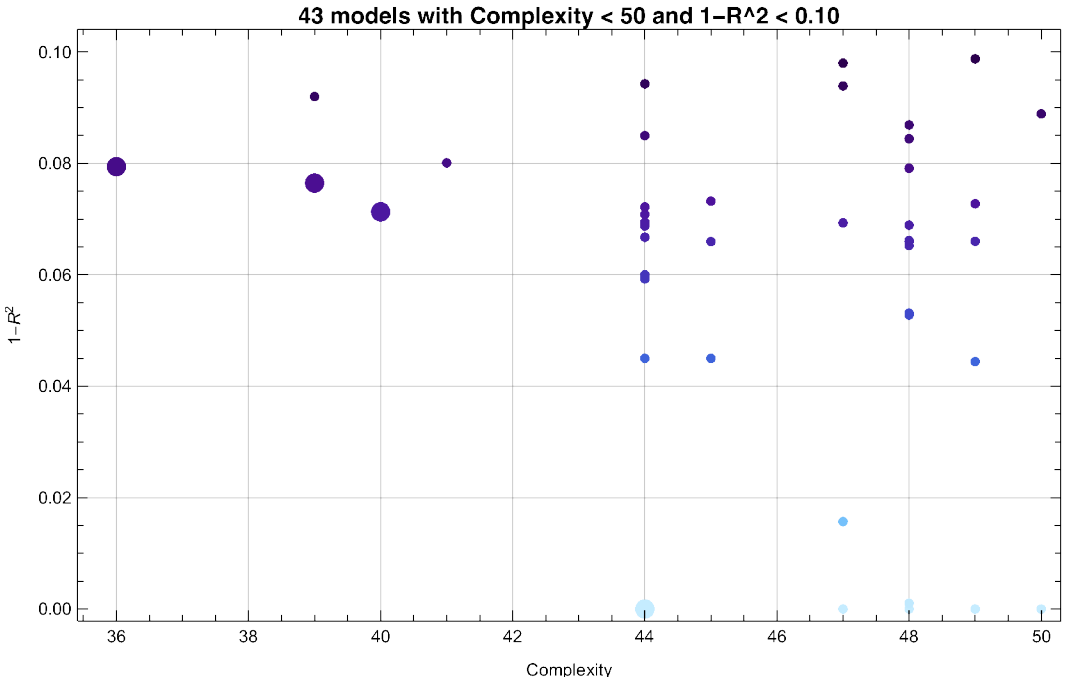
```
In[•]:= ARModels = RetrieveModelSets[
          ProjectName → "PredictGraftLoss"
        ];

In[•]:= bestmodels = CreateModelEnsemble[
          ARModels,
          QualityBox → {50, 0.1},
          SelectionStrategy → Automatic,
          SelectionSize → 115,
          PlotLabel → LabelForm@"Random Models"
        ];

In[•]:= bestimage = ParetoFrontPlot[bestmodels,
          PlotLabel → LabelForm[{Length@bestmodels[[1]],
             "models with Complexity < 50 and 1-R^2 < 0.10"}, Joined → True],
          ImageSize → 550
        ];
```

43 ideal approximate functions

```
In[•]:= Print[bestimage]
```



In[•]:=
```
ModelSelectionReport[
 bestmodels1 = CreateModelEnsemble[
   ARModels,
   QualityBox → {50, 0.1},
   SelectionStrategy → Automatic,
   SelectionSize → 115,
   PlotLabel → LabelForm@"Random Models"
  ]
]
```

Out[•]=

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graftLoss

	Complexity	$1-R^2$	Function
31	48	0.066	$-(1.19\times10^{-2})+0.88\,\text{igG}+(8.37\times10^{-2})\,\text{infectiondatefirst respiratoryInfection}+(8.13\times10^{-3})\,\text{denovoDSA}^3\,b_{44}+0.76\,\text{respiratoryInfection}\,dR_7$
32	48	0.066	$8.40\times10^{-3}+(1.56\times10^{-2})\,\text{denovoDSA}^2\,\text{respiratoryInfection}+0.40\,\text{mMFatRej respiratoryInfection}-0.93\,\text{pyrexia respiratoryInfection}+0.99\,b_{45}$
33	48	0.069	$-(1.18\times10^{-2})+0.90\,\text{igG}+(8.34\times10^{-2})\,\text{infectiondatefirst respiratoryInfection}+(8.05\times10^{-3})\,\text{denovoDSA}^3\,dR_7+0.73\,\text{respiratoryInfection}\,dR_7$
34	48	0.079	$-(1.91\times10^{-2})+(1.29\times10^{-2})\,\text{cNIpostRej}+(8.71\times10^{-2})\,\text{infectiondatefirst respiratoryInfection}+1.03\,b_{45}+(5.86\times10^{-2})\,\text{denovoDSA mMFatRej}^2\,dR_{51}$
35	48	0.084	$1.52\times10^{-2}+0.68\,\text{igG}+0.98\,\text{bTF respiratoryInfection}+0.84\,\text{respiratoryInfection}\,dQ_7+(1.19\times10^{-2})\,\text{denovoDSA dSAandHSAclass}_1{}^2$
36	48	0.087	$1.23\times10^{-2}-(1.03\times10^{-4})\,\text{denovoDSA mMFatRej}^2+0.44\,\text{mMFatRej respiratoryInfection}-1.01\,\text{pyrexia respiratoryInfection}+1.00\,b_{45}$
37	49	0.000	$-(5.74\times10^{-16})-(2.83\times10^{-16})\,\text{denovoDSA}+(2.88\times10^{-17})\,\text{mMFatRej}+1.00\,\text{bTF respiratoryInfection}+1.00\,b_{45}+1.00\,\text{respiratoryInfection}\,dQ_6$
38	49	0.044	$-(2.84\times10^{-2})+(2.23\times10^{-2})\,\text{denovoDSA}+(7.69\times10^{-3})\,\text{mMFatRej}+0.92\,\text{cMV respiratoryInfection}-0.62\,\text{pyrexia respiratoryInfection}+0.91\,b_{45}$
39	49	0.066	$-(1.50\times10^{-2})+(3.32\times10^{-2})\,\text{denovoDSA}+0.25\,\text{respiratoryInfection}+0.31\,\text{mMFatRej respiratoryInfection}-0.88\,\text{pyrexia respiratoryInfection}+0.90\,b_{45}$
40	49	0.073	$-(1.04\times10^{-2})+(7.53\times10^{-4})\,\text{denovoDSA}+0.90\,\text{igG}+(8.23\times10^{-2})\,\text{infectiondatefirst respiratoryInfection}+0.84\,(\text{respiratoryInfection}+b_{44})\,dR_7$
41	49	0.099	$6.80\times10^{-3}-(1.23\times10^{-2})\,\text{mMFatRej}+0.98\,\text{respiratoryInfection}-0.22\,\text{feverOnly hLAmm respiratoryInfection}+1.02\,b_{45}+(2.06\times10^{-2})\,\text{wBCpeakover}_5$
42	50	0.000	$-(4.22\times10^{-17})+(2.28\times10^{-17})\,\text{bTF denovoDSA mMFatRej}+1.00\,b_{45}+1.00\,\text{respiratoryInfection}\,(\text{bTF}+dQ_7)^3$
43	50	0.089	$9.59\times10^{-3}+(1.36\times10^{-2})\,\text{aerobicGNR cNIpostRej hLAmm mMFatRej}+0.96\,\text{respiratoryInfection}-0.21\,\text{feverOnly hLAmm respiratoryInfection}+1.26\,b_{45}$

The optimized model that is a trimmed mean of 43 ideal functions

In[•]:=
```
phenotype = ModelPhenotype[bestmodels];
```

In[•]:=
```
phenotype
```

In[•]:=
```
CreateStandaloneModel[
   model : (_GPModel | _ModelEnsemble), opts___?OptionQ] := Module[
   {inputVars, expression},
   inputVars = DataVariables /. {opts} /. ModelPersonality@model;
   expression = ModelPhenotype[model, opts];
   Function @@ {inputVars, expression}
  ];
```

```
In[•]:= createdModel = CreateStandaloneModel[ bestmodels];

In[•]:= createdModel

Out[•]= Function[ {rMale, rage, infectionCount, feverOnly, pyrexia, inflammation,
    virusInfection, cMV, anemia, heartDisease, respiratoryInfection,
    upperRespiratoryInfection, upperDigestivetract, diarrhea, uTI, wBCinUrine,
    wBCpeakover10, urology, skin, woundInfection, herpesZoster, orthopedics,
    ascites, surgery, aerobicGPC, aerobicGNR, candida, staphylococcusaureus,
    streptococcusaureus, enterobacteraerogenes, enterobactereclacue,
    enterococcusfaecalis, citobacterdiversus, pseudomonas, infectiondatefirst,
    infectiondatelast, asthma, pastanemia, infarctionhemohorrage, calcification,
    digestiveorgan, appendicitis, polyp, ulcer, gERD, pastheart, kidney,
    pastliverbilialy, hBV, hCV, stone, hypothyroidism, gynecology, ocular, allergy,
    hypertention, type2DM, bTF, timeoftransplantation, regraft, aBOI, hLAABmm,
    hLADRmm, hLAmm, pRAclass1pre, pRAclass2pre, pRAclass1after, pRAclass2after,
    mFImax, twinpeak, dSAclass1, dSAclass1number, dSAclass2, dSAclass2number,
    preDSA, denovoDSA, antiHLAclass1, hSAclass1number, antiHLAclass2,
    hSAclass2number, dSAandHSAclass2, dSAandHSAclass1, dSAandHLAclass2pre,
    dSAandHLAclass1pre, a23, a25, a26, a32, a34, a66, b13, b18, b27, b35, b37,
    b38, b42, b44, b45, b47, b49, b50, b51, b52, b53, b54, b55, b56, b57, b58, b59,
    b61, b62, b63, b7, b71, b73, b75, b77, b78, b8, b82, cw17, cw6, cw9, dP10, dP11,
    dP13, dP14, dP15, dP17, dP18, dP19, dP20, dP3, dP4, dP5, dP6, dP9, dQ11, dQ2,
    dQ4, dQ5, dQ6, dQ7, dQ8, dQ9, dR1, dR10, dR103, dR11, dR12, dR13, dR14, dR15,
    dR16, dR17, dR18, dR4, dR51, dR52, dR53, dR7, dR8, dR9, pregnancyhistory,
    birthhistory, naturalAbortion, artificialAbortion, hDperiod, cGN, igA, nS,
    hypoplastickidney, malignantHypertention, banfi, banft, banfg, banfv,
    banfci, banfct, banfcv, banfcg, banfptc, banfptcbm, banfah, banfaah,
    interstitialHemorrhage, cellInvasion, lymphinvasion, thrombusformation,
    coaglationnecrosis, •igA, igM, igG, sABC1q, c3, c4d, c5b, bulbarsclerosis,
    cRPpreRej, cRPpostRej, wBCpeakover5, maxCRP, wBCpreRej, wBCpostKTx,
    wBCpeakover9postRej, maxWBC, mMFpostRej, mMFatRej, cNIpostRej, graftLoss},
   MedianAverage[{-0.0196015 + 1.0196 b45 + 0.102837 denovoDSA dR51 mMFatRej +
      0.0873113 infectiondatefirst respiratoryInfection,
     -0.0154699 + 1.01547 b45 + 0.0866031 infectiondatefirst respiratoryInfection +
      0.105318 denovoDSA dR51 mMFatRej respiratoryInfection,
     -0.020488 + 1.02049 b45 + 0.0614038 denovoDSA dR51 mMFatRej^2 +
      0.0867739 infectiondatefirst respiratoryInfection,
     -3.93615 × 10^-16 + 1. b45 + 2.24951 × 10^-17 denovoDSA + 1. antiHLAclass2
       respiratoryInfection + 0.775194 bTF mMFatRej respiratoryInfection,
     -0.0251796 + 0.21033 denovoDSA dR7 + 0.103397 denovoDSA igG mMFatRej +
      0.0882967 infectiondatefirst respiratoryInfection,
     -0.00357207 + 0.884381 b45 + 0.0340547 denovoDSA + 0.421841 mMFatRej
       respiratoryInfection - 0.970064 pyrexia respiratoryInfection,
     0.00826446 + 0.661157 b45 + 0.330579 igG preDSA +
      0.991736 bTF respiratoryInfection + 0.991736 dQ7 respiratoryInfection,
     -9.74248 × 10^-16 + 1. b45 + 2.77027 × 10^-17 denovoDSA mMFatRej +
      1. (bTF + dQ7)^3 respiratoryInfection, 0.00561418 + 0.994386 b45 -
```

0.522603 denovoDSA nS + 0.502314 mMFatRej respiratoryInfection −
1.14818 pyrexia respiratoryInfection, 0.00826446 + 0.661157 b45 +
0.330579 igG preDSA + 0.991736 (b45 + bTF + dQ7) respiratoryInfection,
−0.0123065 + 0.808211 igG − 0.0309738 cNIpostRej denovoDSA mMFatRej −
0.368291 hLADRmm respiratoryInfection +
0.136438 infectiondatefirst respiratoryInfection,
-4.07673×10^{-16} + 1. b45 + 7.87117×10^{-18} denovoDSA + 1. dQ7 respiratoryInfection +
0.775194 bTF mMFatRej respiratoryInfection^2, 0.0110172 +
0.199846 b63 denovoDSA + 0.563669 igG + 0.988983 bTF respiratoryInfection +
0.876249 dQ7 respiratoryInfection, −0.00440546 + 1.00441 b45 +
0.502203 cGN dQ7 preDSA + 0.957178 (0.0480144 + bTF + dQ7) respiratoryInfection,
-5.73625×10^{-16} + 1. b45 − 2.82564×10^{-16} denovoDSA + 2.88317×10^{-17} mMFatRej +
1. bTF respiratoryInfection + 1. dQ6 respiratoryInfection, −0.0103658 +
0.199722 b61 denovoDSA + 0.90498 igG + 0.773247 dR7 respiratoryInfection +
0.0790395 infectiondatefirst respiratoryInfection, −0.021433 + 0.898361 b45 +
0.0351634 denovoDSA + 0.628137 $\sqrt{\text{mMFatRej}}$ respiratoryInfection −
0.754515 pyrexia respiratoryInfection, −0.0053686 + 1.00537 b45 +
0.0729909 denovoDSA dR51 mMFatRej^2 − 0.243593 respiratoryInfection +
0.111621 infectiondatefirst respiratoryInfection,
−0.0283694 + 0.90611 b45 + 0.0223358 denovoDSA + 0.00768689 mMFatRej +
0.923656 cMV respiratoryInfection − 0.621816 pyrexia respiratoryInfection,
-4.21571×10^{-17} + 1. b45 + 2.28022×10^{-17} bTF denovoDSA mMFatRej +
1. (bTF + dQ7)^3 respiratoryInfection, −0.0183869 + 1.00413 b45 +
0.00177804 mMFatRej preDSA + 0.673062 dR17 respiratoryInfection +
0.0863311 infectiondatefirst respiratoryInfection, −0.00528435 + 1.00528 b45 +
0.0695278 denovoDSA dR51 mMFatRej^2 − 0.244831 respiratoryInfection +
0.111711 infectiondatefirst respiratoryInfection, −0.011447 +
0.190932 b77 denovoDSA + 0.771555 igG + 0.758088 dR7 respiratoryInfection +
0.0844529 infectiondatefirst respiratoryInfection, −0.016539 + 0.708942 igG +
0.0297396 b77 denovoDSA mMFatRej + 0.673165 dR7 respiratoryInfection +
0.0858434 infectiondatefirst respiratoryInfection, −0.012137 +
0.0405105 b45 denovoDSA^2 + 0.846187 igG + 0.760281 dR7 respiratoryInfection +
0.0839519 infectiondatefirst respiratoryInfection,
0.000732803 + 0.902433 b45 + 0.0161391 denovoDSA dSAandHSAclass2 + 0.414331
mMFatRej respiratoryInfection − 0.949852 pyrexia respiratoryInfection,
0.00812898 + 0.991871 b45 + 0.00313752 denovoDSA^3 respiratoryInfection + 0.412872
mMFatRej respiratoryInfection − 0.947125 pyrexia respiratoryInfection,
0.0102858 + 0.989714 b45 + 0.0651558 denovoDSA respiratoryInfection + 0.391084
mMFatRej respiratoryInfection − 0.919596 pyrexia respiratoryInfection,
−0.0118775 + 0.00812994 b44 denovoDSA^3 + 0.878636 igG + 0.760864 dR7
respiratoryInfection + 0.0836712 infectiondatefirst respiratoryInfection,
−0.0149864 + 0.898842 b45 + 0.0331843 denovoDSA + 0.25043 respiratoryInfection +
0.312141 mMFatRej respiratoryInfection −
0.879185 pyrexia respiratoryInfection, −0.0216565 +
0.178564 denovoDSA dR7 + 0.909409 igG + 0.501253 dR7 respiratoryInfection +
0.0841858 infectiondatefirst respiratoryInfection,
0.00369392 + 0.842864 b45 + 0.0105822 denovoDSA^2 + 0.418801 mMFatRej

```
    respiratoryInfection - 0.960158 pyrexia respiratoryInfection,
  0.0083973 + 0.991603 b45 + 0.0156472 denovoDSA^2 respiratoryInfection +
   0.404015 mMFatRej respiratoryInfection -
   0.931294 pyrexia respiratoryInfection, 0.00374679 + 1.08364 b45 +
   0.104097 cNIpostRej + 0.0881836 infectiondatefirst respiratoryInfection +
   0.0445715 mMFatRej pRAclass1pre respiratoryInfection,
  -0.0423156 + 0.0467945 denovoDSA + 0.168647 denovoDSA dR7 +
   0.0542849 igG infectiondatefirst mMFatRej +
   0.0877688 infectiondatefirst respiratoryInfection, -0.0118381 +
   0.00804546 denovoDSA^3 dR7 + 0.900655 igG + 0.725473 dR7 respiratoryInfection +
   0.083387 infectiondatefirst respiratoryInfection,
  -0.0139569 + 0.0798793 denovoDSA + 1.01396 bTF respiratoryInfection +
   0.809121 dQ7 (igG + respiratoryInfection)^(1/3), -0.0190763 +
   1.02988 b45 + 0.0128644 cNIpostRej + 0.058594 denovoDSA dR51 mMFatRej^2 +
   0.0871045 infectiondatefirst respiratoryInfection,
  -0.0104482 + 0.000753305 denovoDSA + 0.898946 igG + 0.0823085 infectiondatefirst
    respiratoryInfection + 0.843823 dR7 (b44 + respiratoryInfection),
  0.0152055 + 0.0119332 denovoDSA dSAandHSAclass1^2 + 0.677853 igG +
   0.984794 bTF respiratoryInfection + 0.837291 dQ7 respiratoryInfection,
  0.0123428 + 1.00211 b45 - 0.000103328 denovoDSA mMFatRej^2 +
   0.441531 mMFatRej respiratoryInfection - 1.01339 pyrexia respiratoryInfection,
  0.00680474 + 1.02252 b45 - 0.0122817 mMFatRej + 0.982616 respiratoryInfection -
   0.216916 feverOnly hLAmm respiratoryInfection + 0.0205556 wBCpeakover5,
  0.00959147 + 1.25627 b45 + 0.0135586 aerobicGNR cNIpostRej hLAmm mMFatRej +
   0.961754 respiratoryInfection -
   0.212829 feverOnly hLAmm respiratoryInfection}, 0.7]]
```

◆ Sparse modelling

■ The following functions could be evaluated if Mathematica® and DataModeler® have been installed
  and this Mathematica notebook is saved in a directory which has the DataModelerModelSets folder with generated models we created
  and the rawdata.xlsx Excel® file we provided.

At first, read in the following raw data: ALLNAMES and ALLTRAININGDATA.

◆ renaldata

ALLNAMES

ALLTRAININGDATA

Retrieval of sparse models from DataModelerModelSets

Raw sparse model

The next command requires DataModeler® installed.

```
In[•]:= Needs["DataModeler`"]
```

The next command demands that DataModelerModelSets are located in the same directory as this AnalaysisOfPredictor.nb file.

```
In[•]:= ARModels = RetrieveModelSets[
          ProjectName → "PredictGraftLoss"
        ];

In[•]:= Length@ARModels
Out[•]= 11 540

In[•]:= interestingModelSet = SelectModels[ ARModels, QualityBox → {50, 0.1}];

In[•]:= rawsparseModel = Last@ParetoFront@interestingModelSet;
        ModelExpression@rawsparseModel
Out[•]= -(3.94 × 10^-16) + (2.25 × 10^-17) denovoDSA + 0.78 bTF mMFatRej respiratoryInfection +
         1.00 respiratoryInfection antiHLAclass2 + 1.00 b45
```

Focus the perfect model onto the used variables

```
In[•]:= focusedPerfectModel = RestructureModelInputs[
          rawsparseModel, DataVariables → {ModelVariables, TargetColumn}];
        ModelVariableIndices@focusedPerfectModel
Out[•]= {1, 2, 3, 4, 5, 6}

In[•]:= ModelVariables@focusedPerfectModel
Out[•]= {respiratoryInfection, bTF, denovoDSA, antiHLAclass2, b45, mMFatRej}

In[•]:= ModelPhenotype@focusedPerfectModel
Out[•]= -3.93615 × 10^-16 + 1. b45 + 2.24951 × 10^-17 denovoDSA +
         1. antiHLAclass2 respiratoryInfection + 0.775194 bTF mMFatRej respiratoryInfection
```

Retrieval of the raw data

Either of the three commands below will work. They yield the same result.

```
{trainingHeader, trainingData} = {ALLNAMES, ALLTRAININGDATA};

{trainingHeader, trainingData} = {renalitms[[All, 2]], renaldata};

{trainingHeader, trainingData} = ImportDataMatrix["renaldata.xlsx"];
Dimensions@trainingData
Out[•]= {51, 212}
```

Extracting the modeling variables and Checking missing cells

The input data is not completely numeric. To make that more obvious, we replace the non-numerics with **Indeterminate**.

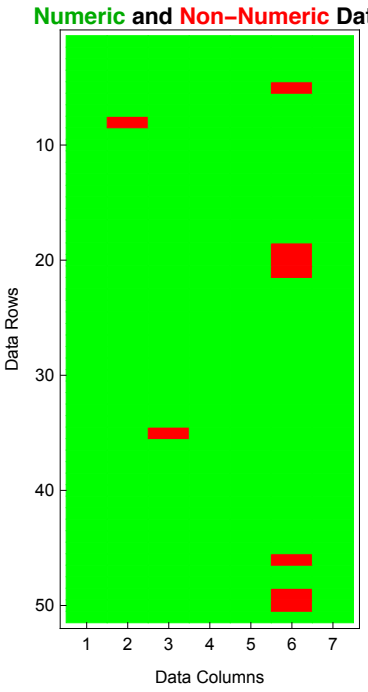
In[•]:=
```
rawDataColumns =
  Flatten@{ModelVariableIndices@rawsparseModel, TargetColumn@rawsparseModel};
dataHeaders = trainingHeader[[rawDataColumns]];
dataArray = MakeDataNumeric[
   trainingData[[All, rawDataColumns]],
   ReplacementFunction → Style["X", Red, Bold]
  ];
MatrixForm@dataArray
```

Out[•]//MatrixForm=

0.	0.	0.	0.	0.	1.05	0.
1.	0.	3.	1.	0.	2.01	1.
0.	0.	0.	0.	0.	5.5	0.
1.	0.	0.	0.	0.	1.79	0.
0.	0.	0.	0.	0.	X	0.
1.	0.	5.	1.	0.	1.49	1.
0.	1.	1.	0.	0.	0.97	0.
1.	X	0.	0.	0.	2.06	1.
0.	0.	0.	0.	0.	5.21	0.
0.	1.	0.	0.	0.	5.38	0.
1.	0.	0.	0.	0.	2.3	0.
1.	0.	1.	0.	0.	4.79	0.
0.	0.	0.	0.	0.	2.31	0.
1.	0.	1.	1.	0.	3.02	1.
0.	0.	0.	1.	0.	0.54	0.
0.	0.	0.	0.	0.	0.94	0.
1.	0.	0.	0.	0.	0.64	0.
1.	1.	0.	0.	0.	1.29	1.
0.	0.	1.	1.	0.	X	0.
1.	0.	1.	1.	0.	X	1.
0.	0.	0.	1.	0.	X	1.
0.	1.	1.	1.	0.	5.8	0.
0.	1.	0.	0.	0.	1.95	0.
0.	1.	0.	0.	0.	1.25	0.
0.	0.	5.	1.	1.	6.9	1.
1.	0.	2.	1.	0.	2.28	1.
0.	0.	0.	0.	0.	2.	0.
0.	0.	1.	1.	0.	3.19	0.
0.	0.	0.	0.	0.	2.1	0.
0.	1.	1.	1.	0.	2.77	0.
0.	0.	2.	1.	0.	2.28	0.
0.	1.	0.	0.	0.	1.01	0.
0.	0.	1.	1.	0.	1.55	0.
0.	0.	1.	1.	0.	1.96	0.
0.	1.	X	0.	0.	1.79	1.
0.	0.	0.	1.	0.	3.25	0.
0.	0.	0.	0.	0.	2.08	0.
0.	0.	1.	1.	0.	5.61	0.
0.	0.	2.	1.	0.	0.69	0.
0.	0.	0.	0.	0.	2.53	0.
0.	1.	2.	1.	1.	4.57	1.
0.	1.	1.	1.	0.	1.43	0.
0.	1.	0.	1.	0.	3.3	0.
0.	0.	0.	1.	0.	1.25	0.
0.	0.	1.	1.	0.	1.51	0.
0.	0.	0.	0.	0.	X	0.
0.	0.	0.	0.	0.	1.66	0.
0.	0.	1.	1.	0.	5.15	0.
0.	1.	0.	1.	0.	X	0.
0.	0.	0.	0.	0.	X	0.
0.	0.	0.	0.	0.	0.56	0.

In[•]:=
```
DataCompletenessMap[dataArray, DataVariableLabels → dataHeaders]
```

Out[•]=



■ Statistical Evaluation of the performance of sparse models

◇ Raw Sparse Model

In[•]:=
```
RawSparseModel = UpdateModelQuality[
    SetModelVariables@
     CreateModelFromExpression[ModelPhenotype@focusedPerfectModel,
      Sequence @@ ModelPersonality[focusedPerfectModel]],
    dataArray];
```

In[•]:=
```
ModelSelectionTable@RawSparseModel
```

Out[•]=

Model Selection Table

	Complexity	$1-R^2$	Vars	Function
1	44	0.000	respiratoryInfection bTF denovoDSA antiHLAclass2 b45 mMFatRej	$-(3.94\times10^{-16})+(2.25\times10^{-17})$ denovoDSA + 0.78 bTF mMFatRej respiratoryInfection + 1.00 respiratoryInfection antiHLAclass$_2$ + 1.00 b_{45}

In[•]:=
```
rawsparseModel = UpdateModelQuality[
    SetModelVariables@CreateModelFromExpression[
      -3.936149117061908`*^-16 + 0.9999999999999996` b45 + 2.2495128628033782`*^-17
        denovoDSA + 1.0000000000000007` antiHLAclass2 respiratoryInfection +
       0.7751937984496123` bTF mMFatRej respiratoryInfection,
      TargetColumn → -1,
      DataVariables → ToExpression@CreateDataVariableNames@ALLNAMES
     ],
    ALLTRAININGDATA];
ModelSummaryTable[
 rawsparseModel,
 ALLTRAININGDATA,
 ModelSummaryTableProperties → {"ModelExpression", "ModelQuality",
   "ModelVariables", "ModelPredictionComparisonPlot", "ANOVATable"},
 SortBy → "Observed", DataDensityPlot → False, FontSize → 14,
 ImageSize → 500
]
```

Out[•]=

Model Summary Table

Expression

$$-(3.94\times10^{-16})+(2.25\times10^{-17})\,\text{denovoDSA}+0.78\,\text{bTF mMFatRej respiratoryInfection}+1.00\,\text{respiratoryInfection antiHLAclass}_2+1.00\,\text{b}_{45}$$

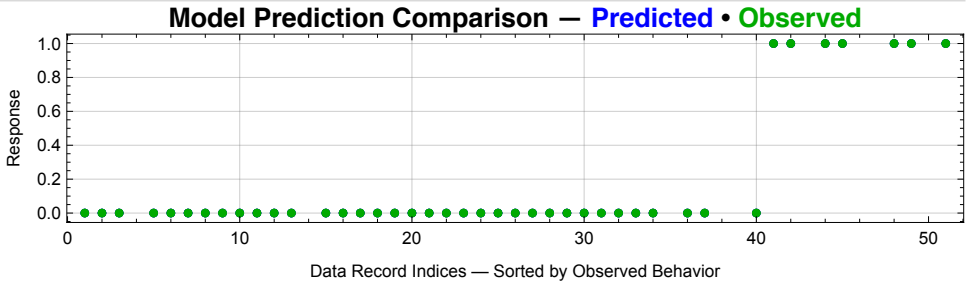
Model Quality

Complexity	$1-R^2$
44	0.

Variables

respiratoryInfection	bTF
denovoDSA	antiHLAclass2
b45	mMFatRej

Model Prediction Comparison Plot



ANOVA

	DF	SS	MS	F-Statistic	P-Value
b45	1	1.45833	1.45833	2.18854×10^{32}	0
denovoDSA	1	1.31716	1.31716	1.97668×10^{32}	0
antiHLAclass2 respiratoryInfection	1	2.0923	2.0923	3.13994×10^{32}	0
bTF mMFatRej respiratoryInfection	1	0.965545	0.965545	1.44901×10^{32}	0
Error	37	2.46549×10^{-31}	6.66349×10^{-33}		
Total	41	5.83333			

◇ Pruned Sparse Model

In[•]:=
```
ModelPhenotype@focusedPerfectModel
```

Out[•]=
$$-3.93615\times10^{-16}+1.\,\text{b45}+2.24951\times10^{-17}\,\text{denovoDSA}+1.\,\text{antiHLAclass2 respiratoryInfection}+0.775194\,\text{bTF mMFatRej respiratoryInfection}$$

In[•]:=
```
PrunedSpaseModel = UpdateModelQuality[
    SetModelVariables@CreateModelFromExpression[

      0.9999999999999996` b45 +
       1.0000000000000007` antiHLAclass2 respiratoryInfection +
       0.7751937984496123` bTF mMFatRej respiratoryInfection

      , Sequence @@ ModelPersonality[focusedPerfectModel]],
    dataArray];
ModelSelectionTable@PrunedSpaseModel
```

Out[•]=

Model Selection Table

	Complexity	$1-R^2$	Vars	Function
1	36	0.149	respiratoryInfection bTF antiHLAclass2 b45 mMFatRej	0.78 bTF mMFatRej respiratoryInfection + 1.00 respiratoryInfection antiHLAclass_2 + 1.00 b_{45}

In[•]:=
```
prunedModel = UpdateModelQuality[
    SetModelVariables@CreateModelFromExpression[
      0.9999999999999996` b45 +
       1.0000000000000007` antiHLAclass2 respiratoryInfection +
       0.7751937984496123` bTF mMFatRej respiratoryInfection,
      TargetColumn → -1,
      DataVariables → ToExpression@CreateDataVariableNames@ALLNAMES
     ],
    ALLTRAININGDATA];
ModelSummaryTable[
 prunedModel,
 ALLTRAININGDATA,
 ModelSummaryTableProperties → {"ModelExpression", "ModelQuality",
   "ModelVariables", "ModelPredictionComparisonPlot", "ANOVATable"},
 SortBy → "Observed", DataDensityPlot → False, FontSize → 14,
 ImageSize → 500
]
```

Out[•]=

Model Summary Table

Expression

$0.78\ bTF\ mMFatRej\ respiratoryInfection + 1.00\ respiratoryInfection\ antiHLAclass_2 + 1.00\ b_{45}$

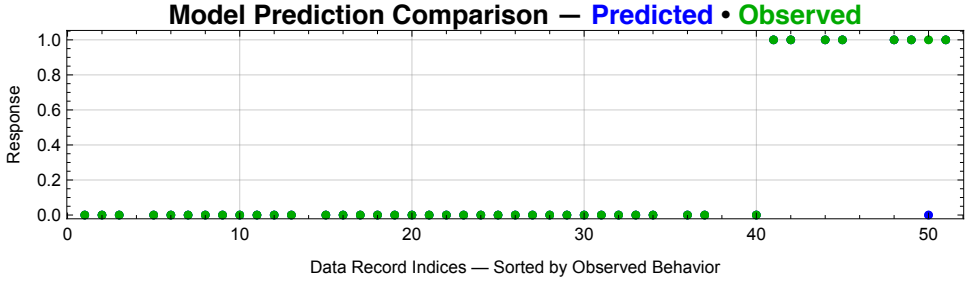
Model Quality

Complexity	$1-R^2$
36	0.149306

Variables

respiratoryInfection, bTF, antiHLAclass2, b45, mMFatRej

Model Prediction Comparison Plot



ANOVA

	DF	SS	MS	F-Statistic	P-Value
b45	1	1.38968	1.38968	55.7459	4.94878×10^{-9}
antiHLAclass2 respiratoryInfection	1	3.23006	3.23006	129.572	5.76892×10^{-14}
bTF mMFatRej respiratoryInfection	1	0.91967	0.91967	36.8919	4.08905×10^{-7}
Error	39	0.972222	0.0249288		
Total	42	6.51163			