

CoP SAP 6.8

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6.8 Cross Validation Prediction Using Vaccine Product

To explore the robustness of the prediction, a cross validation analysis using the 4 vaccine products will be explored. Specifically, a prediction model for viral load will be created using a virus-specific antibody based on data from all but one of the vaccine products (e.g., the final selected model in Section 6.4.1; for binary viral loads as in 6.4.2 logistic models are used). Then that model will be used to predict viral load in animals that got the vaccine product that was not used to build the model. We will use agreement measures to predict how well the modeled viral loads predict the observed viral load (in the animals that got the vaccine product left out of the prediction model). We will use the RMAC (random marginal agreement coefficient) versions of the concordance correlation coefficient for numeric viral load or the RMAC Cohen's Kappa coefficient for binary viral load. RMAC are the same as the usual agreement coefficients when the distribution of the predicted viral loads equal the distribution of the observed viral loads, but when those distributions differ the RMAC are slightly better because they do not imply greater agreement when those distributions disagree more (Fay, 2005). This cross validation prediction will be repeated for each vaccine product. See Fay, et al., (2012), for a similar idea predicting outcome in different species. We use a nonparametric bootstrap to perform the inferences.

These types of cross validation prediction will also be done for pairs of vaccine products. For example, build a prediction model using data from Vaccine A and use it to predict Vaccine B, predict using Vaccine A to predict Vaccine C, etc.

Numeric Viral Load

Table 6.8.1: RMAC with Sanofi Vaccine Product Excluded

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.44 (0.12, 0.7)	0.59 (0.3, 0.78)	0.18 (-0.05, 0.42)	0.22 (-0.04, 0.47)	0.28 (0.03, 0.52)	0.36 (0.12, 0.56)	0.32 (0.05, 0.53)	0.37 (0.08, 0.63)
AUC BAL Subgenomic	0.3 (-0.06, 0.57)	0.48 (0.12, 0.71)	0.14 (-0.11, 0.35)	0.18 (-0.09, 0.4)	0.18 (-0.07, 0.36)	0.19 (-0.05, 0.38)	0.21 (-0.07, 0.43)	0.24 (-0.05, 0.46)
AUC Nasal Swab N1	0.52 (0.18, 0.74)	0.6 (0.34, 0.75)	0.34 (-0.07, 0.62)	0.39 (0.02, 0.64)	0.53 (0.2, 0.73)	0.46 (0.03, 0.74)	0.47 (0.16, 0.68)	0.59 (0.26, 0.79)
AUC Nasal Swab Subgenomic	0.42 (0.06, 0.72)	0.54 (0.26, 0.76)	0.18 (-0.16, 0.52)	0.22 (-0.13, 0.54)	0.39 (0.08, 0.69)	0.37 (-0.02, 0.69)	0.35 (0.04, 0.63)	0.44 (0.1, 0.73)
AUC OP Swab N1	0.2 (0.02, 0.55)	0.15 (-0.08, 0.59)	0.13 (-0.04, 0.45)	0.15 (-0.03, 0.46)	0.2 (0.03, 0.49)	0.11 (-0.13, 0.58)	0.17 (0, 0.5)	0.22 (0.03, 0.55)
AUC OP Swab Subgenomic	0.08 (-0.05, 0.5)	0.03 (-0.12, 0.55)	0.03 (-0.09, 0.37)	0.05 (-0.08, 0.42)	0.09 (-0.04, 0.45)	0 (-0.15, 0.53)	0.06 (-0.06, 0.48)	0.09 (-0.05, 0.5)
log VL Day2 PostChal- lenge BAL N1	0.19 (-0.23, 0.49)	0.31 (-0.02, 0.51)	-0.05 (-0.36, 0.17)	-0.02 (-0.32, 0.2)	0.15 (-0.21, 0.4)	0.07 (-0.29, 0.34)	0.11 (-0.22, 0.36)	0.19 (-0.22, 0.46)
log VL Day2 PostChal- lenge BAL Subgenomic	0.22 (-0.13, 0.47)	0.29 (0.01, 0.49)	0.04 (-0.24, 0.24)	0.06 (-0.22, 0.27)	0.16 (-0.14, 0.38)	0.11 (-0.21, 0.35)	0.16 (-0.13, 0.37)	0.19 (-0.12, 0.41)
log VL Day2 PostChal- lenge OPswab N1	0.3 (-0.06, 0.5)	0.09 (-0.21, 0.27)	0.02 (-0.35, 0.2)	0.06 (-0.29, 0.23)	0.13 (-0.17, 0.3)	0.11 (-0.23, 0.33)	0.17 (-0.17, 0.34)	0.19 (-0.12, 0.37)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.33 (-0.02, 0.53)	0.14 (-0.18, 0.37)	0.08 (-0.28, 0.29)	0.12 (-0.23, 0.31)	0.19 (-0.14, 0.38)	0.21 (-0.18, 0.46)	0.21 (-0.11, 0.4)	0.24 (-0.09, 0.44)
log VL Day2 PostChal- lenge NasalSwab N1	0.43 (0.04, 0.67)	0.46 (0.13, 0.64)	0.13 (-0.27, 0.41)	0.19 (-0.18, 0.44)	0.4 (0.02, 0.65)	0.28 (-0.1, 0.56)	0.32 (-0.03, 0.59)	0.49 (0.12, 0.71)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.4 (-0.01, 0.66)	0.42 (0.06, 0.6)	0.06 (-0.36, 0.32)	0.12 (-0.28, 0.38)	0.35 (-0.07, 0.59)	0.23 (-0.18, 0.51)	0.27 (-0.08, 0.53)	0.44 (0.02, 0.67)

Table 6.8.2: RMAC with Moderna Vaccine Product Excluded

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.21 (-0.13, 0.48)	0.44 (0.07, 0.7)	0.27 (-0.01, 0.52)	0.41 (0.08, 0.67)	0.16 (-0.13, 0.39)	0.1 (-0.18, 0.33)	0.17 (-0.11, 0.4)	0.2 (-0.11, 0.44)
AUC BAL Subgenomic	0.15 (-0.11, 0.37)	0.32 (0.02, 0.53)	0.18 (-0.04, 0.38)	0.32 (0.05, 0.53)	0.08 (-0.14, 0.25)	0.03 (-0.18, 0.2)	0.1 (-0.11, 0.28)	0.11 (-0.12, 0.29)
AUC Nasal Swab N1	0.33 (-0.03, 0.57)	0.28 (-0.06, 0.52)	0.46 (0.11, 0.67)	0.62 (0.31, 0.79)	0.16 (-0.14, 0.36)	0.18 (-0.13, 0.4)	0.22 (-0.07, 0.43)	0.32 (0.03, 0.51)
AUC Nasal Swab Subgenomic	0.46 (0.15, 0.69)	0.4 (0.1, 0.61)	0.52 (0.24, 0.72)	0.61 (0.37, 0.77)	0.34 (0.08, 0.5)	0.26 (-0.03, 0.46)	0.4 (0.12, 0.57)	0.43 (0.16, 0.59)
AUC OP Swab N1	0.4 (0.05, 0.65)	0.41 (0.06, 0.66)	0.54 (0.17, 0.77)	0.63 (0.3, 0.83)	0.39 (0.04, 0.61)	0.24 (-0.15, 0.54)	0.39 (0.06, 0.63)	0.44 (0.07, 0.69)
AUC OP Swab Subgenomic	0.28 (-0.04, 0.52)	0.22 (-0.09, 0.45)	0.37 (0.01, 0.62)	0.48 (0.11, 0.72)	0.27 (-0.04, 0.52)	0.09 (-0.25, 0.39)	0.26 (-0.06, 0.52)	0.27 (-0.09, 0.55)
log VL Day2 PostChal- lenge BAL N1	0.22 (-0.17, 0.46)	0.42 (0.04, 0.64)	0.27 (-0.12, 0.51)	0.34 (-0.12, 0.65)	0.27 (0, 0.45)	0.18 (-0.08, 0.34)	0.26 (-0.01, 0.43)	0.25 (-0.04, 0.44)
log VL Day2 PostChal- lenge BAL Subgenomic	0.3 (-0.07, 0.54)	0.45 (0.1, 0.67)	0.34 (-0.01, 0.57)	0.43 (-0.01, 0.72)	0.34 (0.08, 0.52)	0.24 (-0.04, 0.41)	0.33 (0.05, 0.51)	0.32 (0.03, 0.51)
log VL Day2 PostChal- lenge OPswab N1	0.04 (-0.35, 0.35)	-0.03 (-0.39, 0.25)	0.06 (-0.37, 0.44)	0.07 (-0.41, 0.5)	-0.02 (-0.38, 0.3)	0.01 (-0.27, 0.23)	-0.01 (-0.36, 0.29)	0.05 (-0.3, 0.35)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.21 (-0.18, 0.49)	0.14 (-0.25, 0.4)	0.2 (-0.23, 0.51)	0.21 (-0.23, 0.58)	0.13 (-0.25, 0.42)	0.18 (-0.15, 0.41)	0.15 (-0.24, 0.43)	0.22 (-0.15, 0.48)
log VL Day2 PostChal- lenge NasalSwab N1	0.66 (0.34, 0.84)	0.62 (0.35, 0.78)	0.72 (0.49, 0.84)	0.61 (0.38, 0.76)	0.6 (0.33, 0.78)	0.54 (0.25, 0.72)	0.65 (0.36, 0.82)	0.62 (0.32, 0.81)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.57 (0.28, 0.77)	0.5 (0.18, 0.71)	0.6 (0.36, 0.76)	0.51 (0.23, 0.69)	0.46 (0.13, 0.71)	0.46 (0.11, 0.69)	0.52 (0.24, 0.74)	0.47 (0.11, 0.74)

Table 6.8.3: RMAC with Janssen Vaccine Product Excluded

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.22 (-0.21, 0.57)	0.46 (0.1, 0.72)	-0.06 (-0.42, 0.38)	0.16 (-0.22, 0.53)	-0.05 (-0.36, 0.21)	0.01 (-0.32, 0.3)	0.05 (-0.3, 0.35)	0.17 (-0.2, 0.49)
AUC BAL Subgenomic	0.15 (-0.22, 0.45)	0.31 (-0.06, 0.59)	-0.13 (-0.45, 0.26)	0.09 (-0.28, 0.42)	-0.06 (-0.37, 0.21)	-0.04 (-0.35, 0.21)	0.02 (-0.35, 0.33)	0.09 (-0.29, 0.4)
AUC Nasal Swab N1	0.12 (-0.25, 0.46)	0.14 (-0.31, 0.53)	-0.03 (-0.35, 0.26)	0.11 (-0.22, 0.38)	-0.14 (-0.44, 0.14)	-0.1 (-0.45, 0.24)	-0.03 (-0.39, 0.29)	0.08 (-0.31, 0.44)
AUC Nasal Swab Subgenomic	0.28 (-0.1, 0.56)	0.33 (-0.14, 0.68)	0.02 (-0.26, 0.28)	0.17 (-0.11, 0.44)	-0.11 (-0.39, 0.15)	-0.06 (-0.42, 0.27)	0.04 (-0.29, 0.34)	0.2 (-0.22, 0.51)
AUC OP Swab N1	-0.01 (-0.37, 0.36)	0.13 (-0.21, 0.48)	-0.04 (-0.31, 0.21)	0.09 (-0.17, 0.34)	-0.17 (-0.47, 0.07)	-0.06 (-0.38, 0.19)	-0.05 (-0.39, 0.23)	0.1 (-0.26, 0.41)
AUC OP Swab Subgenomic	0.01 (-0.29, 0.31)	0.13 (-0.23, 0.44)	-0.1 (-0.34, 0.15)	0.06 (-0.21, 0.3)	-0.24 (-0.53, 0.03)	-0.21 (-0.49, 0.06)	-0.1 (-0.41, 0.17)	-0.04 (-0.38, 0.27)
log VL Day2 PostChal- lenge BAL N1	0.15 (-0.16, 0.38)	0.24 (-0.07, 0.46)	0.01 (-0.29, 0.23)	0.07 (-0.19, 0.23)	0.12 (-0.12, 0.31)	0.11 (-0.11, 0.27)	0.14 (-0.14, 0.36)	0.14 (-0.14, 0.35)
log VL Day2 PostChal- lenge BAL Subgenomic	0.16 (-0.1, 0.37)	0.21 (-0.07, 0.45)	0.01 (-0.26, 0.24)	0.07 (-0.16, 0.25)	0.08 (-0.16, 0.29)	0.12 (-0.09, 0.29)	0.14 (-0.14, 0.36)	0.14 (-0.14, 0.37)
log VL Day2 PostChal- lenge OPswab N1	0.26 (0.04, 0.41)	0.17 (-0.04, 0.28)	0.21 (0.05, 0.31)	0.23 (0.09, 0.32)	0.12 (-0.07, 0.26)	0.07 (-0.13, 0.21)	0.18 (-0.04, 0.32)	0.16 (-0.03, 0.29)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.33 (0.11, 0.5)	0.21 (-0.01, 0.36)	0.27 (0.11, 0.39)	0.29 (0.14, 0.4)	0.16 (-0.06, 0.33)	0.1 (-0.12, 0.29)	0.24 (0.02, 0.42)	0.22 (0, 0.39)
log VL Day2 PostChal- lenge NasalSwab N1	0.5 (0.22, 0.71)	0.36 (0.03, 0.61)	0.35 (0.09, 0.55)	0.29 (0.08, 0.46)	0.34 (0.08, 0.56)	0.33 (0.04, 0.57)	0.44 (0.13, 0.67)	0.43 (0.11, 0.67)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.51 (0.24, 0.7)	0.38 (0.07, 0.59)	0.32 (0.08, 0.5)	0.28 (0.08, 0.42)	0.32 (0.09, 0.54)	0.31 (0.01, 0.59)	0.43 (0.13, 0.64)	0.41 (0.11, 0.64)

Table 6.8.4: RMAC with Novavax Vaccine Product Excluded

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	-0.22 (-0.6, -0.01)	0.25 (-0.25, 0.49)	-0.14 (-0.63, 0.17)	-0.06 (-0.58, 0.24)	0.06 (-0.45, 0.34)	-0.15 (-0.61, 0.13)	0.03 (-0.45, 0.32)	-0.02 (-0.48, 0.21)
AUC BAL Subgenomic	-0.35 (-0.67, -0.08)	0.22 (-0.26, 0.57)	-0.23 (-0.64, 0.13)	-0.06 (-0.51, 0.34)	-0.2 (-0.63, 0.15)	-0.44 (-0.79, -0.13)	-0.16 (-0.58, 0.21)	-0.2 (-0.61, 0.13)
AUC Nasal Swab N1	0.02 (-0.67, 0.32)	0.01 (-0.61, 0.29)	0.03 (-0.62, 0.33)	0.09 (-0.6, 0.38)	0.06 (-0.63, 0.36)	0.02 (-0.63, 0.32)	0.08 (-0.63, 0.4)	0.18 (-0.49, 0.43)
AUC Nasal Swab Subgenomic	0.15 (-0.66, 0.48)	0.14 (-0.53, 0.44)	0.03 (-0.64, 0.39)	0.08 (-0.61, 0.41)	0.33 (-0.42, 0.6)	0.08 (-0.61, 0.41)	0.35 (-0.47, 0.64)	0.38 (-0.36, 0.6)
AUC OP Swab N1	-0.07 (-0.61, 0.26)	-0.04 (-0.59, 0.28)	0 (-0.57, 0.33)	0.06 (-0.55, 0.38)	0.25 (-0.43, 0.55)	-0.15 (-0.67, 0.19)	0.17 (-0.5, 0.51)	0.24 (-0.36, 0.52)
AUC OP Swab Subgenomic	-0.27 (-0.71, 0.07)	-0.33 (-0.77, 0.02)	-0.24 (-0.7, 0.1)	-0.15 (-0.66, 0.2)	0 (-0.6, 0.36)	-0.52 (-0.84, -0.23)	-0.08 (-0.67, 0.28)	-0.1 (-0.63, 0.24)
log VL Day2 PostChal- lenge BAL N1	-0.19 (-0.43, -0.02)	0.05 (-0.29, 0.28)	-0.23 (-0.49, -0.01)	-0.2 (-0.47, 0.02)	0.02 (-0.29, 0.25)	-0.18 (-0.45, 0.01)	-0.06 (-0.36, 0.17)	-0.08 (-0.35, 0.11)
log VL Day2 PostChal- lenge BAL Subgenomic	-0.26 (-0.69, -0.02)	0.05 (-0.54, 0.33)	-0.28 (-0.76, 0.04)	-0.22 (-0.74, 0.09)	0.06 (-0.46, 0.31)	-0.23 (-0.73, 0.05)	-0.03 (-0.55, 0.23)	-0.14 (-0.64, 0.11)
log VL Day2 PostChal- lenge OPswab N1	-0.09 (-0.31, 0.07)	-0.19 (-0.41, -0.03)	-0.15 (-0.39, 0.02)	-0.13 (-0.36, 0.05)	-0.13 (-0.37, 0.05)	-0.18 (-0.39, -0.03)	-0.09 (-0.33, 0.09)	-0.09 (-0.32, 0.08)
log VL Day2 PostChal- lenge OPswab Subgenomic	-0.08 (-0.47, 0.15)	-0.23 (-0.59, 0.02)	-0.17 (-0.56, 0.08)	-0.14 (-0.52, 0.11)	-0.07 (-0.47, 0.17)	-0.15 (-0.54, 0.08)	-0.03 (-0.45, 0.22)	-0.04 (-0.42, 0.19)
log VL Day2 PostChal- lenge NasalSwab N1	0.09 (-0.22, 0.34)	0.02 (-0.28, 0.24)	0.09 (-0.19, 0.31)	0.03 (-0.25, 0.26)	0.25 (-0.07, 0.51)	0.1 (-0.18, 0.32)	0.22 (-0.12, 0.5)	0.21 (-0.06, 0.42)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.05 (-0.36, 0.33)	-0.05 (-0.46, 0.22)	0 (-0.38, 0.26)	-0.05 (-0.42, 0.2)	0.21 (-0.22, 0.47)	0 (-0.39, 0.27)	0.19 (-0.25, 0.47)	0.13 (-0.28, 0.39)

Table 6.8.5: RMAC Average

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.1625	0.4350	0.0625	0.1825	0.1125	0.0800	0.1425	0.1800
AUC BAL Subgenomic	0.0625	0.3325	-0.0100	0.1325	0.0000	-0.0650	0.0425	0.0600
AUC Nasal Swab N1	0.2475	0.2575	0.2000	0.3025	0.1525	0.1400	0.1850	0.2925
AUC Nasal Swab Subgenomic	0.3275	0.3525	0.1875	0.2700	0.2375	0.1625	0.2850	0.3625
AUC OP Swab N1	0.1300	0.1625	0.1575	0.2325	0.1675	0.0350	0.1700	0.2500
AUC OP Swab Subgenomic	0.0250	0.0125	0.0150	0.1100	0.0300	-0.1600	0.0350	0.0550
log VL Day2 PostChal- lenge BAL N1	0.0925	0.2550	0.0000	0.0475	0.1400	0.0450	0.1125	0.1250
log VL Day2 PostChal- lenge BAL Subgenomic	0.1050	0.2500	0.0275	0.0850	0.1600	0.0600	0.1500	0.1275
log VL Day2 PostChal- lenge OPswab N1	0.1275	0.0100	0.0350	0.0575	0.0250	0.0025	0.0625	0.0775
log VL Day2 PostChal- lenge OPswab Subgenomic	0.1975	0.0650	0.0950	0.1200	0.1025	0.0850	0.1425	0.1600
log VL Day2 PostChal- lenge NasalSwab N1	0.4200	0.3650	0.3225	0.2800	0.3975	0.3125	0.4075	0.4375
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.3825	0.3125	0.2450	0.2150	0.3350	0.2500	0.3525	0.3625

Pairs of Vaccine Products

Table 6.8.6: RMAC using Sanofi to predict Moderna

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.3 (-0.04, 0.56)	0.46 (0.12, 0.7)	0.49 (0.17, 0.7)	0.47 (0.15, 0.69)	0.27 (-0.01, 0.47)	0.21 (-0.06, 0.4)	0.3 (0.02, 0.53)	0.28 (-0.02, 0.49)
AUC BAL Subgenomic	0.21 (-0.06, 0.4)	0.39 (0.08, 0.61)	0.39 (0.11, 0.59)	0.4 (0.12, 0.59)	0.14 (-0.05, 0.29)	0.1 (-0.09, 0.23)	0.2 (-0.02, 0.36)	0.17 (-0.05, 0.33)
AUC Nasal Swab N1	0.36 (0.05, 0.54)	0.34 (0.03, 0.55)	0.67 (0.43, 0.8)	0.67 (0.43, 0.81)	0.32 (0.04, 0.5)	0.28 (0.02, 0.44)	0.36 (0.09, 0.52)	0.41 (0.14, 0.56)
AUC Nasal Swab Subgenomic	0.51 (0.27, 0.68)	0.47 (0.22, 0.64)	0.65 (0.49, 0.75)	0.6 (0.42, 0.72)	0.53 (0.31, 0.67)	0.38 (0.12, 0.54)	0.54 (0.33, 0.67)	0.5 (0.27, 0.65)
AUC OP Swab N1	0.53 (0.24, 0.7)	0.44 (0.18, 0.6)	0.45 (0.19, 0.63)	0.47 (0.17, 0.66)	0.6 (0.27, 0.79)	0.32 (0.03, 0.51)	0.59 (0.32, 0.76)	0.52 (0.17, 0.72)
AUC OP Swab Subgenomic	0.37 (0.11, 0.53)	0.19 (0, 0.29)	0.36 (0.02, 0.62)	0.35 (-0.03, 0.62)	0.48 (0.2, 0.66)	0.15 (-0.06, 0.28)	0.42 (0.16, 0.59)	0.34 (0.02, 0.54)
log VL Day2 PostChal- lenge BAL N1	0.14 (-0.22, 0.38)	0.29 (-0.05, 0.49)	0.19 (-0.27, 0.55)	0.2 (-0.23, 0.55)	0.2 (-0.07, 0.37)	0.08 (-0.16, 0.22)	0.17 (-0.1, 0.34)	0.17 (-0.12, 0.35)
log VL Day2 PostChal- lenge BAL Subgenomic	0.26 (-0.11, 0.49)	0.38 (0.03, 0.59)	0.3 (-0.17, 0.64)	0.32 (-0.13, 0.63)	0.31 (0.05, 0.47)	0.15 (-0.08, 0.28)	0.29 (0.01, 0.47)	0.27 (-0.03, 0.45)
log VL Day2 PostChal- lenge OPswab N1	0.08 (-0.28, 0.39)	0.01 (-0.21, 0.15)	0.07 (-0.35, 0.46)	0.04 (-0.41, 0.48)	0.06 (-0.25, 0.33)	0.07 (-0.16, 0.26)	0.06 (-0.28, 0.37)	0.08 (-0.25, 0.37)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.22 (-0.13, 0.48)	0.11 (-0.16, 0.27)	0.18 (-0.25, 0.53)	0.16 (-0.26, 0.55)	0.17 (-0.17, 0.44)	0.21 (-0.09, 0.44)	0.19 (-0.17, 0.46)	0.22 (-0.13, 0.47)
log VL Day2 PostChal- lenge NasalSwab N1	0.49 (0.27, 0.64)	0.48 (0.25, 0.63)	0.6 (0.36, 0.74)	0.53 (0.27, 0.69)	0.5 (0.27, 0.67)	0.34 (0.14, 0.47)	0.45 (0.27, 0.59)	0.49 (0.24, 0.67)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.4 (0.17, 0.62)	0.36 (0.08, 0.59)	0.44 (0.19, 0.65)	0.37 (0.08, 0.61)	0.37 (0.06, 0.66)	0.27 (0.01, 0.49)	0.35 (0.12, 0.58)	0.35 (0.03, 0.65)

Table 6.8.7: RMAC using Sanofi to predict Janssen

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.17 (-0.22, 0.5)	0.41 (0.06, 0.66)	-0.2 (-0.52, 0.19)	0.01 (-0.33, 0.36)	-0.02 (-0.3, 0.21)	-0.06 (-0.35, 0.21)	0.07 (-0.27, 0.34)	0.13 (-0.22, 0.42)
AUC BAL Subgenomic	0.12 (-0.21, 0.36)	0.28 (-0.06, 0.55)	-0.19 (-0.5, 0.14)	0 (-0.35, 0.29)	-0.02 (-0.29, 0.19)	-0.06 (-0.33, 0.15)	0.04 (-0.29, 0.3)	0.07 (-0.26, 0.33)
AUC Nasal Swab N1	0.12 (-0.21, 0.41)	0.13 (-0.29, 0.48)	-0.15 (-0.43, 0.11)	-0.02 (-0.31, 0.25)	-0.04 (-0.33, 0.24)	-0.04 (-0.34, 0.23)	0.05 (-0.28, 0.36)	0.1 (-0.27, 0.44)
AUC Nasal Swab Subgenomic	0.18 (-0.14, 0.44)	0.28 (-0.17, 0.62)	-0.19 (-0.43, 0.01)	-0.06 (-0.29, 0.19)	-0.09 (-0.36, 0.15)	-0.13 (-0.43, 0.14)	0.04 (-0.27, 0.31)	0.13 (-0.24, 0.43)
AUC OP Swab N1	-0.09 (-0.41, 0.23)	0.03 (-0.26, 0.3)	-0.32 (-0.53, -0.11)	-0.16 (-0.41, 0.08)	-0.22 (-0.52, 0.02)	-0.18 (-0.49, 0.03)	-0.1 (-0.43, 0.16)	0.01 (-0.33, 0.31)
AUC OP Swab Subgenomic	-0.2 (-0.46, 0.07)	-0.19 (-0.46, 0.05)	-0.4 (-0.58, -0.22)	-0.28 (-0.5, -0.06)	-0.35 (-0.61, -0.1)	-0.38 (-0.61, -0.18)	-0.24 (-0.51, 0)	-0.22 (-0.51, 0.07)
log VL Day2 PostChal- lenge BAL N1	0.07 (-0.17, 0.26)	0.16 (-0.05, 0.31)	-0.14 (-0.42, 0.13)	-0.02 (-0.24, 0.16)	0.03 (-0.16, 0.18)	0 (-0.17, 0.13)	0.04 (-0.16, 0.21)	0.06 (-0.16, 0.23)
log VL Day2 PostChal- lenge BAL Subgenomic	0.12 (-0.13, 0.31)	0.18 (-0.06, 0.37)	-0.12 (-0.4, 0.18)	0.02 (-0.22, 0.22)	0.03 (-0.18, 0.2)	0.03 (-0.15, 0.17)	0.08 (-0.16, 0.27)	0.09 (-0.15, 0.29)
log VL Day2 PostChal- lenge OPswab N1	0.21 (-0.01, 0.37)	0.07 (-0.06, 0.13)	0.08 (-0.09, 0.2)	0.15 (0, 0.26)	0.06 (-0.11, 0.18)	0 (-0.16, 0.11)	0.12 (-0.08, 0.25)	0.1 (-0.08, 0.22)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.28 (0.06, 0.45)	0.13 (-0.02, 0.23)	0.15 (-0.05, 0.29)	0.24 (0.07, 0.37)	0.1 (-0.09, 0.26)	0.03 (-0.17, 0.2)	0.18 (-0.03, 0.35)	0.16 (-0.04, 0.32)
log VL Day2 PostChal- lenge NasalSwab N1	0.3 (0.11, 0.47)	0.27 (0.02, 0.46)	0.19 (-0.05, 0.4)	0.2 (-0.02, 0.39)	0.22 (0.03, 0.4)	0.16 (-0.03, 0.31)	0.25 (0.05, 0.42)	0.3 (0.05, 0.52)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.32 (0.11, 0.51)	0.29 (0.05, 0.49)	0.13 (-0.1, 0.33)	0.17 (-0.03, 0.36)	0.2 (0, 0.41)	0.13 (-0.08, 0.35)	0.24 (0.03, 0.43)	0.29 (0.03, 0.54)

Table 6.8.8: RMAC using Sanofi to predict Novavax

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	-0.17 (-0.52, 0.03)	0.18 (-0.33, 0.44)	-0.03 (-0.51, 0.32)	-0.14 (-0.63, 0.21)	0.14 (-0.35, 0.43)	-0.06 (-0.5, 0.23)	0.13 (-0.32, 0.43)	0 (-0.45, 0.24)
AUC BAL Subgenomic	-0.38 (-0.69, -0.1)	0.17 (-0.33, 0.52)	-0.24 (-0.61, 0.15)	-0.28 (-0.68, 0.11)	-0.16 (-0.59, 0.21)	-0.36 (-0.73, -0.03)	-0.13 (-0.54, 0.25)	-0.21 (-0.62, 0.13)
AUC Nasal Swab N1	0.09 (-0.62, 0.37)	0.21 (-0.42, 0.43)	0.3 (-0.43, 0.59)	0.21 (-0.53, 0.5)	0.42 (-0.33, 0.64)	0.11 (-0.58, 0.41)	0.29 (-0.49, 0.56)	0.34 (-0.32, 0.54)
AUC Nasal Swab Subgenomic	0.03 (-0.73, 0.41)	0.27 (-0.41, 0.56)	0.24 (-0.5, 0.61)	0.14 (-0.59, 0.51)	0.55 (-0.19, 0.77)	0.15 (-0.58, 0.5)	0.37 (-0.47, 0.68)	0.38 (-0.38, 0.64)
AUC OP Swab N1	0.13 (-0.48, 0.48)	-0.05 (-0.6, 0.3)	0.54 (-0.02, 0.75)	0.44 (-0.24, 0.69)	0.59 (-0.02, 0.81)	-0.12 (-0.67, 0.24)	0.5 (-0.21, 0.76)	0.45 (-0.13, 0.71)
AUC OP Swab Subgenomic	-0.34 (-0.75, 0.02)	-0.57 (-0.87, -0.29)	0.18 (-0.39, 0.46)	0.06 (-0.53, 0.39)	0.3 (-0.37, 0.59)	-0.56 (-0.86, -0.26)	0.07 (-0.62, 0.41)	0 (-0.58, 0.35)
log VL Day2 PostChal- lenge BAL N1	-0.26 (-0.49, -0.07)	-0.14 (-0.45, 0.11)	-0.18 (-0.5, 0.1)	-0.26 (-0.55, -0.01)	-0.12 (-0.43, 0.14)	-0.3 (-0.55, -0.09)	-0.19 (-0.48, 0.06)	-0.16 (-0.45, 0.05)
log VL Day2 PostChal- lenge BAL Subgenomic	-0.32 (-0.72, -0.05)	-0.06 (-0.63, 0.27)	-0.19 (-0.67, 0.19)	-0.28 (-0.75, 0.09)	-0.09 (-0.61, 0.22)	-0.38 (-0.81, -0.06)	-0.14 (-0.65, 0.18)	-0.23 (-0.7, 0.07)
log VL Day2 PostChal- lenge OPswab N1	-0.01 (-0.24, 0.17)	-0.22 (-0.44, -0.05)	-0.07 (-0.34, 0.14)	-0.06 (-0.32, 0.13)	-0.03 (-0.3, 0.19)	-0.14 (-0.36, 0.03)	0.02 (-0.25, 0.24)	-0.02 (-0.26, 0.18)
log VL Day2 PostChal- lenge OPswab Subgenomic	-0.01 (-0.41, 0.24)	-0.26 (-0.61, -0.01)	-0.02 (-0.47, 0.25)	-0.02 (-0.44, 0.24)	0.08 (-0.36, 0.34)	-0.11 (-0.52, 0.15)	0.1 (-0.35, 0.37)	0.03 (-0.37, 0.28)
log VL Day2 PostChal- lenge NasalSwab N1	-0.07 (-0.36, 0.17)	-0.06 (-0.34, 0.16)	0.05 (-0.25, 0.3)	0 (-0.3, 0.25)	0.1 (-0.2, 0.37)	-0.08 (-0.35, 0.14)	-0.01 (-0.31, 0.26)	0.09 (-0.18, 0.31)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.16 (-0.53, 0.11)	-0.17 (-0.55, 0.11)	-0.05 (-0.45, 0.24)	-0.08 (-0.46, 0.2)	0.06 (-0.37, 0.35)	-0.19 (-0.55, 0.09)	-0.08 (-0.48, 0.21)	0.01 (-0.4, 0.3)

Table 6.8.9: RMAC using Moderna to predict Sanofi

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.43 (0.1, 0.63)	0.58 (0.31, 0.75)	0.35 (0.13, 0.54)	0.32 (0.09, 0.51)	0.32 (0.02, 0.53)	0.41 (0.18, 0.57)	0.38 (0.05, 0.58)	0.41 (0.12, 0.61)
AUC BAL Subgenomic	0.3 (-0.07, 0.56)	0.51 (0.12, 0.71)	0.27 (-0.01, 0.48)	0.26 (-0.03, 0.47)	0.19 (-0.12, 0.41)	0.21 (-0.09, 0.39)	0.27 (-0.1, 0.53)	0.27 (-0.06, 0.5)
AUC Nasal Swab N1	0.37 (0.16, 0.51)	0.38 (0.17, 0.52)	0.48 (0.25, 0.63)	0.45 (0.23, 0.6)	0.32 (0.13, 0.47)	0.44 (0.12, 0.65)	0.35 (0.13, 0.52)	0.49 (0.27, 0.62)
AUC Nasal Swab Subgenomic	0.46 (0.18, 0.65)	0.51 (0.31, 0.67)	0.4 (0.11, 0.65)	0.34 (0.06, 0.58)	0.48 (0.24, 0.67)	0.5 (0.17, 0.72)	0.45 (0.2, 0.64)	0.51 (0.24, 0.71)
AUC OP Swab N1	0.24 (0.09, 0.5)	0.17 (-0.03, 0.5)	0.21 (0.06, 0.48)	0.18 (0.03, 0.43)	0.28 (0.12, 0.51)	0.17 (-0.05, 0.54)	0.25 (0.09, 0.54)	0.26 (0.09, 0.53)
AUC OP Swab Subgenomic	0.14 (0.03, 0.47)	0.07 (-0.06, 0.42)	0.13 (0.01, 0.52)	0.11 (-0.01, 0.47)	0.19 (0.06, 0.52)	0.07 (-0.07, 0.54)	0.15 (0.02, 0.55)	0.15 (0.03, 0.52)
log VL Day2 PostChal- lenge BAL N1	0.21 (-0.15, 0.44)	0.31 (-0.02, 0.53)	0.03 (-0.27, 0.22)	0 (-0.3, 0.2)	0.24 (-0.12, 0.48)	0.14 (-0.2, 0.36)	0.2 (-0.13, 0.45)	0.22 (-0.18, 0.49)
log VL Day2 PostChal- lenge BAL Subgenomic	0.24 (-0.09, 0.46)	0.31 (0.01, 0.52)	0.09 (-0.18, 0.27)	0.06 (-0.21, 0.26)	0.24 (-0.08, 0.47)	0.16 (-0.15, 0.39)	0.23 (-0.1, 0.48)	0.22 (-0.1, 0.45)
log VL Day2 PostChal- lenge OPswab N1	0.06 (-0.05, 0.09)	0.01 (-0.09, 0.02)	0.03 (-0.08, 0.05)	0.03 (-0.07, 0.04)	0.03 (-0.07, 0.07)	0.06 (-0.05, 0.12)	0.04 (-0.06, 0.07)	0.06 (-0.04, 0.1)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.17 (0, 0.27)	0.07 (-0.07, 0.16)	0.08 (-0.05, 0.14)	0.08 (-0.05, 0.12)	0.11 (-0.04, 0.19)	0.2 (-0.05, 0.35)	0.13 (-0.03, 0.21)	0.16 (-0.01, 0.26)
log VL Day2 PostChal- lenge NasalSwab N1	0.45 (0.13, 0.65)	0.46 (0.16, 0.63)	0.26 (-0.08, 0.48)	0.23 (-0.1, 0.45)	0.44 (0.14, 0.62)	0.37 (0.02, 0.58)	0.36 (0.07, 0.61)	0.49 (0.16, 0.69)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.43 (0.07, 0.64)	0.41 (0.09, 0.58)	0.18 (-0.22, 0.38)	0.15 (-0.23, 0.36)	0.41 (0.07, 0.59)	0.33 (-0.06, 0.54)	0.34 (0.04, 0.58)	0.44 (0.05, 0.63)

Table 6.8.10: RMAC using Moderna to predict Janssen

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.02 (-0.35, 0.34)	0.37 (0.02, 0.63)	-0.14 (-0.47, 0.25)	0.08 (-0.27, 0.42)	-0.2 (-0.48, 0.03)	-0.15 (-0.42, 0.1)	-0.09 (-0.41, 0.19)	0.05 (-0.3, 0.36)
AUC BAL Subgenomic	0 (-0.36, 0.32)	0.27 (-0.1, 0.56)	-0.18 (-0.49, 0.19)	0.06 (-0.31, 0.39)	-0.22 (-0.5, 0.05)	-0.19 (-0.46, 0.03)	-0.11 (-0.45, 0.2)	-0.02 (-0.37, 0.3)
AUC Nasal Swab N1	-0.15 (-0.45, 0.16)	-0.11 (-0.47, 0.25)	-0.21 (-0.46, 0.02)	-0.09 (-0.35, 0.16)	-0.36 (-0.58, -0.15)	-0.29 (-0.57, -0.02)	-0.25 (-0.53, 0.03)	-0.12 (-0.45, 0.21)
AUC Nasal Swab Subgenomic	0.11 (-0.24, 0.39)	0.16 (-0.25, 0.49)	-0.06 (-0.31, 0.16)	0.05 (-0.18, 0.31)	-0.22 (-0.47, 0.01)	-0.16 (-0.47, 0.12)	-0.05 (-0.37, 0.23)	0.11 (-0.27, 0.42)
AUC OP Swab N1	-0.09 (-0.38, 0.2)	0.05 (-0.26, 0.34)	-0.06 (-0.32, 0.14)	0.04 (-0.19, 0.22)	-0.2 (-0.49, 0.02)	-0.12 (-0.43, 0.1)	-0.09 (-0.42, 0.17)	0.06 (-0.27, 0.34)
AUC OP Swab Subgenomic	-0.12 (-0.39, 0.16)	-0.03 (-0.35, 0.24)	-0.13 (-0.37, 0.07)	-0.02 (-0.26, 0.17)	-0.27 (-0.54, -0.01)	-0.27 (-0.53, -0.03)	-0.15 (-0.44, 0.1)	-0.1 (-0.41, 0.19)
log VL Day2 PostChal- lenge BAL N1	0.11 (-0.13, 0.27)	0.23 (-0.09, 0.47)	0.01 (-0.23, 0.18)	0.05 (-0.2, 0.2)	0.13 (-0.11, 0.31)	0.1 (-0.09, 0.24)	0.15 (-0.14, 0.37)	0.14 (-0.15, 0.33)
log VL Day2 PostChal- lenge BAL Subgenomic	0.14 (-0.09, 0.32)	0.21 (-0.08, 0.46)	0.01 (-0.23, 0.2)	0.06 (-0.17, 0.22)	0.09 (-0.17, 0.31)	0.12 (-0.09, 0.29)	0.15 (-0.14, 0.39)	0.14 (-0.14, 0.37)
log VL Day2 PostChal- lenge OPswab N1	0 (-0.13, 0.05)	-0.03 (-0.16, 0.01)	-0.01 (-0.13, 0.04)	-0.01 (-0.14, 0.03)	-0.02 (-0.15, 0.03)	-0.02 (-0.14, 0.04)	-0.01 (-0.13, 0.04)	-0.01 (-0.13, 0.05)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.12 (-0.03, 0.21)	0.07 (-0.06, 0.15)	0.07 (-0.06, 0.14)	0.08 (-0.03, 0.13)	0.04 (-0.11, 0.13)	0.03 (-0.14, 0.16)	0.08 (-0.07, 0.18)	0.1 (-0.06, 0.2)
log VL Day2 PostChal- lenge NasalSwab N1	0.42 (0.17, 0.63)	0.33 (0.03, 0.56)	0.29 (0.08, 0.47)	0.21 (0.05, 0.35)	0.29 (0.07, 0.49)	0.29 (0.04, 0.5)	0.41 (0.11, 0.63)	0.37 (0.09, 0.59)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.45 (0.2, 0.64)	0.35 (0.07, 0.54)	0.28 (0.07, 0.42)	0.2 (0.04, 0.31)	0.28 (0.08, 0.47)	0.28 (0.02, 0.53)	0.41 (0.13, 0.61)	0.36 (0.11, 0.56)

Table 6.8.11: RMAC using Moderna to predict Novavax

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	-0.37 (-0.69, -0.12)	0.21 (-0.29, 0.5)	-0.03 (-0.53, 0.3)	-0.06 (-0.57, 0.26)	0.16 (-0.31, 0.5)	-0.25 (-0.66, 0.06)	0.15 (-0.28, 0.51)	-0.04 (-0.49, 0.22)
AUC BAL Subgenomic	-0.42 (-0.67, -0.15)	0.26 (-0.18, 0.63)	-0.03 (-0.43, 0.39)	0.04 (-0.4, 0.47)	-0.11 (-0.5, 0.29)	-0.51 (-0.8, -0.22)	-0.02 (-0.36, 0.43)	-0.18 (-0.55, 0.19)
AUC Nasal Swab N1	0.02 (-0.7, 0.38)	-0.09 (-0.68, 0.26)	0 (-0.66, 0.36)	-0.01 (-0.68, 0.33)	0.02 (-0.68, 0.4)	0.07 (-0.62, 0.43)	0.22 (-0.6, 0.58)	0.2 (-0.51, 0.51)
AUC Nasal Swab Subgenomic	0.19 (-0.68, 0.55)	0 (-0.63, 0.37)	0.14 (-0.58, 0.52)	0.06 (-0.63, 0.42)	0.48 (-0.29, 0.75)	0.23 (-0.52, 0.57)	0.65 (-0.16, 0.87)	0.5 (-0.24, 0.72)
AUC OP Swab N1	-0.03 (-0.59, 0.32)	0.05 (-0.53, 0.39)	0.07 (-0.52, 0.41)	0.05 (-0.56, 0.38)	0.34 (-0.36, 0.64)	0.04 (-0.56, 0.39)	0.39 (-0.34, 0.69)	0.29 (-0.32, 0.58)
AUC OP Swab Subgenomic	-0.26 (-0.71, 0.1)	-0.32 (-0.76, 0.04)	-0.14 (-0.65, 0.21)	-0.18 (-0.68, 0.17)	0.15 (-0.52, 0.49)	-0.29 (-0.76, 0.08)	0.16 (-0.55, 0.49)	-0.03 (-0.6, 0.31)
log VL Day2 PostChal- lenge BAL N1	-0.11 (-0.34, 0.04)	0.25 (-0.11, 0.46)	0.03 (-0.28, 0.23)	0.02 (-0.27, 0.2)	0.16 (-0.17, 0.39)	-0.01 (-0.29, 0.17)	0.12 (-0.21, 0.34)	0.1 (-0.19, 0.26)
log VL Day2 PostChal- lenge BAL Subgenomic	-0.15 (-0.57, 0.05)	0.29 (-0.24, 0.53)	0.05 (-0.5, 0.29)	0.09 (-0.46, 0.29)	0.23 (-0.19, 0.49)	0 (-0.47, 0.23)	0.16 (-0.24, 0.42)	0.05 (-0.36, 0.23)
log VL Day2 PostChal- lenge OPswab N1	-0.35 (-0.55, -0.19)	-0.39 (-0.58, -0.23)	-0.35 (-0.55, -0.18)	-0.36 (-0.55, -0.2)	-0.35 (-0.55, -0.19)	-0.32 (-0.52, -0.16)	-0.35 (-0.55, -0.18)	-0.33 (-0.52, -0.17)
log VL Day2 PostChal- lenge OPswab Subgenomic	-0.35 (-0.67, -0.11)	-0.39 (-0.7, -0.15)	-0.37 (-0.7, -0.14)	-0.38 (-0.69, -0.14)	-0.3 (-0.64, -0.06)	-0.23 (-0.6, 0.01)	-0.28 (-0.64, -0.04)	-0.23 (-0.59, 0)
log VL Day2 PostChal- lenge NasalSwab N1	0.11 (-0.21, 0.36)	0.07 (-0.24, 0.29)	0.17 (-0.11, 0.39)	0.1 (-0.18, 0.31)	0.26 (-0.06, 0.54)	0.19 (-0.1, 0.42)	0.28 (-0.08, 0.59)	0.25 (-0.03, 0.46)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.1 (-0.32, 0.36)	0.01 (-0.4, 0.29)	0.15 (-0.25, 0.39)	0.06 (-0.3, 0.29)	0.23 (-0.2, 0.49)	0.15 (-0.27, 0.41)	0.29 (-0.18, 0.57)	0.18 (-0.22, 0.43)

Table 6.8.12: RMAC using Janssen to predict Sanofi

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.23 (0.01, 0.42)	0.43 (0.17, 0.66)	0.03 (-0.12, 0.12)	0.1 (-0.09, 0.28)	0.11 (-0.09, 0.32)	0.19 (-0.02, 0.39)	0.13 (-0.07, 0.3)	0.17 (-0.03, 0.37)
AUC BAL Subgenomic	0.13 (-0.08, 0.3)	0.26 (0.04, 0.42)	0.01 (-0.12, 0.04)	0.06 (-0.09, 0.17)	0.06 (-0.11, 0.18)	0.07 (-0.1, 0.19)	0.07 (-0.09, 0.2)	0.09 (-0.08, 0.21)
AUC Nasal Swab N1	0.18 (-0.07, 0.29)	0.15 (-0.06, 0.23)	0.11 (-0.16, 0.22)	0.14 (-0.12, 0.25)	0.18 (-0.1, 0.3)	0.21 (-0.14, 0.41)	0.15 (-0.11, 0.26)	0.2 (-0.06, 0.31)
AUC Nasal Swab Subgenomic	0.21 (-0.09, 0.49)	0.28 (0.03, 0.48)	0.04 (-0.22, 0.26)	0.09 (-0.18, 0.32)	0.13 (-0.15, 0.37)	0.15 (-0.17, 0.42)	0.11 (-0.16, 0.34)	0.2 (-0.09, 0.47)
AUC OP Swab N1	0.01 (-0.1, 0.09)	0.03 (-0.1, 0.2)	0.02 (-0.1, 0.16)	0.05 (-0.09, 0.21)	0.03 (-0.09, 0.16)	0.03 (-0.13, 0.32)	0.04 (-0.09, 0.19)	0.07 (-0.06, 0.27)
AUC OP Swab Subgenomic	-0.02 (-0.12, 0.19)	-0.03 (-0.14, 0.26)	-0.03 (-0.15, 0.15)	-0.01 (-0.13, 0.23)	-0.02 (-0.13, 0.19)	-0.05 (-0.16, 0.2)	-0.02 (-0.13, 0.21)	-0.02 (-0.13, 0.19)
log VL Day2 PostChal- lenge BAL N1	0.17 (-0.13, 0.35)	0.26 (0.02, 0.41)	-0.02 (-0.2, 0.02)	0.04 (-0.17, 0.13)	0.11 (-0.21, 0.33)	0.08 (-0.24, 0.28)	0.08 (-0.17, 0.24)	0.14 (-0.14, 0.3)
log VL Day2 PostChal- lenge BAL Subgenomic	0.17 (-0.06, 0.31)	0.21 (0.03, 0.34)	0.01 (-0.11, 0.02)	0.06 (-0.1, 0.13)	0.1 (-0.12, 0.23)	0.1 (-0.16, 0.28)	0.11 (-0.09, 0.22)	0.12 (-0.07, 0.23)
log VL Day2 PostChal- lenge OPswab N1	0.3 (-0.08, 0.52)	0.09 (-0.17, 0.26)	-0.02 (-0.4, 0.2)	0.08 (-0.29, 0.31)	0.09 (-0.27, 0.31)	0.06 (-0.28, 0.26)	0.13 (-0.24, 0.33)	0.15 (-0.15, 0.31)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.32 (-0.02, 0.53)	0.14 (-0.14, 0.33)	0.06 (-0.31, 0.3)	0.17 (-0.21, 0.42)	0.16 (-0.2, 0.38)	0.15 (-0.2, 0.36)	0.18 (-0.15, 0.38)	0.2 (-0.09, 0.36)
log VL Day2 PostChal- lenge NasalSwab N1	0.44 (0.07, 0.67)	0.47 (0.2, 0.64)	0.18 (-0.2, 0.43)	0.31 (-0.02, 0.54)	0.31 (-0.11, 0.62)	0.21 (-0.18, 0.5)	0.26 (-0.1, 0.55)	0.49 (0.13, 0.7)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.42 (0.03, 0.66)	0.47 (0.2, 0.62)	0.12 (-0.29, 0.35)	0.26 (-0.1, 0.5)	0.28 (-0.17, 0.58)	0.2 (-0.21, 0.48)	0.23 (-0.14, 0.49)	0.46 (0.07, 0.67)

Table 6.8.13: RMAC using Janssen to predict Moderna

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	0.09 (-0.16, 0.28)	0.31 (0, 0.54)	0.02 (-0.17, 0.15)	0.21 (-0.04, 0.41)	0.05 (-0.19, 0.25)	0.02 (-0.23, 0.22)	0.06 (-0.18, 0.24)	0.07 (-0.18, 0.25)
AUC BAL Subgenomic	0.06 (-0.13, 0.22)	0.18 (-0.04, 0.33)	-0.02 (-0.17, 0.04)	0.14 (-0.05, 0.29)	0.01 (-0.17, 0.15)	-0.01 (-0.19, 0.11)	0.03 (-0.15, 0.16)	0.03 (-0.15, 0.15)
AUC Nasal Swab N1	-0.01 (-0.28, 0.16)	-0.07 (-0.33, 0.09)	0.02 (-0.26, 0.17)	0.1 (-0.16, 0.26)	-0.07 (-0.35, 0.09)	-0.04 (-0.33, 0.15)	-0.05 (-0.31, 0.12)	-0.02 (-0.29, 0.14)
AUC Nasal Swab Subgenomic	0.23 (-0.05, 0.44)	0.16 (-0.1, 0.35)	0.17 (-0.09, 0.36)	0.27 (0.02, 0.47)	0.09 (-0.17, 0.25)	0.06 (-0.22, 0.25)	0.14 (-0.13, 0.31)	0.17 (-0.09, 0.33)
AUC OP Swab N1	-0.03 (-0.27, 0.09)	0.06 (-0.2, 0.21)	0.09 (-0.18, 0.26)	0.22 (-0.07, 0.41)	0.02 (-0.25, 0.18)	0.04 (-0.28, 0.26)	0.06 (-0.22, 0.23)	0.12 (-0.18, 0.32)
AUC OP Swab Subgenomic	0 (-0.25, 0.18)	0.02 (-0.25, 0.2)	0.06 (-0.23, 0.27)	0.19 (-0.13, 0.42)	0 (-0.27, 0.22)	-0.07 (-0.34, 0.14)	0.01 (-0.26, 0.23)	-0.01 (-0.27, 0.19)
log VL Day2 PostChal- lenge BAL N1	0.13 (-0.12, 0.26)	0.29 (0.01, 0.45)	0.01 (-0.1, 0.02)	0.13 (-0.07, 0.23)	0.22 (-0.01, 0.36)	0.14 (-0.07, 0.26)	0.17 (-0.02, 0.27)	0.15 (-0.03, 0.24)
log VL Day2 PostChal- lenge BAL Subgenomic	0.19 (-0.05, 0.34)	0.3 (0.04, 0.45)	0.01 (-0.11, 0.02)	0.19 (-0.03, 0.3)	0.22 (0.04, 0.34)	0.19 (-0.04, 0.33)	0.21 (0.02, 0.31)	0.18 (0, 0.28)
log VL Day2 PostChal- lenge OPswab N1	0 (-0.37, 0.3)	-0.03 (-0.36, 0.21)	0.01 (-0.41, 0.36)	0.06 (-0.41, 0.46)	-0.1 (-0.46, 0.24)	-0.05 (-0.32, 0.15)	-0.07 (-0.42, 0.21)	0 (-0.3, 0.25)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.18 (-0.2, 0.45)	0.13 (-0.21, 0.35)	0.16 (-0.26, 0.46)	0.21 (-0.22, 0.57)	0.08 (-0.31, 0.37)	0.11 (-0.19, 0.3)	0.1 (-0.28, 0.36)	0.16 (-0.16, 0.38)
log VL Day2 PostChal- lenge NasalSwab N1	0.65 (0.34, 0.83)	0.57 (0.32, 0.73)	0.69 (0.42, 0.85)	0.65 (0.39, 0.8)	0.55 (0.26, 0.75)	0.52 (0.21, 0.73)	0.62 (0.32, 0.8)	0.6 (0.31, 0.78)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.57 (0.27, 0.77)	0.46 (0.15, 0.68)	0.55 (0.3, 0.74)	0.51 (0.22, 0.72)	0.45 (0.11, 0.69)	0.45 (0.1, 0.69)	0.51 (0.22, 0.71)	0.45 (0.11, 0.71)

Table 6.8.14: RMAC using Janssen to predict Novavax

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	-0.2 (-0.61, 0)	0.15 (-0.36, 0.37)	-0.34 (-0.77, -0.06)	-0.13 (-0.64, 0.13)	0.09 (-0.4, 0.29)	0.05 (-0.41, 0.22)	-0.01 (-0.51, 0.21)	-0.09 (-0.58, 0.12)
AUC BAL Subgenomic	-0.35 (-0.74, -0.09)	-0.11 (-0.61, 0.22)	-0.58 (-0.87, -0.32)	-0.31 (-0.75, 0.02)	-0.16 (-0.63, 0.13)	-0.25 (-0.7, 0.03)	-0.22 (-0.68, 0.07)	-0.31 (-0.74, -0.02)
AUC Nasal Swab N1	-0.16 (-0.74, 0.11)	-0.25 (-0.76, 0.03)	-0.15 (-0.71, 0.11)	-0.15 (-0.72, 0.12)	-0.05 (-0.66, 0.19)	0.03 (-0.59, 0.25)	-0.08 (-0.69, 0.18)	-0.11 (-0.69, 0.14)
AUC Nasal Swab Subgenomic	0.15 (-0.59, 0.4)	-0.01 (-0.63, 0.27)	-0.01 (-0.63, 0.27)	0.02 (-0.62, 0.29)	0.25 (-0.43, 0.45)	0.28 (-0.38, 0.46)	0.25 (-0.48, 0.48)	0.23 (-0.45, 0.43)
AUC OP Swab N1	-0.37 (-0.75, -0.09)	-0.26 (-0.7, 0.01)	-0.19 (-0.65, 0.09)	-0.12 (-0.63, 0.15)	-0.17 (-0.67, 0.11)	0.02 (-0.52, 0.29)	-0.11 (-0.63, 0.18)	-0.03 (-0.55, 0.23)
AUC OP Swab Subgenomic	-0.19 (-0.63, 0.09)	-0.18 (-0.66, 0.12)	-0.02 (-0.52, 0.25)	0.08 (-0.46, 0.35)	0.08 (-0.46, 0.34)	-0.14 (-0.62, 0.13)	0.1 (-0.48, 0.37)	-0.12 (-0.61, 0.14)
log VL Day2 PostChal- lenge BAL N1	-0.2 (-0.43, -0.03)	-0.06 (-0.37, 0.16)	-0.39 (-0.6, -0.21)	-0.27 (-0.51, -0.07)	0.07 (-0.22, 0.27)	-0.05 (-0.32, 0.12)	-0.08 (-0.36, 0.12)	-0.14 (-0.4, 0.04)
log VL Day2 PostChal- lenge BAL Subgenomic	-0.32 (-0.75, -0.06)	-0.17 (-0.71, 0.15)	-0.54 (-0.88, -0.26)	-0.38 (-0.83, -0.07)	-0.12 (-0.66, 0.14)	-0.11 (-0.63, 0.12)	-0.18 (-0.7, 0.09)	-0.28 (-0.76, -0.01)
log VL Day2 PostChal- lenge OPswab N1	0.14 (-0.06, 0.32)	0.01 (-0.23, 0.19)	0.26 (0.03, 0.44)	0.34 (0.07, 0.53)	0.18 (-0.11, 0.43)	0.09 (-0.11, 0.26)	0.16 (-0.09, 0.38)	0.09 (-0.13, 0.26)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.19 (-0.17, 0.43)	-0.06 (-0.45, 0.2)	0.35 (0, 0.57)	0.45 (0.09, 0.69)	0.32 (-0.07, 0.62)	0.07 (-0.32, 0.29)	0.27 (-0.13, 0.54)	0.12 (-0.25, 0.34)
log VL Day2 PostChal- lenge NasalSwab N1	0.25 (-0.07, 0.48)	0.05 (-0.26, 0.28)	0.26 (0, 0.47)	0.2 (-0.08, 0.43)	0.38 (-0.02, 0.67)	0.35 (-0.04, 0.62)	0.35 (-0.02, 0.63)	0.3 (0.02, 0.52)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.24 (-0.18, 0.49)	0 (-0.42, 0.29)	0.21 (-0.18, 0.43)	0.18 (-0.21, 0.42)	0.37 (-0.11, 0.68)	0.28 (-0.14, 0.54)	0.36 (-0.11, 0.65)	0.25 (-0.16, 0.52)

Table 6.8.15: RMAC using Novavax to predict Sanofi

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	-0.23 (-0.42, -0.08)	0.28 (-0.01, 0.55)	-0.08 (-0.28, 0.11)	-0.1 (-0.31, 0.1)	-0.02 (-0.24, 0.19)	-0.05 (-0.25, 0.13)	-0.06 (-0.28, 0.12)	-0.04 (-0.28, 0.16)
AUC BAL Subgenomic	-0.29 (-0.46, -0.16)	-0.03 (-0.23, 0.14)	-0.18 (-0.36, -0.03)	-0.16 (-0.33, 0)	-0.17 (-0.35, -0.02)	-0.21 (-0.38, -0.07)	-0.2 (-0.37, -0.06)	-0.22 (-0.39, -0.08)
AUC Nasal Swab N1	0.42 (0.17, 0.61)	0.6 (0.32, 0.77)	0.53 (0.14, 0.78)	0.55 (0.25, 0.75)	0.61 (0.29, 0.8)	0.53 (0.15, 0.74)	0.54 (0.25, 0.72)	0.59 (0.31, 0.76)
AUC Nasal Swab Subgenomic	0.5 (0.15, 0.71)	0.41 (0.1, 0.66)	0.31 (-0.08, 0.64)	0.4 (0.02, 0.69)	0.47 (0.15, 0.76)	0.48 (0.08, 0.77)	0.44 (0.14, 0.69)	0.55 (0.24, 0.78)
AUC OP Swab N1	0.3 (0.08, 0.66)	0.11 (-0.13, 0.58)	0.24 (0.04, 0.6)	0.29 (0.08, 0.63)	0.19 (0.02, 0.51)	0.12 (-0.14, 0.61)	0.19 (0, 0.54)	0.26 (0.06, 0.6)
AUC OP Swab Subgenomic	0.01 (-0.13, 0.33)	-0.11 (-0.26, 0.12)	0.01 (-0.12, 0.31)	0.05 (-0.09, 0.42)	-0.02 (-0.18, 0.19)	-0.1 (-0.23, 0.23)	-0.02 (-0.15, 0.26)	-0.01 (-0.15, 0.26)
log VL Day2 PostChal- lenge BAL N1	-0.34 (-0.62, -0.11)	-0.03 (-0.35, 0.22)	-0.19 (-0.48, 0.05)	-0.28 (-0.55, -0.07)	-0.23 (-0.53, 0.02)	-0.35 (-0.61, -0.13)	-0.3 (-0.56, -0.08)	-0.27 (-0.56, -0.02)
log VL Day2 PostChal- lenge BAL Subgenomic	-0.35 (-0.6, -0.17)	-0.03 (-0.31, 0.19)	-0.17 (-0.44, 0.04)	-0.15 (-0.43, 0.06)	-0.17 (-0.44, 0.03)	-0.27 (-0.52, -0.08)	-0.22 (-0.47, -0.03)	-0.27 (-0.52, -0.08)
log VL Day2 PostChal- lenge OPswab N1	0.28 (-0.13, 0.53)	-0.11 (-0.46, 0.11)	0.08 (-0.3, 0.33)	0.19 (-0.17, 0.43)	0 (-0.35, 0.19)	0.04 (-0.33, 0.28)	0.04 (-0.33, 0.26)	0.13 (-0.23, 0.33)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.26 (-0.13, 0.5)	-0.13 (-0.48, 0.09)	0.07 (-0.32, 0.35)	0.18 (-0.21, 0.44)	0.09 (-0.26, 0.3)	0.02 (-0.37, 0.29)	0.11 (-0.25, 0.34)	0.15 (-0.2, 0.37)
log VL Day2 PostChal- lenge NasalSwab N1	0.44 (0.14, 0.62)	0.18 (-0.25, 0.46)	0.39 (0.04, 0.63)	0.43 (0.12, 0.62)	0.49 (0.16, 0.68)	0.37 (0.01, 0.6)	0.38 (0.07, 0.62)	0.55 (0.28, 0.7)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.35 (-0.07, 0.64)	-0.25 (-0.65, 0.04)	0.16 (-0.23, 0.44)	0.29 (-0.07, 0.54)	0.3 (-0.14, 0.56)	0.27 (-0.12, 0.55)	0.22 (-0.15, 0.48)	0.36 (-0.09, 0.62)

Table 6.8.16: RMAC using Novavax to predict Moderna

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	-0.22 (-0.44, -0.05)	0.21 (-0.13, 0.48)	0.14 (-0.15, 0.42)	0.15 (-0.15, 0.42)	-0.04 (-0.29, 0.18)	-0.12 (-0.37, 0.09)	-0.07 (-0.32, 0.14)	-0.07 (-0.33, 0.14)
AUC BAL Subgenomic	-0.24 (-0.41, -0.12)	-0.04 (-0.24, 0.12)	-0.07 (-0.26, 0.1)	-0.02 (-0.23, 0.16)	-0.15 (-0.34, -0.01)	-0.19 (-0.36, -0.06)	-0.18 (-0.35, -0.04)	-0.19 (-0.37, -0.06)
AUC Nasal Swab N1	0.57 (0.3, 0.72)	0.41 (0.07, 0.65)	0.62 (0.4, 0.73)	0.56 (0.38, 0.67)	0.39 (0.09, 0.6)	0.5 (0.17, 0.71)	0.54 (0.25, 0.73)	0.57 (0.27, 0.76)
AUC Nasal Swab Subgenomic	0.66 (0.39, 0.81)	0.3 (-0.02, 0.55)	0.66 (0.45, 0.78)	0.6 (0.42, 0.73)	0.49 (0.25, 0.64)	0.45 (0.13, 0.66)	0.62 (0.36, 0.77)	0.59 (0.32, 0.76)
AUC OP Swab N1	0.51 (0.16, 0.73)	0.33 (-0.06, 0.62)	0.61 (0.27, 0.81)	0.6 (0.3, 0.77)	0.36 (0, 0.6)	0.3 (-0.14, 0.63)	0.42 (0.08, 0.67)	0.48 (0.1, 0.73)
AUC OP Swab Subgenomic	0.11 (-0.22, 0.38)	-0.12 (-0.41, 0.12)	0.36 (-0.05, 0.65)	0.46 (0.05, 0.73)	0 (-0.29, 0.26)	-0.09 (-0.43, 0.21)	0.05 (-0.26, 0.32)	0.05 (-0.29, 0.35)
log VL Day2 PostChal- lenge BAL N1	-0.06 (-0.3, 0.09)	0.28 (-0.03, 0.46)	0.27 (-0.12, 0.51)	0.22 (-0.11, 0.41)	0.06 (-0.2, 0.22)	-0.05 (-0.29, 0.11)	0.02 (-0.21, 0.17)	0.03 (-0.21, 0.18)
log VL Day2 PostChal- lenge BAL Subgenomic	-0.22 (-0.43, -0.08)	0.2 (-0.08, 0.38)	0.17 (-0.12, 0.38)	0.26 (-0.06, 0.47)	0.02 (-0.22, 0.2)	-0.11 (-0.35, 0.05)	-0.04 (-0.27, 0.12)	-0.11 (-0.33, 0.05)
log VL Day2 PostChal- lenge OPswab N1	-0.03 (-0.41, 0.28)	-0.26 (-0.57, -0.02)	0.08 (-0.36, 0.46)	0.06 (-0.39, 0.47)	-0.17 (-0.5, 0.11)	-0.08 (-0.37, 0.15)	-0.16 (-0.48, 0.11)	-0.04 (-0.37, 0.25)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.11 (-0.3, 0.41)	-0.21 (-0.55, 0.05)	0.19 (-0.25, 0.5)	0.2 (-0.22, 0.57)	0 (-0.37, 0.28)	-0.03 (-0.37, 0.2)	0.02 (-0.36, 0.29)	0.11 (-0.27, 0.37)
log VL Day2 PostChal- lenge NasalSwab N1	0.62 (0.35, 0.81)	0.43 (0.11, 0.64)	0.53 (0.35, 0.68)	0.4 (0.17, 0.59)	0.64 (0.37, 0.82)	0.58 (0.27, 0.78)	0.7 (0.42, 0.86)	0.55 (0.22, 0.76)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.57 (0.24, 0.77)	0.03 (-0.33, 0.26)	0.6 (0.39, 0.72)	0.48 (0.22, 0.66)	0.43 (0.11, 0.67)	0.51 (0.13, 0.76)	0.5 (0.22, 0.71)	0.45 (0.1, 0.7)

Table 6.8.17: RMAC using Novavax to predict Janssen

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
AUC BAL N1	-0.22 (-0.45, -0.05)	0.28 (-0.06, 0.53)	0.04 (-0.25, 0.27)	0.03 (-0.22, 0.22)	0.06 (-0.22, 0.27)	0.01 (-0.25, 0.21)	0.03 (-0.25, 0.26)	0 (-0.25, 0.21)
AUC BAL Subgenomic	-0.31 (-0.48, -0.17)	-0.06 (-0.28, 0.12)	-0.15 (-0.34, -0.01)	-0.12 (-0.32, 0.03)	-0.15 (-0.35, 0)	-0.21 (-0.4, -0.06)	-0.19 (-0.39, -0.05)	-0.22 (-0.42, -0.08)
AUC Nasal Swab N1	-0.04 (-0.37, 0.26)	0.15 (-0.28, 0.53)	-0.05 (-0.35, 0.24)	0.01 (-0.29, 0.25)	-0.04 (-0.37, 0.26)	-0.13 (-0.5, 0.22)	0 (-0.36, 0.33)	-0.02 (-0.39, 0.32)
AUC Nasal Swab Subgenomic	0.28 (-0.1, 0.55)	0.32 (-0.11, 0.66)	0.14 (-0.16, 0.43)	0.17 (-0.11, 0.44)	0.07 (-0.22, 0.33)	0.06 (-0.34, 0.41)	0.17 (-0.19, 0.47)	0.21 (-0.21, 0.53)
AUC OP Swab N1	0.06 (-0.35, 0.47)	0.11 (-0.23, 0.49)	0.07 (-0.22, 0.36)	0.12 (-0.16, 0.41)	0.07 (-0.21, 0.32)	0.13 (-0.15, 0.38)	0.14 (-0.19, 0.43)	0.2 (-0.15, 0.52)
AUC OP Swab Subgenomic	0.17 (-0.12, 0.4)	0 (-0.27, 0.2)	0.21 (-0.03, 0.42)	0.25 (0, 0.45)	0.11 (-0.15, 0.31)	0.07 (-0.17, 0.24)	0.2 (-0.08, 0.41)	0.14 (-0.13, 0.35)
log VL Day2 PostChal- lenge BAL N1	-0.17 (-0.46, 0.02)	0.04 (-0.27, 0.26)	-0.03 (-0.34, 0.18)	-0.09 (-0.39, 0.11)	-0.04 (-0.3, 0.12)	-0.13 (-0.41, 0.04)	-0.08 (-0.37, 0.1)	-0.1 (-0.41, 0.09)
log VL Day2 PostChal- lenge BAL Subgenomic	-0.31 (-0.52, -0.15)	-0.04 (-0.29, 0.16)	-0.11 (-0.34, 0.05)	-0.09 (-0.33, 0.08)	-0.11 (-0.34, 0.03)	-0.2 (-0.42, -0.04)	-0.15 (-0.38, 0)	-0.22 (-0.45, -0.06)
log VL Day2 PostChal- lenge OPswab N1	0.31 (0.03, 0.49)	0.05 (-0.26, 0.23)	0.32 (0.1, 0.44)	0.4 (0.18, 0.52)	0.14 (-0.09, 0.25)	0.12 (-0.11, 0.24)	0.18 (-0.07, 0.32)	0.17 (-0.07, 0.31)
log VL Day2 PostChal- lenge OPswab Subgenomic	0.33 (0.07, 0.51)	-0.05 (-0.31, 0.13)	0.37 (0.16, 0.51)	0.45 (0.23, 0.59)	0.17 (-0.03, 0.29)	0.07 (-0.15, 0.2)	0.23 (0.01, 0.38)	0.19 (-0.04, 0.35)
log VL Day2 PostChal- lenge NasalSwab N1	0.54 (0.2, 0.79)	0.18 (-0.12, 0.43)	0.26 (-0.03, 0.53)	0.32 (0.03, 0.55)	0.33 (0.05, 0.58)	0.35 (0, 0.65)	0.45 (0.12, 0.7)	0.41 (0.03, 0.71)
log VL Day2 PostChal- lenge NasalSwab Subgenomic	0.54 (0.26, 0.72)	-0.08 (-0.43, 0.13)	0.38 (0.1, 0.58)	0.37 (0.12, 0.55)	0.36 (0.16, 0.52)	0.38 (0.04, 0.67)	0.45 (0.18, 0.63)	0.39 (0.11, 0.6)

Binary Viral Load

Table 6.8.18: Binary RMAC with Sanofi Vaccine Product Excluded

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.02 (-0.06, 1)	1 (1, 1)	-0.02 (-0.06, 1)	1 (1, 1)	1 (1, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	0.25 (-0.17, 0.61)	0.02 (-0.36, 0.41)	0.05 (-0.33, 0.44)	0.19 (-0.24, 0.56)	-0.02 (-0.41, 0.35)	0.09 (-0.31, 0.46)	-0.02 (-0.41, 0.35)	-0.33 (-0.68, 0.03)
bin VL Day2 PostChal- lenge OPswab N1	0.46 (-0.08, 1)	-0.06 (-0.13, 1)	-0.08 (-0.18, -0.02)	-0.06 (-0.16, 1)	-0.02 (-0.06, 1)	-0.04 (-0.11, 1)	-0.04 (-0.11, 1)	0.65 (-0.06, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	0.08 (-0.3, 0.49)	0.19 (-0.22, 0.6)	-0.03 (-0.41, 0.35)	0.5 (-0.08, 0.88)	-0.17 (-0.46, 0.16)	0.13 (-0.27, 0.53)	0.42 (-0.11, 0.8)	0.28 (-0.18, 0.66)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	-0.02 (-0.06, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.13 (-0.24, -0.04)	-0.11 (-0.21, -0.04)	-0.08 (-0.18, -0.02)	-0.06 (-0.13, 1)	0.11 (-0.24, 0.57)	-0.16 (-0.3, -0.06)	-0.02 (-0.06, 1)	-0.13 (-0.24, -0.04)

Table 6.8.19: Binary RMAC with Moderna Vaccine Product Excluded

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.02 (-0.06, 1)	-0.04 (-0.11, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.04 (-0.11, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	0.31 (-0.1, 0.67)	-0.19 (-0.47, 0.17)	-0.14 (-0.53, 0.26)	0.38 (-0.05, 0.73)	0.17 (-0.24, 0.52)	0.31 (-0.1, 0.67)	0.58 (0.2, 0.84)	0.01 (-0.35, 0.4)
bin VL Day2 PostChal- lenge OPswab N1	-0.06 (-0.13, 1)	-0.06 (-0.13, 1)	-0.06 (-0.13, 1)	-0.04 (-0.11, 1)	-0.06 (-0.16, 1)	-0.06 (-0.13, 1)	1 (1, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	-0.33 (-0.53, -0.18)	0.13 (-0.27, 0.51)	-0.24 (-0.41, -0.11)	0.01 (-0.3, 0.42)	-0.24 (-0.41, -0.11)	0.42 (-0.11, 0.8)	0.08 (-0.3, 0.49)	0.06 (-0.27, 0.5)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	-0.02 (-0.06, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	0.11 (-0.24, 0.6)	-0.11 (-0.21, -0.02)	-0.11 (-0.21, -0.02)	0.25 (-0.16, 0.78)	0.25 (-0.16, 0.78)	0.26 (-0.18, 0.7)	-0.16 (-0.3, -0.06)	0.34 (-0.13, 1)

Table 6.8.20: Binary RMAC with Janssen Vaccine Product Excluded

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.03 (-0.08, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	-0.02 (-0.05, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	-0.15 (-0.47, 0.18)	0.13 (-0.25, 0.48)	0.08 (-0.28, 0.42)	0.07 (-0.29, 0.42)	-0.28 (-0.42, -0.16)	-0.13 (-0.39, 0.18)	0 (-0.31, 0.36)	0.23 (-0.16, 0.58)
bin VL Day2 PostChal- lenge OPswab N1	-0.03 (-0.08, 1)	-0.07 (-0.14, -0.02)	0.65 (-0.05, 1)	-0.03 (-0.08, 1)	-0.05 (-0.12, 1)	-0.03 (-0.08, 1)	-0.05 (-0.1, 1)	-0.05 (-0.1, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	0.18 (-0.21, 0.56)	-0.04 (-0.36, 0.32)	-0.19 (-0.31, -0.08)	0.09 (-0.21, 0.52)	0.09 (-0.21, 0.52)	0.01 (-0.25, 0.38)	-0.25 (-0.42, -0.14)	-0.13 (-0.39, 0.18)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.08 (-0.16, -0.02)	0.26 (-0.12, 0.78)	-0.1 (-0.21, -0.03)	0.2 (-0.14, 0.65)	0.2 (-0.14, 0.65)	-0.12 (-0.23, -0.05)	-0.14 (-0.25, -0.05)	-0.08 (-0.16, -0.02)

Table 6.8.21: Binary RMAC with Novavax Vaccine Product Excluded

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.11 (-0.21, -0.02)	-0.16 (-0.3, -0.06)	0.25 (-0.16, 0.78)	-0.11 (-0.21, -0.02)	-0.17 (-0.46, 0.17)	-0.08 (-0.18, -0.02)	0.16 (-0.26, 0.53)	0.01 (-0.3, 0.41)
bin VL Day2 PostChal- lenge BAL Subgenomic	-0.14 (-0.52, 0.21)	0.09 (-0.31, 0.46)	-0.24 (-0.62, 0.14)	-0.1 (-0.48, 0.28)	0.02 (-0.33, 0.41)	0.05 (-0.36, 0.39)	-0.22 (-0.49, 0.11)	-0.26 (-0.64, 0.09)
bin VL Day2 PostChal- lenge OPswab N1	-0.08 (-0.37, 0.28)	-0.04 (-0.33, 0.35)	0.01 (-0.3, 0.41)	-0.18 (-0.33, -0.08)	-0.18 (-0.33, -0.08)	-0.18 (-0.33, -0.08)	0.02 (-0.33, 0.41)	0.19 (-0.24, 0.61)
bin VL Day2 PostChal- lenge OPswab Subgenomic	-0.31 (-0.68, 0.05)	-0.08 (-0.46, 0.3)	-0.24 (-0.62, 0.14)	0.07 (-0.33, 0.44)	0.23 (-0.17, 0.6)	0.23 (-0.17, 0.54)	0.12 (-0.3, 0.51)	0.35 (-0.04, 0.69)
bin VL Day2 PostChal- lenge NasalSwab N1	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.22 (-0.49, 0.11)	-0.03 (-0.41, 0.34)	-0.44 (-0.68, -0.27)	-0.37 (-0.58, -0.21)	-0.19 (-0.53, 0.16)	-0.19 (-0.53, 0.16)	-0.3 (-0.49, -0.16)	0.03 (-0.38, 0.39)

Table 6.8.22: Binary RMAC Average

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.0450	0.4500	0.3025	0.4675	0.4525	-0.0400	0.2800	0.4975
bin VL Day2 PostChal- lenge BAL Subgenomic	0.0675	0.0125	-0.0625	0.1350	-0.0275	0.0800	0.0850	-0.0875
bin VL Day2 PostChal- lenge OPswab N1	0.0725	-0.0575	0.1300	-0.0775	-0.0775	-0.0775	0.2325	0.1925
bin VL Day2 PostChal- lenge OPswab Subgenomic	-0.0950	0.0500	-0.1750	0.1675	-0.0225	0.1975	0.0925	0.1400
bin VL Day2 PostChal- lenge NasalSwab N1	0.7450	0.7450	0.7450	0.7450	0.2350	0.7450	0.7450	0.7450
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.0800	0.0025	-0.1825	0.0050	0.0925	-0.0525	-0.1550	0.0400

Pairs of Vaccine Products

Table 6.8.23: Binary RMAC using Sanofi to predict Moderna

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	0.08 (-0.32, 0.48)	0.27 (-0.19, 0.69)	-0.14 (-0.43, 0.21)	0.01 (-0.39, 0.4)	0.38 (-0.05, 0.73)	0.12 (-0.28, 0.52)	-0.14 (-0.43, 0.21)	0.18 (-0.25, 0.59)
bin VL Day2 PostChal- lenge OPswab N1	-0.04 (-0.11, 1)	-0.04 (-0.11, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.04 (-0.11, 1)	-0.02 (-0.06, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	0.01 (-0.3, 0.41)	-0.16 (-0.3, -0.06)	0.06 (-0.27, 0.5)	-0.16 (-0.3, -0.06)	-0.24 (-0.41, -0.11)	-0.13 (-0.24, -0.04)	0.19 (-0.24, 0.6)	-0.16 (-0.3, -0.06)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.08 (-0.18, -0.02)	-0.06 (-0.13, 1)	-0.06 (-0.16, 1)	-0.06 (-0.16, 1)	0.17 (-0.18, 0.65)	0.34 (-0.13, 1)	-0.08 (-0.18, -0.02)	-0.06 (-0.13, 1)

Table 6.8.24: Binary RMAC using Sanofi to predict Janssen

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	-0.02 (-0.36, 0.33)	0.23 (-0.17, 0.56)	0.12 (-0.25, 0.45)	0.38 (-0.02, 0.71)	-0.28 (-0.42, -0.16)	-0.13 (-0.39, 0.18)	0.09 (-0.25, 0.45)	0.33 (-0.06, 0.67)
bin VL Day2 PostChal- lenge OPswab N1	0.35 (-0.1, 1)	-0.08 (-0.16, -0.02)	0.65 (-0.05, 1)	-0.05 (-0.12, 1)	-0.05 (-0.12, 1)	-0.03 (-0.08, 1)	-0.07 (-0.14, -0.02)	-0.05 (-0.1, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	0.18 (-0.21, 0.56)	-0.28 (-0.45, -0.16)	-0.19 (-0.31, -0.08)	0.09 (-0.21, 0.52)	0.09 (-0.21, 0.52)	-0.03 (-0.28, 0.33)	-0.23 (-0.39, -0.12)	-0.17 (-0.42, 0.13)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.08 (-0.16, -0.02)	-0.07 (-0.14, -0.02)	-0.07 (-0.14, -0.02)	-0.07 (-0.14, -0.02)	-0.08 (-0.16, -0.02)	-0.07 (-0.14, -0.02)	-0.1 (-0.21, -0.03)	-0.07 (-0.14, -0.02)

Table 6.8.25: Binary RMAC using Sanofi to predict Novavax

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)
bin VL Day2 PostChal- lenge BAL Subgenomic	0.21 (-0.2, 0.54)	-0.17 (-0.55, 0.21)	-0.38 (-0.73, -0.01)	-0.39 (-0.73, -0.04)	-0.26 (-0.63, 0.1)	-0.33 (-0.68, 0.02)	0.21 (-0.2, 0.59)	0.12 (-0.3, 0.46)
bin VL Day2 PostChal- lenge OPswab N1	-0.04 (-0.44, 0.32)	-0.18 (-0.33, -0.08)	0.06 (-0.27, 0.5)	-0.18 (-0.33, -0.08)	-0.18 (-0.33, -0.08)	-0.18 (-0.33, -0.08)	0.05 (-0.36, 0.42)	-0.17 (-0.44, 0.19)
bin VL Day2 PostChal- lenge OPswab Subgenomic	0.03 (-0.36, 0.39)	0 (-0.39, 0.38)	0.31 (-0.08, 0.67)	0.45 (0.05, 0.77)	0.03 (-0.37, 0.41)	-0.58 (-0.86, -0.3)	0.16 (-0.26, 0.54)	0.14 (-0.26, 0.51)
bin VL Day2 PostChal- lenge NasalSwab N1	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.17 (-0.44, 0.16)	-0.03 (-0.41, 0.34)	-0.33 (-0.53, -0.18)	-0.37 (-0.58, -0.21)	0.14 (-0.26, 0.51)	-0.13 (-0.41, 0.26)	-0.3 (-0.49, -0.16)	0.03 (-0.37, 0.41)

Table 6.8.26: Binary RMAC using Moderna to predict Sanofi

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.04 (-0.11, 1)	-0.06 (-0.13, 1)	1 (1, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	0.15 (-0.26, 0.53)	0.02 (-0.36, 0.41)	0.15 (-0.26, 0.51)	0.03 (-0.37, 0.42)	0.1 (-0.3, 0.49)	0.09 (-0.31, 0.45)	0.1 (-0.3, 0.49)	-0.31 (-0.69, 0.05)
bin VL Day2 PostChal- lenge OPswab N1	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	0.01 (-0.3, 0.42)	-0.16 (-0.3, -0.06)	-0.13 (-0.24, -0.04)	0.5 (-0.08, 0.88)	-0.18 (-0.33, -0.08)	0.13 (-0.27, 0.53)	-0.16 (-0.3, -0.06)	0.33 (-0.16, 0.75)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.06 (-0.16, 1)	-0.08 (-0.18, -0.02)	-0.13 (-0.24, -0.04)	-0.06 (-0.13, 1)	0.34 (-0.13, 1)	-0.16 (-0.3, -0.06)	-0.02 (-0.06, 1)	-0.11 (-0.21, -0.02)

Table 6.8.27: Binary RMAC using Moderna to predict Janssen

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.03 (-0.08, 1)	-0.03 (-0.08, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	-0.03 (-0.08, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	0.02 (-0.35, 0.36)	0.22 (-0.17, 0.56)	0.03 (-0.33, 0.37)	-0.04 (-0.36, 0.28)	-0.13 (-0.39, 0.18)	0 (-0.33, 0.33)	-0.13 (-0.39, 0.2)	0.07 (-0.28, 0.42)
bin VL Day2 PostChal- lenge OPswab N1	-0.03 (-0.08, 1)	-0.03 (-0.08, 1)	-0.03 (-0.08, 1)	-0.03 (-0.08, 1)	-0.03 (-0.08, 1)	-0.03 (-0.08, 1)	-0.03 (-0.08, 1)	-0.03 (-0.08, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	-0.16 (-0.28, -0.07)	-0.21 (-0.33, -0.1)	-0.19 (-0.31, -0.08)	0.01 (-0.25, 0.38)	-0.16 (-0.28, -0.07)	0.01 (-0.25, 0.38)	-0.19 (-0.31, -0.08)	-0.06 (-0.31, 0.27)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.1 (-0.19, -0.03)	0.26 (-0.12, 0.78)	-0.12 (-0.23, -0.05)	0.14 (-0.19, 0.61)	0.14 (-0.19, 0.61)	-0.12 (-0.23, -0.05)	-0.14 (-0.25, -0.05)	-0.1 (-0.21, -0.03)

Table 6.8.28: Binary RMAC using Moderna to predict Novavax

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.16 (-0.3, -0.06)	-0.02 (-0.41, 0.35)	0.1 (-0.31, 0.49)	0.22 (-0.22, 0.6)	-0.17 (-0.46, 0.17)	-0.11 (-0.21, -0.02)	0.1 (-0.31, 0.46)	-0.22 (-0.49, 0.11)
bin VL Day2 PostChal- lenge BAL Subgenomic	-0.08 (-0.44, 0.28)	0.34 (-0.13, 0.69)	-0.19 (-0.53, 0.16)	0.08 (-0.3, 0.49)	0.13 (-0.27, 0.53)	0.04 (-0.36, 0.41)	0.08 (-0.3, 0.49)	-0.14 (-0.49, 0.23)
bin VL Day2 PostChal- lenge OPswab N1	-0.16 (-0.3, -0.06)	-0.16 (-0.3, -0.06)	-0.16 (-0.27, -0.06)	-0.16 (-0.3, -0.06)	-0.16 (-0.3, -0.06)	-0.16 (-0.27, -0.06)	-0.16 (-0.3, -0.06)	-0.16 (-0.3, -0.06)
bin VL Day2 PostChal- lenge OPswab Subgenomic	-0.33 (-0.69, 0.02)	-0.01 (-0.41, 0.35)	-0.49 (-0.73, -0.3)	-0.41 (-0.7, -0.08)	0.14 (-0.26, 0.53)	0 (-0.39, 0.37)	-0.36 (-0.64, -0.03)	-0.17 (-0.55, 0.21)
bin VL Day2 PostChal- lenge NasalSwab N1	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.26 (-0.58, 0.08)	0.09 (-0.31, 0.46)	-0.36 (-0.64, -0.08)	-0.37 (-0.58, -0.21)	-0.14 (-0.48, 0.22)	-0.3 (-0.63, 0.05)	-0.37 (-0.58, -0.21)	0.03 (-0.38, 0.39)

Table 6.8.29: Binary RMAC using Janssen to predict Sanofi

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	-0.31 (-0.63, 0.02)	-0.27 (-0.44, -0.13)	0.1 (-0.31, 0.49)	-0.26 (-0.53, 0.08)	-0.08 (-0.44, 0.28)	0.15 (-0.26, 0.53)	-0.14 (-0.49, 0.21)	0.15 (-0.26, 0.53)
bin VL Day2 PostChal- lenge OPswab N1	0.34 (-0.13, 1)	-0.06 (-0.13, 1)	-0.22 (-0.49, 0.13)	-0.08 (-0.37, 0.28)	-0.11 (-0.21, -0.02)	-0.08 (-0.18, -0.02)	-0.06 (-0.16, 1)	0.65 (-0.06, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	-0.08 (-0.37, 0.28)	-0.04 (-0.33, 0.35)	0.02 (-0.37, 0.39)	-0.08 (-0.46, 0.3)	0.28 (-0.17, 0.65)	-0.17 (-0.44, 0.19)	0.1 (-0.31, 0.49)	0.16 (-0.27, 0.53)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.11 (-0.21, -0.02)	-0.08 (-0.18, -0.02)	-0.11 (-0.21, -0.02)	-0.06 (-0.13, 1)	0.11 (-0.24, 0.57)	-0.16 (-0.3, -0.06)	-0.02 (-0.06, 1)	-0.13 (-0.24, -0.04)

Table 6.8.30: Binary RMAC using Janssen to predict Moderna

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	0.08 (-0.32, 0.48)	0.08 (-0.32, 0.48)	-0.39 (-0.69, -0.1)	0.08 (-0.33, 0.48)	0.17 (-0.28, 0.52)	0.31 (-0.1, 0.67)	0.02 (-0.39, 0.41)	-0.1 (-0.39, 0.27)
bin VL Day2 PostChal- lenge OPswab N1	-0.08 (-0.18, -0.02)	-0.04 (-0.11, 1)	-0.18 (-0.33, -0.08)	-0.13 (-0.27, -0.04)	-0.13 (-0.24, -0.04)	-0.08 (-0.18, -0.02)	-0.06 (-0.13, 1)	-0.04 (-0.11, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	-0.37 (-0.58, -0.21)	-0.16 (-0.3, -0.06)	-0.13 (-0.41, 0.22)	0.13 (-0.27, 0.56)	-0.03 (-0.37, 0.34)	0.19 (-0.21, 0.61)	-0.17 (-0.46, 0.17)	-0.27 (-0.44, -0.13)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	0.01 (-0.3, 0.41)	-0.11 (-0.21, -0.02)	-0.11 (-0.21, -0.02)	0.5 (-0.11, 1)	0.33 (-0.16, 0.78)	0.19 (-0.24, 0.62)	-0.16 (-0.3, -0.06)	0.34 (-0.13, 1)

Table 6.8.31: Binary RMAC using Janssen to predict Novavax

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)	-0.08 (-0.18, -0.02)
bin VL Day2 PostChal- lenge BAL Subgenomic	0.21 (-0.2, 0.54)	-0.17 (-0.55, 0.21)	-0.24 (-0.62, 0.14)	0.02 (-0.36, 0.41)	-0.42 (-0.73, -0.08)	0.28 (-0.14, 0.64)	-0.24 (-0.58, 0.12)	-0.2 (-0.58, 0.15)
bin VL Day2 PostChal- lenge OPswab N1	-0.26 (-0.53, 0.08)	0.02 (-0.33, 0.41)	-0.08 (-0.46, 0.3)	-0.17 (-0.55, 0.21)	-0.39 (-0.73, -0.08)	-0.33 (-0.7, 0.02)	-0.01 (-0.42, 0.37)	-0.14 (-0.52, 0.23)
bin VL Day2 PostChal- lenge OPswab Subgenomic	0.15 (-0.26, 0.53)	0 (-0.39, 0.38)	0.49 (0.01, 0.83)	0.28 (-0.18, 0.68)	-0.03 (-0.41, 0.35)	-0.31 (-0.69, 0.05)	0.15 (-0.26, 0.53)	0.14 (-0.26, 0.51)
bin VL Day2 PostChal- lenge NasalSwab N1	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.19 (-0.53, 0.16)	0.1 (-0.3, 0.49)	-0.24 (-0.62, 0.14)	-0.37 (-0.58, -0.21)	0.05 (-0.36, 0.45)	-0.2 (-0.58, 0.19)	0.28 (-0.14, 0.61)	0.03 (-0.37, 0.39)

Table 6.8.32: Binary RMAC using Novavax to predict Sanofi

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.02 (-0.06, 1)	1 (1, 1)	-0.02 (-0.06, 1)	1 (1, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	0 (-0.39, 0.38)	0.08 (-0.33, 0.44)	-0.46 (-0.79, -0.1)	0.14 (-0.26, 0.51)	0.19 (-0.22, 0.54)	-0.16 (-0.55, 0.23)	0.07 (-0.33, 0.45)	-0.33 (-0.69, 0.03)
bin VL Day2 PostChal- lenge OPswab N1	0.25 (-0.16, 0.78)	-0.13 (-0.24, -0.04)	-0.13 (-0.24, -0.04)	-0.06 (-0.16, 1)	-0.04 (-0.11, 1)	-0.06 (-0.13, 1)	-0.13 (-0.27, -0.04)	0.46 (-0.08, 1)
bin VL Day2 PostChal- lenge OPswab Subgenomic	-0.08 (-0.37, 0.28)	0.12 (-0.3, 0.49)	0.22 (-0.22, 0.6)	0.57 (0.11, 0.9)	0.34 (-0.1, 0.69)	0.1 (-0.31, 0.49)	0.22 (-0.22, 0.61)	0.28 (-0.14, 0.64)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	-0.04 (-0.11, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.13 (-0.24, -0.04)	-0.04 (-0.33, 0.35)	-0.11 (-0.21, -0.02)	-0.08 (-0.18, -0.02)	0.11 (-0.24, 0.57)	-0.16 (-0.3, -0.06)	-0.04 (-0.11, 1)	-0.16 (-0.3, -0.06)

Table 6.8.33: Binary RMAC using Novavax to predict Moderna

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.02 (-0.06, 1)	-0.06 (-0.16, 1)	-0.02 (-0.06, 1)	-0.02 (-0.06, 1)	-0.06 (-0.14, 1)	-0.04 (-0.11, 1)	-0.04 (-0.11, 1)	-0.02 (-0.06, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	-0.36 (-0.72, -0.04)	0.26 (-0.16, 0.63)	0.43 (0.03, 0.76)	0.35 (-0.05, 0.68)	0.03 (-0.4, 0.43)	0.03 (-0.37, 0.41)	0.12 (-0.3, 0.5)	-0.1 (-0.5, 0.26)
bin VL Day2 PostChal- lenge OPswab N1	-0.08 (-0.18, -0.02)	-0.06 (-0.13, 1)	-0.06 (-0.13, 1)	-0.06 (-0.16, 1)	-0.21 (-0.37, -0.08)	-0.06 (-0.13, 1)	-0.04 (-0.11, 1)	-0.08 (-0.18, -0.02)
bin VL Day2 PostChal- lenge OPswab Subgenomic	-0.08 (-0.37, 0.28)	-0.14 (-0.52, 0.22)	-0.21 (-0.37, -0.11)	0.06 (-0.27, 0.5)	-0.27 (-0.44, -0.13)	0.13 (-0.27, 0.5)	0.08 (-0.3, 0.49)	0.08 (-0.3, 0.46)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	-0.02 (-0.06, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	-0.08 (-0.37, 0.28)	0.01 (-0.3, 0.41)	-0.16 (-0.3, -0.06)	0.17 (-0.18, 0.65)	0.33 (-0.16, 0.78)	0.13 (-0.27, 0.56)	-0.18 (-0.33, -0.08)	0.25 (-0.16, 0.78)

Table 6.8.34: Binary RMAC using Novavax to predict Janssen

	log MN 2 weeks prior chal- lenge	log MN day chal- lenge	log MSD ECL 2 weeks prior chal- lenge	log MSD ECL day chal- lenge	log PsVNA ID50 2 weeks prior chal- lenge	log PsVNA ID50 day chal- lenge	log PsVNA ID80 2 weeks prior chal- lenge	log PsVNA ID80 day chal- lenge
bin VL Day2 PostChal- lenge BAL N1	-0.03 (-0.08, 1)	-0.02 (-0.05, 1)	1 (1, 1)	1 (1, 1)	-0.03 (-0.08, 1)	-0.03 (-0.08, 1)	1 (1, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge BAL Subgenomic	-0.12 (-0.49, 0.2)	0.04 (-0.32, 0.37)	-0.22 (-0.55, 0.12)	-0.22 (-0.56, 0.12)	-0.19 (-0.52, 0.12)	-0.06 (-0.43, 0.28)	-0.19 (-0.52, 0.12)	-0.56 (-0.83, -0.27)
bin VL Day2 PostChal- lenge OPswab N1	0.47 (-0.07, 1)	-0.14 (-0.25, -0.05)	0.65 (-0.05, 1)	-0.07 (-0.14, -0.02)	-0.03 (-0.28, 0.33)	-0.03 (-0.08, 1)	0.2 (-0.14, 0.65)	0.2 (-0.14, 0.65)
bin VL Day2 PostChal- lenge OPswab Subgenomic	0.39 (-0.03, 0.74)	-0.02 (-0.38, 0.33)	-0.16 (-0.28, -0.07)	0.29 (-0.14, 0.71)	-0.03 (-0.28, 0.32)	0.18 (-0.21, 0.59)	-0.17 (-0.42, 0.13)	0.08 (-0.29, 0.42)
bin VL Day2 PostChal- lenge NasalSwab N1	1 (1, 1)	1 (1, 1)	1 (1, 1)	1 (1, 1)	-0.1 (-0.21, -0.03)	1 (1, 1)	-0.02 (-0.05, 1)	1 (1, 1)
bin VL Day2 PostChal- lenge NasalSwab Subgenomic	0.05 (-0.23, 0.43)	0.04 (-0.28, 0.42)	-0.12 (-0.23, -0.05)	0.26 (-0.12, 0.78)	0.05 (-0.23, 0.43)	-0.16 (-0.28, -0.07)	-0.16 (-0.28, -0.07)	-0.14 (-0.25, -0.07)