|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Prevalence=3%** | **Threshold** | **Sensitivity** | **Specificity** | **Accuracy** | **AUC** | **Number of Covariates Selected** |
| Full training 0.5 | 0.5 | 2 | 100 | 97 | 79 | 6 |
| Full training | 0.03 | 70 | 75 | 75 | 79 | 6 |
| Under-sampled | 0.49 | 70 | 74 | 74 | 78 | 9 |
| Over-sampled | 0.48 | 70 | 75 | 74 | 78 | 27 |
| SMOTE | 0.41 | 70 | 74 | 74 | 78 | 15 |
|  |  |  |  |  |  |  |
| **Prevalence=5%** |  |  |  |  |  |  |
| Full training 0.5 | 0.5 | 4 | 100 | 95 | 78 | 7 |
| Full training | 0.05 | 69 | 74 | 74 | 78 | 7 |
| Under-sampled | 0.49 | 69 | 74 | 74 | 78 | 9 |
| Over-sampled | 0.48 | 70 | 74 | 74 | 78 | 23 |
| SMOTE | 0.41 | 69 | 74 | 73 | 78 | 16 |
|  |  |  |  |  |  |  |
| **Prevalence=10%** |  |  |  |  |  |  |
| Full training 0.5 | 0.5 | 8 | 100 | 91 | 77 | 8 |
| Full training | 0.1 | 68 | 74 | 73 | 77 | 8 |
| Under-sampled | 0.49 | 68 | 73 | 73 | 77 | 9 |
| Over-sampled | 0.49 | 68 | 73 | 73 | 77 | 17 |
| SMOTE | 0.41 | 68 | 73 | 72 | 77 | 19 |
| **Prevalence=20%** |  |  |  |  |  |  |
| Full training 0.5 | 0.5 | 21 | 97 | 82 | 76 | 8 |
| Full training | 0.2 | 66 | 73 | 72 | 76 | 8 |
| Under-sampled | 0.49 | 66 | 73 | 72 | 76 | 9 |
| Over-sampled | 0.49 | 66 | 73 | 72 | 76 | 13 |
| SMOTE | 0.42 | 66 | 73 | 71 | 75 | 23 |
| **Prevalence=40%** |  |  |  |  |  |  |
| Full training 0.5 | 0.5 | 49 | 84 | 70 | 74 | 9 |
| Full training | 0.4 | 65 | 71 | 69 | 74 | 9 |
| Under-sampled | 0.49 | 65 | 71 | 69 | 74 | 9 |
| Over-sampled | 0.49 | 65 | 71 | 69 | 74 | 10 |
| SMOTE | 0.41 | 64 | 71 | 68 | 73 | 28 |
|  |  |  |  |  |  |  |
| **Prevalence=50%** |  |  |  |  |  |  |
| Full training 0.5 | 0.5 | 63 | 72 | 68 | 73 | 9 |
| Full training | 0.49 | 64 | 72 | 68 | 73 | 9 |

Median (IQR)

|  |  |  |  |
| --- | --- | --- | --- |
| **Prevalence=3%** | **Sensitivity** | **Specificity** | **Accuracy** |
| Full training 0.5 | 2 (2, 3) | 100 (100, 100) | 97 (97, 97) |
| Full training | 70 (67, 74) | 75 (72, 78) | 75 (72, 78) |
| Under-sampled | 70 (66, 74) | 75 (71, 78) | 75 (71, 78) |
| Over-sampled | 70 (66, 74) | 75 (71, 78) | 74 (71, 78) |
| SMOTE | 70 (66, 73) | 75 (71, 78) | 75 (71, 77) |
|  |  |  |  |
| **Prevalence=5%** |  |  |  |
| Full training 0.5 | 4 (3, 4) | 100 (100, 100) | 95 (95, 95) |
| Full training | 70 (67, 72) | 74 (72, 77) | 74 (72, 76) |
| Under-sampled | 69 (66, 72) | 74 (71, 77) | 74 (72, 76) |
| Over-sampled | 70 (67, 72) | 74 (71, 77) | 74 (71, 76) |
| SMOTE | 69 (66, 72) | 74 (71, 77) | 74 (71, 76) |
|  |  |  |  |
| **Prevalence=10%** |  |  |  |
| Full training 0.5 | 8 (7, 9) | 100 (99, 100) | 91 (90, 91) |
| Full training | 68 (66, 70) | 74 (72, 76) | 73 (71, 75) |
| Under-sampled | 68 (66, 71) | 74 (71, 76) | 73 (71, 75) |
| Over-sampled | 68 (66, 70) | 74 (71, 76) | 73 (71, 75) |
| SMOTE | 68 (66, 70) | 73 (71, 75) | 73 (71, 74) |
| **Prevalence=20%** |  |  |  |
| Full training 0.5 | 21 (21, 22) | 97 (97, 97) | 82 (82, 83) |
| Full training | 65 (63, 68) | 74 (71, 76) | 72 (70, 74) |
| Under-sampled | 66 (63, 69) | 74 (70, 76) | 72 (70, 73) |
| Over-sampled | 65 (63, 68) | 74 (71, 76) | 72 (70, 73) |
| SMOTE | 66 (64, 68) | 73 (71, 75) | 71 (70, 73) |
| **Prevalence=40%** |  |  |  |
| Full training 0.5 | 49 (48, 49) | 84 (84, 85) | 70 (70, 70) |
| Full training | 66 (64, 67) | 71 (69, 72) | 69 (68, 69) |
| Under-sampled | 66 (64, 67) | 71 (69, 72) | 69 (68, 69) |
| Over-sampled | 66 (64, 67) | 70 (69, 72) | 69 (68, 69) |
| SMOTE | 65 (62, 67) | 71 (68, 73) | 68 (68, 69) |
|  |  |  |  |
| **Prevalence=50%** |  |  |  |
| Full training 0.5 | 63 (62, 63) | 72 (72, 73) | 68 (67, 68) |
| Full training | 63 (62, 65) | 72 (71, 73) | 68 (67, 68) |

**Table 1. Results comparing models fit to the COT data. The asterisk (\*) indicates that the training data was used for determining the Youden Index.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Model** | **Threshold** | **Sensitivity** | **Specificity** | **NPV** | **PPV** | **Accuracy** | **AUC** | **Number of Covariates Selected** |
| Full training 0.5 | 0.5 | 8 | 99 | 96 | 35 | 96 | 86 | 34 |
| Full training | 0.04 | 85 | 73 | 99 | 12 | 73 | 86 | 34 |
| Full training\* | 0.06 | 79 | 79 | 98 | 19 | 79 | 86 | 34 |
| Full Training 0.03 | 0.03 | 90 | 62 | 99 | 9 | 63 | 86 | 34 |
| Under-Sampled | 0.4 | 85 | 73 | 99 | 12 | 73 | 86 | 30 |
| Under-Sampled\* | 0.44 | 83 | 77 | 82 | 78 | 80 | 86 | 30 |
| Under-Sampled 0.5 | 0.5 | 75 | 81 | 99 | 14 | 81 | 86 | 30 |
| Over-Sampled | 0.4 | 85 | 74 | 99 | 12 | 74 | 86 | 34 |
| Over-Sampled\* | 0.46 | 82 | 77 | 81 | 78 | 80 | 87 | 34 |
| Over-Sampled 0.5 | 0.5 | 75 | 82 | 99 | 15 | 81 | 86 | 34 |
| SMOTE | 0.4 | 85 | 74 | 99 | 12 | 74 | 86 | 34 |
| SMOTE\* | 0.46 | 82 | 77 | 85 | 73 | 79 | 87 | 34 |
| SMOTE 0.5 | 0.5 | 71 | 86 | 99 | 17 | 85 | 86 | 34 |

Reformatted

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Training data and threshold method** | **Threshold** | **Sensitivity** | **Specificity** | **NPV** | **PPV** | **Accuracy** | **AUC** | **Number of Covariates Selected** |
| **Full training set** |  |  |  |  |  |  |  |  |
| Default | 0.5 | 8 | 99 | 96 | 35 | 96 | 86 | 34 |
| Youden's: test set | 0.04 | 85 | 73 | 99 | 12 | 73 | 86 | 34 |
| Youden's: training set | 0.06 | 79 | 79 | 98 | 19 | 79 | 86 | 34 |
| Population prevalence | 0.03 | 90 | 62 | 99 | 9 | 63 | 86 | 34 |
| **Under-sampled** |  |  |  |  |  |  |  |  |
| Youden's: test set | 0.4 | 85 | 73 | 99 | 12 | 73 | 86 | 30 |
| Youden's: training set | 0.44 | 83 | 77 | 82 | 78 | 80 | 86 | 30 |
| Training set prevalence | 0.5 | 75 | 81 | 99 | 14 | 81 | 86 | 30 |
| **Over-sampled** |  |  |  |  |  |  |  |  |
| Youden's: test set | 0.4 | 85 | 74 | 99 | 12 | 74 | 86 | 34 |
| Youden's: training set | 0.46 | 82 | 77 | 81 | 78 | 80 | 87 | 34 |
| Training set prevalence | 0.5 | 75 | 82 | 99 | 15 | 81 | 86 | 34 |
| **SMOTE sampled** |  |  |  |  |  |  |  |  |
| Youden's: test set | 0.4 | 85 | 74 | 99 | 12 | 74 | 86 | 34 |
| Youden's: training set | 0.46 | 82 | 77 | 85 | 73 | 79 | 87 | 34 |
| Training set prevalence | 0.5 | 71 | 86 | 99 | 17 | 85 | 86 | 34 |

**Table 2. Results comparing models fit to the surgical data.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Training data and threshold method** | **Threshold** | **Sensitivity** | **Specificity** | **NPV** | **PPV** | **Accuracy** | **AUC** | **Number of Covariates Selected** |
| **Full training set** |  |  |  |  |  |  |  |  |
| Default | 0.5 | 23 | 100 | 97 | 88 | 97 | 89 | 35 |
| Youden's: test set | 0.036 | 80 | 90 | 99 | 24 | 90 | 89 | 35 |
| Youden's: training set | 0.032 | 80 | 89 | 99 | 22 | 89 | 89 | 35 |
| Population prevalence | 0.034 | 80 | 90 | 99 | 23 | 89 | 89 | 35 |
| **Under-sampled** |  |  |  |  |  |  |  |  |
| Youden's: test set | 0.48 | 82 | 87 | 99 | 20 | 87 | 89 | 20 |
| Youden's: training set | 0.35 | 84 | 83 | 99 | 16 | 83 | 89 | 20 |
| Training set prevalence | 0.5 | 80 | 88 | 99 | 20 | 87 | 89 | 20 |
| **Over-sampled** |  |  |  |  |  |  |  |  |
| Youden's: test set | 0.45 | 79 | 91 | 99 | 24 | 90 | 89 | 123 |
| Youden's: training set | 0.6 | 75 | 89 | 99 | 22 | 89 | 89 | 123 |
| Training set prevalence | 0.5 | 80 | 88 | 99 | 20 | 87 | 89 | 123 |
| **SMOTE sampled** |  |  |  |  |  |  |  |  |
| Youden's: test set | 0.15 | 89 | 79 | 99 | 14 | 80 | 88 | 88 |
| Youden's: training set | 0.27 | 80 | 84 | 99 | 16 | 84 | 88 | 88 |
| Training set prevalence | 0.5 | 75 | 89 | 99 | 21 | 89 | 88 | 88 |