**Supplemental Appendix 1**

**Statistical results at each step of DES-OSA score initial derivation. Rationale and description of each step can be found in the text.**

**Table 1:** Prediction probability (PK) and 95 % confidence interval (95 % CI) of tested parameters and combination of these parameters with regard to their ability to predict the Apnea-Hypopnea Index value. These PK served to select the combination with best PK to end up with the DES-OSA score. The following abbreviations are used in the Table: DTC = distance between thyroid and chin; MP = Mallampati score; BMI = body mass index; NC = neck circumference. Parameters were weighted as follows: DTC 1 (1st weighting) in cm > 6 = 1, 5-6 = 2, < 5 = 3; DTC 2 (2nd weighting) in cm > 6 = 0, 5-6 = 2, < 5 = 3; MP 1 = Mallampati score (1st weighting) Class I = 1, Class II = 2, Class III and IV = 3; MP 2 = Mallampati score (2nd weighting) Class I = 0, Class II = 2, Class III and IV = 3; BMI 1 (1st weighting) in kg/m2 > 30 = 1, > 35 = 2, > 40 = 3; BMI 2 (2d weighting) in kg/m2 > 28 = 1, > 39 = 2, > 41 = 3; NC 1 (1st weighting) in cm > 40 = 1, > 43 = 2, > 46 = 3; NC2 (2d weighting) in cm > 38 = 1, > 42 = 2, > 46 = 3; NC 3 (3d weighting) in cm > 37 = 1, > 42 = 2, > 48 = 3. Hatched cells are redundant combinations.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Combinations** | **Parameter** | **DTC 1** | **DTC 2** | **MP** | **MP 2** | **BMI 1** | **BMI 2** | **NC 1** | **NC 2** | **NC 3** |
| **Alone** |  | 0.582(0.536 to 0.627) | 0.582(0.537 to 0.628) | 0.631(0.588 to 0.674) | 0.631(0.588 to 0.674) | 0.620(0.569 to 0.670) | 0.642(0.598 to 0.685) | 0.648(0.600 to 0.696) | 0.666(0.615 to 0.717) | 0.677(0.629 to 0.726) |
| **Double** | MP 1 | 0.656(0.610 to 0.701) | 0.649(0.600 to 0.698) |  |  |  |  |  |  |  |
| MP 2 | 0.659(0.614 to 0.703) | 0.654(0.608 to 0.701) |  |  |  |  |  |  |  |
| BMI 1 | 0.650(0.560 to 0.702) | 0.646(0.594 to 0.698) | 0.669(0.622 to 0.717) | 0.670(0.623 to 0.717) |  |  |  |  |  |
| BMI 2 | 0.668(0.622 to 0.714) | 0.658(0.608 to 0.707) | 0.686(0.643 to 0.729) | 0.684(0.641 to 0.728) |  |  |  |  |  |
| NC 1 | 0.670(0.621 to 0.719) | 0.667(0.618 to 0.716) | 0.691(0.645 to 0.736) | 0.690(0.645 to 0.734) | 0.667(0.617 to 0.717) | 0.674(0.627 to 0.720) |  |  |  |
| NC 2 | 0.686(0.636 to 0.735) | 0.681(0.632 to 0.730) | 0.705(0.657 to 0.753) | 0.702(0.655 to 0.749) | 0.680(0.627 to 0.733) | 0.690(0.641 to 0.739) |  |  |  |
| NC 3 | 0.695(0.647 to 0.743) | 0.685(0.636 to 0.734) | 0.716(0.669 to 0.762) | 0.712(0.666 to 0.757) | 0.689(0.637 to 0.741) | 0.700(0.653 to 0.747) |  |  |  |
| **Triple** | MP1 - BMI1 | 0.682(0.634 to 0.731) | 0.678(0.628 to 0.727) |  |  |  |  |  |  |  |
| MP1 - BMI2 | 0.701(0.658 to 0.744) | 0.692(0.646 to 0.738) |  |  |  |  |  |  |  |
| MP2 - BMI1 | 0.682(0.635 to 0.729) | 0.679(0.632 to 0.727) |  |  |  |  |  |  |  |
| MP2 - BMI2 | 0.699(0.657 to 0.741) | 0.694(0.650 to 0.738) |  |  |  |  |  |  |  |
| MP1 - NC1 | 0.706(0.659 to 0.751) | 0.700(0.652 to 0.747) |  |  |  |  |  |  |  |
| MP1 - NC2 | 0.721(0.673 to 0.768) | 0.712(0.665 to 0.759) |  |  |  |  |  |  |  |
| MP1 - NC3 | 0.727(0.681 to 0.774) | 0.716(0.669 to 0.764) |  |  |  |  |  |  |  |
| MP2 - NC1 | 0.704(0.660 to 0.749) | 0.701(0.656 to 0.747) |  |  |  |  |  |  |  |
| MP2 - NC2 | 0.719(0.673 to 0.765) | 0.715(0.669 to 0.761) |  |  |  |  |  |  |  |
| MP2 - NC3 | 0.725(0.680 to 0.771) | 0.718(0.672 to 0.765) |  |  |  |  |  |  |  |
| BMI1 - NC1 | 0.686(0.635 to 0.737) | 0.684(0.633 to 0.735) | 0.695(0.648 to 0.741) | 0.696(0.650 to 0.742) |  |  |  |  |  |
| BMI1 - NC2 | 0.697(0.644 to 0.749) | 0.694(0.642 to 0.745) | 0.704(0.654 to 0.754) | 0.702(0.654 to 0.750) |  |  |  |  |  |
| BMI1 - NC3 | 0.701(0.649 to 0.753) | 0.696(0.644 to 0.748) | 0.711(0.662 to 0.760) | 0.709(0.661 to 0.756) |  |  |  |  |  |
| BMI2 - NC1 | 0.693(0.646 to 0.740) | 0.692(0.644 to 0.739) | 0.702(0.658 to 0.747) | 0.704(0.660 to 0.748) |  |  |  |  |  |
| BMI2 - NC2 | 0.707(0.659 to 0.755) | 0.703(0.655 to 0.751) | 0.714(0.668 to 0.760) | 0.713(0.668 to 0.758) |  |  |  |  |  |
| BMI2 - NC3 | 0.716(0.669 to 0.763) | 0.709(0.662 to 0.756) | 0.723(0.678 to 0.761) | 0.722(0.678 to 0.767) |  |  |  |  |  |
| **Quadruple** | MP1-BMI1-NC1 | 0.708(0.660 to 0.756) | 0.708(0.659 to 0.757) |  |  |  |  |  |  |  |
| MP1-BMI1-NC2 | 0.718(0.669 to 0.767) | 0.717(0.668 to 0.766) |  |  |  |  |  |  |  |
| MP1-BMI1-NC3 | 0.722(0.673 to 0.771) | 0.718(0.669 to 0.767) |  |  |  |  |  |  |  |
| MP1-BMI2-NC1 | 0.718(0.673 to 0.762) | 0.717(0.671 to 0.763) |  |  |  |  |  |  |  |
| MP1-BMI2-NC2 | 0.729(0.684 to 0.775) | 0.725(0.680 to 0.772) |  |  |  |  |  |  |  |
| MP1-BMI2-NC3 | 0.737(0.692 to 0.781) | 0.727(0.682 to 0.773) |  |  |  |  |  |  |  |
| MP2-BMI1-NC1 | 0.708(0.662 to 0.755) | 0.710(0.663 to 0.757) |  |  |  |  |  |  |  |
| MP2-BMI1-NC2 | 0.718(0.670 to 0.765) | 0.718(0.670 to 0.766) |  |  |  |  |  |  |  |
| MP2-BMI1-NC3 | 0.721(0.674 to 0.769) | 0.719(0.672 to 0.767) |  |  |  |  |  |  |  |
| MP2-BMI2-NC1 | 0.719(0.675 to 0.763) | 0.719(0.674 to 0.764) |  |  |  |  |  |  |  |
| MP2-BMI2-NC2 | 0.730(0.686 to 0.775) | 0.728(0.683 to 0.772) |  |  |  |  |  |  |  |
| MP2-BMI2-NC3 | 0.737(0.693 to 0.781) | 0.729(0.685 to 0.774) |  |  |  |  |  |  |  |

**Table 2:** Prediction probability (PK) and 95 % confidence interval (95 % CI) of the two best combinations (PK > 0.730) issued from Table 1 and combination with age and gender. Abbreviations and weightings are the same as in Table 1, except for Gender, which received a weighting of 1 for males and 0 for females, and Age, which received a weighting of 0 if ≤43, and 1 if > 43 years, or a weighting of 0 if ≤50 and 1 if > 50 years.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Combinations | Age > 43 years | Age > 50 years | Gender | Age > 43 years+Gender | Age > 50 years+Gender |
| MP1-BMI2-NC3-DTC1 | 0.736(0.693 to 0.779) | 0.738(0.694 to 0.782) | 0.746(0.700 to 0.792) | 0.746(0.701 to 0.791) | 0.746(0.700 to 0.792) |
| MP2-BMI2-NC3-DTC1 | 0.734(0.691 to 0.776) | 0.735(0.692 to 0.778) | 0.746(0.701 to 0.791) | 0.744(0.700 to 0.788) | 0.745(0.700 to 0.790) |

**Table 3:** Area under ROC curves (AUROC), number of true positives (TP), false positives (FP), true negatives (TN), false negatives (FN), sensitivity (Se), specificity (Sp), positive predictive value (PPV), and negative predictive value (NPV) at predicting an apnea-hypopnea index (AHI) >30 events/hr for all combinations issued from Table 1 and 2. The Cohen Kappa (Kappa) coefficient was also calculated to assess the degree of concordance between combinations and AHI. Ninety-five % confidence intervals (95% CI) are provided when necessary. Th is the score threshold value having served for reported calculations. The value of Th was the one with best Se/Sp pair at distinguishing between AHI ≤ or >30 events/hr.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | AUROC(95% CI) | TP(n ) | FP(n ) | TN(n ) | FN(n ) | Se(95% CI) | Sp(95% CI) | PPV | NPV | Th | Kappa(95% CI) | PK(95% CI) |
| MP1-BMI2-NC3-DTC1 | 0.826(0.748 to 0.904) | 37 | 27 | 64 | 11 | 0.771(0.632 to 0.868) | 0.703(0.602 to 0.787) | 0.578 | 0.853 | 6 | 0.440(0.293 to 0.586) | 0.737(0.692 to 0.781) |
| MP2-BMI2-NC3-DTC1 | 0.835(0.759 to 0.912) | 37 | 26 | 65 | 11 | 0.771(0.632 to 0.868) | 0.714(0.614 to 0.797) | 0.587 | 0.855 | 6 | 0.452(0.305 to 0.599) | 0.737(0.693 to 0.781) |
| MP1-BMI2-NC3-DTC1-Gender | 0.825(0.747 to 0.904) | 36 | 22 | 69 | 12 | 0.750(0.610 to 0.851) | 0.758(0.660 to 0.835) | 0.621 | 0.852 | 7 | 0.484(0.337 to 0.632) | 0.746(0.700 to 0.792) |
| MP1-BMI2-NC3-DTC1-Age>43 | 0.834(0.757 to 0.911) | 36 | 23 | 68 | 12 | 0.750(0.610 to 0.851) | 0.747(0.648 to 0.825) | 0.610 | 0.850 | 7 | 0.472(0.324 to 0.620) | 0.736(0.693 to 0.779) |
| MP1-BMI2-NC3-DTC1-Age>50 | 0.830(0.752 to 0.907) | 35 | 21 | 70 | 13 | 0.729(0.588 to 0.835) | 0.769(0.672 to 0.844) | 0.625 | 0.843 | 7 | 0.480(0.330 to 0.629) | 0.738(0.694 to 0.782) |
| MP1-BMI2-NC3-DTC1-Gender-Age>43 | 0.831(0.754 to 0.909) | 43 | 34 | 57 | 5 | 0.896(0.773 to 0.958) | 0.626(0.523 to 0.719) | 0.558 | 0.919 | 7 | 0.457(0.324 to 0.590) | 0.746(0.701 to 0.791) |
| MP1-BMI2-NC3-DTC1-Gender-Age>50 | 0.826(0.748 to 0.905) | 40 | 29 | 62 | 8 | 0.833(0.701 to 0.915) | 0.681(0.579 to 0.768) | 0.580 | 0.886 | 7 | 0.466(0.326 to 0.607) | 0.746(0.700 to 0.792) |
| MP2-BMI2-NC3-DTC1-Gender | 0.834(0.757 to 0.911) | 36 | 21 | 70 | 12 | 0.750(0.610 to 0.851) | 0.769(0.672 to 0.844) | 0.632 | 0.854 | 7 | 0.497(0.350 to 0.644) | 0.746(0.701 to 0.791) |
| MP2-BMI2-NC3-DTC1-Age>43 | 0.841(0.765 to 0.916) | 43 | 34 | 57 | 5 | 0.896(0.773 to 0.958) | 0.626(0.523 to 0.719) | 0.558 | 0.919 | 7 | 0.472(0.324 to 0.620) | 0.734(0.691 to 0.776) |
| MP2-BMI2-NC3-DTC1-Age>50 | 0.837(0.760 to 0.913) | 35 | 21 | 70 | 13 | 0.729(0.588 to 0.835) | 0.769(0.672 to 0.844) | 0.625 | 0.843 | 7 | 0.480(0.330 to 0.629) | 0.735(0.692 to 0.778) |
| MP2-BMI2-NC3-DTC1-Gender-Age>43 | 0.839(0.763 to 0.915) | 43 | 31 | 60 | 5 | 0.896(0.773 to 0.958) | 0.659(0.557 to 0.748) | 0.581 | 0.923 | 7 | 0.492(0.359 to 0.625) | 0.744(0.700 to 0.788) |
| MP2-BMI2-NC3-DTC1-Gender-Age>50 | 0.834(0.757 to 0.911) | 40 | 27 | 64 | 8 | 0.833(0.701 to 0.915) | 0.703(0.602 to 0.787) | 0.597 | 0.889 | 7 | 0.491(0.351 to 0.631) | 0.745(0.700 to 0.790) |