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| **Supplemental Digital Content 1. Assigning Self-Reported Race Responses to Race/Ethnicity Categories** |
| ***Racial Group*** | ***Self-reported Race Response*** |
| White | White |
| Black | Black or African-American, Barbadian, Cape Verdian, Congolese, Dominica Islander, Eritrean, Ethiopian, Gabonian, Ghanaian, Grenadian, Guinean, Haitian, Ivory Coastian, Jamaican, Kenyan, Liberian, Malian, Nigerian, Senegalese, Sierra Leonean, Somalian, St Vincentian, Sudanese, Tanzanian, Togolese, Trinidadian, Ugandan, West Indian, Zimbabwean, Other: East African, Other: North African, Other: South African, Other: West African |
| American Indian and Alaskan Native | Native American, American Indian Or Alaskan |
| Asian | Asian, Bhutanese, Burmese, Cambodian, Chinese, Taiwanese, Filipino, Hmong, Indonesian, Japanese, Korean, Laotian, Malaysian, Okinawan, Sri Lankan, Thai, Vietnamese, Iwo Jiman, Maldivian, Nepalese, Singaporean, Other Asian |
| Hispanic | Hispanic/Latino, Spaniard, Andalusian, Asturian, Castillian, Catalonian, Belearic Islander, Gallego, Valencian, Canarian, Spanish Basque, Mexican, Mexican American, Mexicano, Chicano, La Raza, Mexican American Indian, Central American, Costa Rican, Guatemalan, Honduran, Nicaraguan, Panamanian, Salvadoran, Central American Indian, Canal Zone, South American, Argentinean, Bolivian, Chilean, Colombian, Ecuadorian, Paraguayan, Peruvian, Uruguayan, Venezuelan, South American Indian, Criollo, Latin American, Puerto Rican, Cuban, Dominican |
| Indian/South Asian | Asian Indian, Bangladeshi, Pakistani |
| Pacific Islander | Pacific Islander, Polynesian, Native Hawaiian, Samoan, Tahitian, Tongan, Tokelauan, Micronesian, Guamanian Or Chamorro, Guamanian, Chamorro, Mariana Islander, Marshallese, Palauan, Carolinian, Kosraean, Pohnpeian, Saipanese, Kiribati, Chuukese, Yapese, Melanesian, Fijian, Papua New Guinean, Solomon Islander, New Hebrides, Other Pacific Islander |
| Other Race**†** | Other Race |

**†**Other Race also includes patients with unknown race.

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| **Supplemental Digital Content 2. Sensitivity Analysis of Factors Associated with Occult Hypoxemia\*- Exclusion of ASA-PS 5 Patients** |
| ***Perioperative Variable*** | ***OR*** | ***95% Confidence Interval*** | **p-value** |
| Race/Ethnicity  |  |  |  |
| White**†** | – | – | – |
| Black | 1.40 | 1.08 to 1.82 | **0.011** |
| Asian | 0.86 | 0.57 to 1.29 | 0.454 |
| Hispanic | 1.29 | 1.01 to 1.64 | **0.039** |
| Other | 1.29 | 1.05 to 1.59 | **0.016** |
| Spo2 | 0.71 | 0.68 to 0.73 | **<0.001** |
| ASA Physical Status |  |  |  |
| 1-2**†** | – | – | – |
| 3 | 0.73 | 0.54 to 0.99 | **0.046** |
| 4 | 0.97 | 0.73 to 1.31 | 0.855 |
| 5 | – | – | – |
| Age (per 10 years)**§** | 0.93 | 0.89 to 0.98 | **0.006** |
| BMI (per 5 units)**§** | 0.97 | 0.91 to 1.03 | 0.347 |
| Sex |  |  |  |
| Female**†** | – | – | – |
| Male | 0.90 | 0.76 to 1.07 | 0.246 |
| Fio2 (per 10%)**§** | 0.99 | 0.91 to 1.04 | 0.724 |
| Tidal Volume (per 100 mL) **§** | 0.79 | 0.75 to 0.84 | **<0.001** |
| PEEP (cm H2O) **§** | 1.11 | 1.07 to 1.15 | **<0.001** |
| MAP (per 10 mmHg)**§** | 0.89 | 0.84 to 0.95 | **<0.001** |
| Hematocrit**§** | 1.05 | 1.03 to 1.06 | **<0.001** |
| Volatile Anesthetic Use | 0.91 | 0.72 to 1.16 | 0.458 |
| Vasoactive Infusion Use | 1.18 | 0.98 to 1.42 | 0.086 |
| Diabetes | 0.98 | 0.72 1.33 | 0.888 |
| Peripheral Vascular Disease | 0.93 | 0.59 to 1.47 | 0.751 |
| Hypertension | 0.73 | 0.55 to 0.96 | **0.025** |
| Congestive Heart Failure | 1.46 | 1.07 to 1.99 | **0.018** |
| Chronic Pulmonary Disease | 1.16 | 0.82 to 1.64 | 0.396 |
| Smoking Status |  |  |  |
| Never**†** | – | – | – |
| Current | 1.06 | 0.76 to 1.49 | 0.725 |
| Prior | 0.86 | 0.66 to 1.12 | 0.270 |
| ETco2**§** | 1.00 | 0.98 to 1.01 | 0.467 |
| Renal Failure | 1.23 | 0.79 to 1.90 | 0.359 |
| Year of Procedure |  |  |  |
| 2008 | 1.00 | 0.66 to 1.51 | 0.998 |
| 2009 | 0.77 | 0.51 to 1.16 | 0.209 |
| 2010 | 0.48 | 0.32 to 0.73 | **0.001** |
| 2011**†** | – | – | – |
| 2012 | 1.01 | 0.75 to 1.35 | 0.968 |
| 2013 | 0.81 | 0.59 to 1.09 | 0.164 |
| 2014 | 0.66 | 0.47 to 0.93 | **0.019** |
| 2015 | 0.53 | 0.38 to 0.76 | **0.001** |
| 2016 | 0.54 | 0.36 to 0.80 | **0.002** |
| 2017 | 0.58 | 0.40 to 0.84 | **0.004** |
| 2018 | 0.51 | 0.33 to 0.77 | **0.001** |
| 2019 | 0.45 | 0.26 to 0.77 | **0.004** |
|  |  |  |  |

**\***Occult hypoxemia defined as Sao2% < 88 despite Spo2 > 92%

**†**Reference group

**§**For continuous variables, the odds ratio is calculated per 1 unit increase. Scaled continuous variables were used as follows Age: per 10 years, BMI: per 5 kg/m2, Fio2: per 10%, Tidal Volume: per 100 mL, and Mean Arterial Pressure: per 10 mmHg.

ASA-PS: American Society of Anesthesiologists Physical Status

BMI: Body Mass Index

ETco2: End-tidal Carbon Dioxide

Fio2: Fraction of Inspired Oxygen

PEEP: Positive End-Expiratory Pressure

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| **Supplemental Digital Content 3. Factors Associated with Occult Hypoxemia\* for SpO2 92-96%** |
| ***Perioperative Variable*** | ***OR*** | ***95% Confidence Interval*** | **p-value** |
| Race/Ethnicity  |  |  |  |
| White**†** | – | – | – |
| Black | 1.80 | 1.10 to 2.94 | **0.020** |
| Asian | 0.66 | 0.31 to 1.40 | 0.276 |
| Hispanic | 1.46 | 0.95 to 2.25 | 0.082 |
| Other | 0.97 | 0.62 to 1.52 | 0.902 |
| Spo2 | 0.83 | 0.69 to 0.99 | **0.044** |
| ASA Physical Status |  |  |  |
| 1-2**†** | – | – | – |
| 3 | 1.08 | 0.48 to 2.44 | 0.846 |
| 4 | 1.76 | 0.82 to 3.78 | 0.149 |
| 5 | 2.56 | 1.03 to 6.38 | **0.043** |
| Age (per 10 years)**§** | 0.96 | 0.87 to 1.04 | 0.314 |
| BMI (per 5 unit)**§** | 0.87 | 0.78 to 0.98 | **0.022** |
| Sex |  |  |  |
| Female**†** | – | – | – |
| Male | 1.15 | 0.84 to 1.59 | 0.389 |
| Fio2 (per 10%)**§** | 1.00 | 0.94 to 1.07 | 0.926 |
| Tidal Volume (per 100 mL) **§** | 0.80 | 0.72 to 0.90 | **<0.001** |
| PEEP (cm H2O) **§** | 1.11 | 1.05 to 1.17 | **<0.001** |
| MAP (per 10 mmHg)**§** | 0.91 | 0.82 to 1.02 | 0.096 |
| Hematocrit**§** | 1.04 | 1.02 to 1.06 | **<0.001** |
| Volatile Anesthetic Use | 0.57 | 0.40 to 0.82 | **0.002** |
| Vasoactive Infusion Use | 0.95 | 0.66 to 1.37 | 0.775 |
| Diabetes | 0.73 | 0.31 to 1.70 | 0.463 |
| Peripheral Vascular Disease | 0.92 | 0.29 to 2.90 | 0.884 |
| Hypertension | 1.23 | 0.69 to 2.19 | 0.483 |
| Congestive Heart Failure | 0.55 | 0.23 to 1.28 | 0.162 |
| Chronic Pulmonary Disease | 0.96 | 0.40 to 2.29 | 0.921 |
| Smoking Status |  |  |  |
| Never**†** | – | – | – |
| Current | 0.27 | 0.07 to 1.07 | 0.063 |
| Prior | 0.54 | 0.27 to 1.08 | 0.081 |
| ETco2**§** | 1.00 | 0.98 to 1.01 | 0.664 |
| Renal Failure | 1.09 | 0.34 to 3.45 | 0.885 |
| Year of Procedure |  |  |  |
| 2008 | 0.79 | 0.32 to 1.99 | 0.622 |
| 2009 | 0.67 | 0.30 to 1.50 | 0.331 |
| 2010 | 0.08 | 0.01 to 0.60 | **0.014** |
| 2011**†** | – | – | – |
| 2012 | 1.31 | 0.73 to 2.35 | 0.364 |
| 2013 | 1.24 | 0.70 to 2.20 | 0.468 |
| 2014 | 0.66 | 0.31 to 1.39 | 0.276 |
| 2015 | 0.66 | 0.33 to 1.33 | 0.245 |
| 2016 | 0.94 | 0.42 to 2.08 | 0.869 |
| 2017 | 0.76 | 0.36 to 1.59 | 0.460 |
| 2018 | 0.61 | 0.24 to 1.58 | 0.312 |
| 2019 | 0.85 | 0.32 to 2.29 | 0.750 |
|  |  |  |  |

**\***Occult hypoxemia defined as Sao2% < 88 despite Spo2 > 92%

**†**Reference group

**§**For continuous variables, the odds ratio is calculated per 1 unit increase. Scaled continuous variables were used as follows Age: per 10 years, BMI: per 5 kg/m2, Fio2: per 10%, Tidal Volume: per 100 mL, and Mean Arterial Pressure: per 10 mmHg.

ASA-PS: American Society of Anesthesiologists Physical Status

BMI: Body Mass Index

ETco2: End-tidal CO2

Fio2: Fraction of Inspired Oxygen

PEEP: Positive End-Expiratory Pressure

**Supplemental Digital Content 4 – F1 Score for Predicting Occult Hypoxemia Stratified by Race/Ethnicity**



The F1 score for occult hypoxemia (Sao2 < 88% despite Spo2 >92%) by self-reported White (A), Black (B), and Hispanic (C) race/ethnicity. The F1 score can be used to determine the threshold at which a test has the best performance. The peak F1 score for White (94%, F1 score: 0.08), Black (96%, F1 score: 0.11), Hispanic (95%, F1 score: 0.13) patients are the optimal Spo2 thresholds for predicted occult hypoxemia.