|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Supplemental Table 3. Associations between BMP-related genes and risk of breast cancer overall and by ER/PR status where adjusted p values are >0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | Overall | |  | | | | | ER + / PR + | | | | | ER + / PR - | | | | ER - / PR + | | | | | ER - / PR - | | | | | Multinomial | |
|  |  | Controls | Cases |  | | | | | (N=1292 cases) | | | | | (N=235 cases) | | | | (N=41 cases) | | | | | (N=411 cases) | | | | | Raw | Adjusted |
|  |  | N | N | OR | | (95% CI) | | | OR | (95% CI) | | | | OR | (95% CI) | | | OR | | (95% CI) | | | OR | | (95% CI) | | | P-value | P-value |
| *BMP1* (rs3924231) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | TT/TC | 3966 | 3439 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.13 | 1.00 |
|  | CC | 136 | 95 | 0.81 | (0.62, | | | 1.06) | 0.81 | | (0.55, | | 1.19) | 1.23 | (0.63, | | 2.41) | 3.15 | (1.08, | | | 9.16) | 0.79 | (0.42, | | | 1.49) |  |  |
|  | P-value: Raw; Adjusted | | | 0.12; 0.71 | | |  | | 0.29; 0.83 | | |  | | 0.54; 0.83 | |  | | 0.04; 0.28 | | |  | | 0.46; 0.83 | | |  | |  |  |
| *BMP2* (rs1979855) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | TT | 3137 | 2686 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.16 | 0.79 |
|  | TC/CC | 965 | 848 | 0.96 | (0.86, | | | 1.07) | 0.95 | | (0.82, | | 1.11) | 1.04 | (0.77, | | 1.41) | 2.21 | (1.17, | | | 4.20) | 1.00 | (0.79, | | | 1.27) |  |  |
|  | P-value: Raw; Adjusted | | | 0.49; 1.00 | | |  | | 0.53; 0.53 | | |  | | 0.79; 0.79 | |  | | 0.02; 0.08 | | |  | | 1.00; 1.00 | | |  | |  |  |
| *BMP6* (rs1107495) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | AA | 1912 | 1753 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.10 | 1.00 |
|  | AG | 1612 | 1387 | 1.01 | (0.91, | | | 1.11) | 0.97 | | (0.84, | | 1.12) | 0.77 | (0.57, | | 1.04) | 1.19 | (0.60, | | | 2.37) | 1.09 | (0.87, | | | 1.37) |  |  |
|  | GG | 578 | 393 | 0.86 | (0.73, | | | 1.01) | 0.86 | | (0.67, | | 1.12) | 0.50 | (0.27, | | 0.92) | 1.21 | (0.42, | | | 3.51) | 1.01 | (0.69, | | | 1.48) |  |  |
|  | P-value: Raw; Adjusted | | | 0.06; 1.00 | | |  | | 0.26; 1.00 | | |  | | 0.03; 0.44 | |  | | 0.73; 1.00 | | |  | | 0.97; 1.00 | | |  | |  |  |
| *BMP6* (rs270417) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | TT | 2527 | 2060 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.03 | 0.54 |
|  | TC | 1356 | 1254 | 1.07 | (0.97, | | | 1.19) | 1.09 | | (0.94, | | 1.25) | 1.23 | (0.92, | | 1.63) | 0.72 | (0.37, | | | 1.42) | 1.10 | (0.89, | | | 1.38) |  |  |
|  | CC | 217 | 221 | 1.17 | (0.96, | | | 1.44) | 1.33 | | (1.03, | | 1.72) | 1.46 | (0.88, | | 2.45) | Undefined | | | | | 1.13 | (0.74, | | | 1.74) |  |  |
|  | P-value: Raw; Adjusted | | | 0.12; 1.00 | | |  | | 0.03; 0.50 | | |  | | 0.15; 1.00 | |  | | 0.95; 1.00 | | |  | | 0.57; 1.00 | | |  | |  |  |
| *BMP6* (rs6910759) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | AA | 1876 | 1529 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.32 | 1.00 |
|  | AG | 1738 | 1516 | 1.00 | (0.90, | | | 1.10) | 1.06 | | (0.92, | | 1.23) | 1.09 | (0.81, | | 1.48) | 0.91 | (0.46, | | | 1.82) | 1.01 | (0.80, | | | 1.27) |  |  |
|  | GG | 487 | 489 | 1.09 | (0.94, | | | 1.27) | 1.13 | | (0.92, | | 1.38) | 1.52 | (1.02, | | 2.25) | 1.29 | (0.51, | | | 3.27) | 0.98 | (0.70, | | | 1.37) |  |  |
|  | P-value: Raw; Adjusted | | | 0.25; 1.00 | | |  | | 0.25; 1.00 | | |  | | 0.04; 0.56 | |  | | 0.59; 1.00 | | |  | | 0.93; 1.00 | | |  | |  |  |
| *BMP6* (rs911749) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | GG | 2085 | 1902 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.51 | 1.00 |
|  | GA | 1615 | 1361 | 0.96 | (0.87, | | | 1.06) | 0.92 | | (0.80, | | 1.05) | 0.97 | (0.73, | | 1.28) | 1.21 | (0.64, | | | 2.30) | 0.99 | (0.79, | | | 1.23) |  |  |
|  | AA | 402 | 272 | 0.80 | (0.68, | | | 0.95) | 0.84 | | (0.64, | | 1.10) | 0.75 | (0.41, | | 1.35) | 0.69 | (0.16, | | | 3.03) | 0.74 | (0.47, | | | 1.16) |  |  |
|  | P-value: Raw; Adjusted | | | 0.01; 0.22 | | |  | | 0.21; 1.00 | | |  | | 0.34; 1.00 | |  | | 0.62; 1.00 | | |  | | 0.19; 1.00 | | |  | |  |  |
| *BMP6* (rs12215656) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | GG | 3401 | 2833 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.08 | 1.00 |
|  | GA/AA | 701 | 701 | 1.10 | (0.98, | | | 1.24) | 1.26 | | (1.07, | | 1.47) | 1.02 | (0.73, | | 1.44) | 0.88 | (0.38, | | | 2.03) | 1.13 | (0.87, | | | 1.46) |  |  |
|  | P-value: Raw; Adjusted | | | 0.11; 1.00 | | |  | | <.01; 0.09 | | |  | | 0.89; 1.00 | |  | | 0.76; 1.00 | | |  | | 0.36; 1.00 | | |  | |  |  |
| *BMP7* (rs6123674) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | AA | 1649 | 1382 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.07 | 1.00 |
|  | AG/GG | 2440 | 2144 | 1.02 | (0.93, | | | 1.12) | 1.06 | | (0.93, | | 1.22) | 1.17 | (0.88, | | 1.55) | 1.13 | (0.59, | | | 2.16) | 1.37 | (1.10, | | | 1.71) |  |  |
|  | P-value: Raw; Adjusted | | | 0.73; 1.00 | | |  | | 0.39; 1.00 | | |  | | 0.28; 1.00 | |  | | 0.71; 1.00 | | |  | | <.01; 0.08 | | |  | |  |  |
| *BMP7* (rs13037653) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | TT | 3757 | 3188 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.17 | 1.00 |
|  | TC/CC | 344 | 347 | 1.12 | (0.96, | | | 1.32) | 1.17 | | (0.95, | | 1.44) | 1.17 | (0.77, | | 1.78) | 2.39 | (1.08, | | | 5.31) | 1.05 | (0.74, | | | 1.48) |  |  |
|  | P-value: Raw; Adjusted | | | 0.16; 1.00 | | |  | | 0.15; 1.00 | | |  | | 0.47; 1.00 | |  | | 0.03; 0.42 | | |  | | 0.79; 1.00 | | |  | |  |  |
| *BMP7* (rs6025468) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | AA | 2616 | 2310 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.41 | 1.00 |
|  | AG | 1315 | 1111 | 0.95 | (0.86, | | | 1.05) | 1.07 | | (0.93, | | 1.23) | 0.96 | (0.72, | | 1.28) | 0.97 | (0.50, | | | 1.89) | 1.13 | (0.91, | | | 1.41) |  |  |
|  | GG | 170 | 114 | 0.76 | (0.59, | | | 0.97) | 0.78 | | (0.54, | | 1.12) | 0.50 | (0.20, | | 1.25) | Undefined | | | | | 1.25 | (0.76, | | | 2.04) |  |  |
|  | P-value: Raw; Adjusted | | | 0.03; 0.39 | | |  | | 0.18; 1.00 | | |  | | 0.14; 1.00 | |  | | 0.95; 1.00 | | |  | | 0.38; 1.00 | | |  | |  |  |
| *BMPR1A* (rs12415784) | | | |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | TT/TC | 3839 | 3317 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.21 | 0.82 |
|  | CC | 260 | 216 | 1.02 | (0.84, | | | 1.24) | 1.13 | | (0.83, | | 1.53) | 0.94 | (0.49, | | 1.83) | 2.73 | (1.03, | | | 7.24) | 0.77 | (0.44, | | | 1.32) |  |  |
|  | P-value: Raw; Adjusted | | | 0.83; 1.00 | | |  | | 0.45; 0.48 | | |  | | 0.86; 0.86 | |  | | 0.04; 0.22 | | |  | | 0.34; 0.48 | | |  | |  |  |
| *BMPR1A* (rs10887668) | | | |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | AA/AC | 4058 | 3502 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.09 | 0.47 |
|  | CC | 44 | 33 | 0.82 | (0.52, | | | 1.30) | 0.60 | | (0.30, | | 1.22) | 1.43 | (0.50, | | 4.09) | Undefined | | | | | 2.08 | (1.02, | | | 4.25) |  |  |
|  | P-value: Raw; Adjusted | | | 0.40; 1.00 | | |  | | 0.16; 0.48 | | |  | | 0.50; 0.50 | |  | | 0.96; 0.96 | | |  | | 0.05; 0.22 | | |  | |  |  |
| *BMPR1B* (rs12508087) | | | |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | TT | 2584 | 2252 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.05 | 0.69 |
|  | TA | 1345 | 1148 | 0.95 | (0.86, | | | 1.05) | 0.90 | | (0.79, | | 1.04) | 0.91 | (0.68, | | 1.22) | 1.46 | (0.77, | | | 2.80) | 0.94 | (0.75, | | | 1.17) |  |  |
|  | AA | 173 | 134 | 0.85 | (0.68, | | | 1.08) | 0.63 | | (0.44, | | 0.90) | 0.75 | (0.37, | | 1.50) | 1.67 | (0.49, | | | 5.74) | 0.70 | (0.41, | | | 1.22) |  |  |
|  | P-value: Raw; Adjusted | | | 0.19; 1.00 | | |  | | 0.01; 0.12 | | |  | | 0.42; 0.42 | |  | | 0.41; 0.41 | | |  | | 0.21; 0.35 | | |  | |  |  |
| *BMPR1B* (rs4490463) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | AA | 1790 | 1549 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.02 | 0.25 |
|  | AG | 1763 | 1568 | 0.98 | (0.89, | | | 1.08) | 1.03 | | (0.89, | | 1.19) | 1.33 | (0.99, | | 1.79) | 0.94 | (0.47, | | | 1.86) | 0.84 | (0.67, | | | 1.05) |  |  |
|  | GG | 548 | 416 | 0.81 | (0.70, | | | 0.94) | 0.74 | | (0.60, | | 0.91) | 0.96 | (0.62, | | 1.48) | 1.09 | (0.44, | | | 2.68) | 0.61 | (0.44, | | | 0.87) |  |  |
|  | P-value: Raw; Adjusted | | | <.01; 0.06 | | |  | | <.01; 0.07 | | |  | | 0.86; 0.86 | |  | | 0.86; 0.86 | | |  | | <.01; 0.07 | | |  | |  |  |
| *BMPR1B* (rs6849425) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | CC | 2614 | 2297 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.15 | 1.00 |
|  | CT | 1324 | 1108 | 0.94 | (0.85, | | | 1.04) | 0.91 | | (0.79, | | 1.05) | 0.83 | (0.62, | | 1.11) | 1.38 | (0.72, | | | 2.64) | 1.06 | (0.85, | | | 1.33) |  |  |
|  | TT | 164 | 130 | 0.87 | (0.68, | | | 1.10) | 0.63 | | (0.43, | | 0.92) | 1.02 | (0.54, | | 1.94) | 1.21 | (0.28, | | | 5.27) | 0.62 | (0.33, | | | 1.16) |  |  |
|  | P-value: Raw; Adjusted | | | 0.25; 1.00 | | |  | | 0.02; 0.14 | | |  | | 0.95; 0.95 | |  | | 0.80; 0.80 | | |  | | 0.14; 0.35 | | |  | |  |  |
| *BMPR1B* (rs7698964) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | GG | 3412 | 2909 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.09 | 0.94 |
|  | GA/AA | 690 | 626 | 1.02 | (0.90, | | | 1.15) | 1.01 | | (0.85, | | 1.19) | 1.50 | (1.10, | | 2.05) | 0.80 | (0.33, | | | 1.92) | 0.90 | (0.68, | | | 1.18) |  |  |
|  | P-value: Raw; Adjusted | | | 0.74; 1.00 | | |  | | 0.93; 0.93 | | |  | | 0.01; 0.11 | |  | | 0.61; 0.61 | | |  | | 0.45; 0.45 | | |  | |  |  |
| *BMPR1B* (rs7661049) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | GG | 1320 | 1052 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.07 | 0.79 |
|  | GA | 1940 | 1743 | 1.06 | (0.96, | | | 1.18) | 1.10 | | (0.94, | | 1.28) | 1.22 | (0.86, | | 1.71) | 0.74 | (0.35, | | | 1.56) | 1.02 | (0.79, | | | 1.31) |  |  |
|  | AA | 841 | 739 | 1.00 | (0.88, | | | 1.15) | 0.87 | | (0.72, | | 1.06) | 1.54 | (1.05, | | 2.25) | 1.19 | (0.53, | | | 2.70) | 1.14 | (0.85, | | | 1.52) |  |  |
|  | P-value: Raw; Adjusted | | | 0.95; 1.00 | | |  | | 0.16; 0.35 | | |  | | 0.03; 0.21 | |  | | 0.67; 0.67 | | |  | | 0.38; 0.38 | | |  | |  |  |
| *BMPR1B* (rs2120834) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | GG | 1958 | 1656 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.09 | 0.94 |
|  | GC/CC | 2144 | 1879 | 0.99 | (0.90, | | | 1.09) | 1.01 | | (0.88, | | 1.15) | 1.12 | (0.85, | | 1.47) | 2.90 | (1.36, | | | 6.16) | 1.01 | (0.82, | | | 1.25) |  |  |
|  | P-value: Raw; Adjusted | | | 0.82; 1.00 | | |  | | 0.89; 0.89 | | |  | | 0.43; 0.43 | |  | | <.01; 0.07 | | |  | | 0.91; 0.91 | | |  | |  |  |
| *BMPR1B* (rs1863652) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | CC/CT | 3506 | 2973 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.23 | 1.00 |
|  | TT | 594 | 562 | 1.14 | (1.01, | | | 1.30) | 1.23 | | (1.02, | | 1.48) | 1.22 | (0.84, | | 1.76) | 1.25 | (0.55, | | | 2.87) | 1.02 | (0.75, | | | 1.38) |  |  |
|  | P-value: Raw; Adjusted | | | 0.04; 0.51 | | |  | | 0.03; 0.21 | | |  | | 0.30; 0.35 | |  | | 0.60; 0.60 | | |  | | 0.90; 0.90 | | |  | |  |  |
| *BMPR1B* (rs3821968) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | CC | 2589 | 2238 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.14 | 1.00 |
|  | CT | 1268 | 1101 | 1.09 | (0.98, | | | 1.21) | 1.09 | | (0.93, | | 1.26) | 0.84 | (0.61, | | 1.16) | 0.58 | (0.26, | | | 1.30) | 0.92 | (0.72, | | | 1.17) |  |  |
|  | TT | 237 | 192 | 1.08 | (0.87, | | | 1.32) | 1.17 | | (0.83, | | 1.64) | 0.31 | (0.10, | | 0.98) | 1.51 | (0.43, | | | 5.27) | 1.50 | (0.94, | | | 2.38) |  |  |
|  | P-value: Raw; Adjusted | | | 0.49; 1.00 | | |  | | 0.37; 0.37 | | |  | | 0.05; 0.28 | |  | | 0.52; 0.52 | | |  | | 0.09; 0.35 | | |  | |  |  |
| *BMPR2* (rs1980153) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | AA | 3000 | 2678 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.24 | 0.79 |
|  | AT/TT | 1102 | 856 | 0.90 | (0.81, | | | 1.00) | 0.94 | | (0.80, | | 1.09) | 0.95 | (0.69, | | 1.31) | 0.65 | (0.28, | | | 1.47) | 0.76 | (0.58, | | | 0.98) |  |  |
|  | P-value: Raw; Adjusted | | | 0.06; 0.36 | | |  | | 0.40; 0.40 | | |  | | 0.76; 0.76 | |  | | 0.30; 0.30 | | |  | | 0.04; 0.15 | | |  | |  |  |
| *BMPR2* (rs4303700) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | GG | 2807 | 2379 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.23 | 0.79 |
|  | GA/AA | 1268 | 1138 | 0.99 | (0.90, | | | 1.10) | 0.94 | | (0.82, | | 1.08) | 1.06 | (0.80, | | 1.41) | 1.91 | (1.01, | | | 3.61) | 1.05 | (0.84, | | | 1.30) |  |  |
|  | P-value: Raw; Adjusted | | | 0.92; 1.00 | | |  | | 0.37; 0.37 | | |  | | 0.68; 0.68 | |  | | 0.05; 0.15 | | |  | | 0.69; 0.69 | | |  | |  |  |
| *BMPR2* (rs4675278) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | GG | 1923 | 1674 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.16 | 0.79 |
|  | GA | 1762 | 1487 | 0.99 | (0.90, | | | 1.09) | 1.04 | | (0.91, | | 1.19) | 1.01 | (0.76, | | 1.34) | 1.62 | (0.81, | | | 3.23) | 0.83 | (0.67, | | | 1.04) |  |  |
|  | AA | 415 | 372 | 1.07 | (0.91, | | | 1.25) | 1.25 | | (1.00, | | 1.57) | 0.95 | (0.58, | | 1.56) | 2.55 | (1.01, | | | 6.47) | 1.33 | (0.95, | | | 1.85) |  |  |
|  | P-value: Raw; Adjusted | | | 0.40; 1.00 | | |  | | 0.05; 0.15 | | |  | | 0.84; 0.84 | |  | | 0.05; 0.15 | | |  | | 0.10; 0.15 | | |  | |  |  |
| *BMPR2* (rs1199496) | | |  |  |  | | |  |  | |  | |  |  |  | |  |  |  | | |  |  |  | | |  |  |  |
|  | AA | 1876 | 1643 | 1.00 |  | | |  | 1.00 | |  | |  | 1.00 |  | |  | 1.00 |  | | |  | 1.00 |  | | |  | 0.16 | 0.79 |
|  | AT/TT | 2225 | 1890 | 0.99 | (0.91, | | | 1.09) | 1.01 | | (0.89, | | 1.15) | 1.14 | (0.87, | | 1.49) | 0.48 | (0.25, | | | 0.93) | 0.91 | (0.74, | | | 1.12) |  |  |
|  | P-value: Raw; Adjusted | | | 0.90; 1.00 | | |  | | 0.88; 0.88 | | |  | | 0.35; 0.35 | |  | | 0.03; 0.15 | | |  | | 0.38; 0.38 | | |  | |  |  |
| ER/PR data are compared to 3125 controls from the same centers for which cases have ER/PR data | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Adjusted for age, study, reference year BMI, reference year vigorous activity, parity, age at first birth, alcohol consumption and genetic admixture. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 4. Associations between candidate genes and breast cancer by genetic admixture | | | | | | | | | | | | |  |  |  |  |  |  |  |  |  |  |  |
|  |  | White, non-Hispanic | | | | | 0 - 28% Native American Ancestry | | | | | 29 - 70% Native American Ancestry | | | | | 71 - 100% Native American Ancestry | | | | | Interaction | |
|  |  | Controls | Cases |  |  |  | Controls | Cases |  |  |  | Controls | Cases |  |  |  | Controls | Cases |  |  |  | Raw | Holms |
|  |  | N | N | OR | (95% CI) | | N | N | OR | (95% CI) | | N | N | OR | (95% CI) | | N | N | OR | (95% CI) | | P-value | P-value |
| ACVR2A (rs1014064) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 738 | 738 | 1.00 |  |  | 114 | 101 | 1.00 |  |  | 549 | 433 | 1.00 |  |  | 140 | 129 | 1.00 |  |  | 0.83 | 1.00 |
|  | AG/GG | 818 | 731 | 0.90 | (0.78, | 1.03) | 158 | 173 | 1.29 | (0.90, | 1.85) | 1105 | 930 | 1.08 | (0.92, | 1.26) | 481 | 300 | **0.68** | **(0.51,** | **0.92)** |  |  |
| ACVR2A (rs2161983) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 728 | 728 | 1.00 |  |  | 111 | 96 | 1.00 |  |  | 542 | 430 | 1.00 |  |  | 137 | 129 | 1.00 |  |  | 0.67 | 1.00 |
|  | CT/TT | 827 | 741 | 0.90 | (0.78, | 1.04) | 161 | 177 | 1.35 | (0.93, | 1.94) | 1112 | 933 | 1.07 | (0.91, | 1.25) | 484 | 300 | **0.66** | **(0.49,** | **0.89)** |  |  |
| ACVR2A (rs3768687) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 738 | 735 | 1.00 |  |  | 113 | 101 | 1.00 |  |  | 547 | 433 | 1.00 |  |  | 139 | 129 | 1.00 |  |  | 0.71 | 1.00 |
|  | GA/AA | 814 | 730 | 0.90 | (0.78, | 1.04) | 159 | 173 | 1.28 | (0.89, | 1.84) | 1105 | 926 | 1.06 | (0.91, | 1.25) | 480 | 300 | **0.68** | **(0.50,** | **0.91)** |  |  |
| ACVR2A (rs10497025) | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 865 | 862 | 1.00 |  |  | 166 | 156 | 1.00 |  |  | 1091 | 834 | 1.00 |  |  | 399 | 298 | 1.00 |  |  | 0.19 | 0.58 |
|  | CG/GG | 691 | 607 | 0.89 | (0.77, | 1.03) | 106 | 117 | 1.19 | (0.83, | 1.71) | 563 | 529 | **1.22** | **(1.04,** | **1.42)** | 222 | 131 | **0.75** | **(0.57,** | **0.99)** |  |  |
| ACVR2B (rs928813) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 278 | 286 | 1.00 |  |  | 83 | 71 | 1.00 |  |  | 683 | 527 | 1.00 |  |  | 360 | 217 | 1.00 |  |  | **0.01** | **0.02** |
|  | GT/TT | 1272 | 1174 | 0.91 | (0.75, | 1.09) | 189 | 200 | 1.23 | (0.83, | 1.83) | 968 | 831 | 1.11 | (0.96, | 1.29) | 261 | 208 | **1.35** | **(1.04,** | **1.75)** |  |  |
| ACVR2B (rs2276541) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 594 | 519 | 1.00 |  |  | 84 | 85 | 1.00 |  |  | 447 | 369 | 1.00 |  |  | 138 | 117 | 1.00 |  |  | **0.03** | **0.05** |
|  | AG/GG | 962 | 948 | 1.12 | (0.97, | 1.30) | 188 | 189 | 1.03 | (0.70, | 1.50) | 1207 | 994 | 1.00 | (0.85, | 1.18) | 483 | 312 | **0.69** | **(0.51,** | **0.93)** |  |  |
| BMP4 (rs17563) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 311 | 265 | 1.00 |  |  | 87 | 55 | 1.00 |  |  | 690 | 498 | 1.00 |  |  | 361 | 238 | 1.00 |  |  | 0.20 | 0.57 |
|  | TC | 716 | 745 | 1.24 | (1.02, | 1.50) | 108 | 103 | 1.72 | (1.08, | 2.74) | 621 | 534 | 1.18 | (1.00, | 1.40) | 195 | 148 | 1.14 | (0.86, | 1.52) |  |  |
|  | CC | 501 | 426 | 1.02 | (0.83, | 1.26) | 47 | 61 | **2.42** | **(1.40,** | **4.16)** | 159 | 121 | 1.06 | (0.81, | 1.39) | 30 | 21 | 1.13 | (0.62, | 2.09) |  |  |
| BMP4 (rs762642) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 540 | 501 | 1.00 |  |  | 96 | 90 | 1.00 |  |  | 549 | 493 | 1.00 |  |  | 226 | 145 | 1.00 |  |  | 0.54 | 0.84 |
|  | TG | 759 | 722 | 1.03 | (0.88, | 1.20) | 126 | 140 | 1.18 | (0.80, | 1.74) | 809 | 660 | 0.89 | (0.76, | 1.05) | 287 | 206 | 1.10 | (0.82, | 1.47) |  |  |
|  | GG | 256 | 246 | 1.03 | (0.83, | 1.27) | 50 | 44 | 0.82 | (0.48, | 1.39) | 296 | 210 | **0.77** | **(0.62,** | **0.96)** | 108 | 78 | 1.09 | (0.75, | 1.58) |  |  |
| BMP4 (rs2761887) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA/AC | 1247 | 1180 | 1.00 |  |  | 230 | 227 | 1.00 |  |  | 1366 | 1082 | 1.00 |  |  | 479 | 343 | 1.00 |  |  | 0.70 | 0.84 |
|  | CC | 308 | 288 | 1.00 | (0.83, | 1.20) | 42 | 47 | 1.10 | (0.68, | 1.76) | 287 | 280 | **1.27** | **(1.05,** | **1.53)** | 142 | 86 | 0.85 | (0.62, | 1.17) |  |  |
| BMP6 (rs270417) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 802 | 715 | 1.00 |  |  | 120 | 156 | 1.00 |  |  | 1065 | 834 | 1.00 |  |  | 540 | 355 | 1.00 |  |  | 0.52 | 1.00 |
|  | TC/CC | 754 | 754 | 1.12 | (0.97, | 1.30) | 152 | 118 | **0.55** | **(0.38,** | **0.79)** | 587 | 529 | 1.11 | (0.95, | 1.29) | 81 | 74 | 1.33 | (0.92, | 1.92) |  |  |
| BMP7 (rs7273197) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 698 | 657 | 1.00 |  |  | 145 | 141 | 1.00 |  |  | 946 | 848 | 1.00 |  |  | 380 | 269 | 1.00 |  |  | 0.16 | 0.62 |
|  | CT/TT | 858 | 812 | 1.01 | (0.88, | 1.17) | 127 | 133 | 1.08 | (0.76, | 1.53) | 708 | 515 | **0.80** | **(0.69,** | **0.93)** | 241 | 160 | 0.87 | (0.67, | 1.14) |  |  |
| BMP7 (rs3787382) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 1024 | 923 | 1.00 |  |  | 164 | 165 | 1.00 |  |  | 993 | 832 | 1.00 |  |  | 342 | 265 | 1.00 |  |  | **0.003** | **0.04** |
|  | CT | 486 | 481 | 1.11 | (0.95, | 1.29) | 87 | 94 | 1.11 | (0.76, | 1.63) | 577 | 469 | 0.97 | (0.83, | 1.13) | 239 | 136 | 0.74 | (0.56, | 0.97) |  |  |
|  | TT | 46 | 65 | 1.58 | (1.07, | 2.33) | 20 | 15 | 0.78 | (0.37, | 1.61) | 80 | 60 | 0.86 | (0.60, | 1.22) | 40 | 28 | 0.86 | (0.50, | 1.47) |  |  |
| BMP7 (rs6025446) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA/AG | 1298 | 1203 | 1.00 |  |  | 199 | 226 | 1.00 |  |  | 1209 | 1034 | 1.00 |  |  | 423 | 327 | 1.00 |  |  | **0.003** | **0.04** |
|  | GG | 257 | 266 | 1.13 | (0.93, | 1.37) | 73 | 48 | 0.60 | (0.39, | 0.92) | 445 | 329 | 0.86 | (0.73, | 1.02) | 198 | 102 | 0.70 | (0.52, | 0.93) |  |  |
| BMPR2 (rs17199235) | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 1213 | 1138 | 1.00 |  |  | 221 | 219 | 1.00 |  |  | 1435 | 1229 | 1.00 |  |  | 597 | 411 | 1.00 |  |  | 0.06 | 0.35 |
|  | AG/GG | 343 | 331 | 1.03 | (0.87, | 1.22) | 51 | 55 | 1.10 | (0.70, | 1.72) | 219 | 134 | **0.67** | **(0.53,** | **0.85)** | 24 | 18 | 0.93 | (0.48, | 1.82) |  |  |
| Bold indicates adjusted estimates remained significant at ≤0.05. | | | | | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Adjusted for age, study, genetic admixture, reference year BMI, reference year vigorous activity, parity, age at first birth and alcohol consumption. | | | | | | | | | | | | | | | | | | | | |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Supplemental Table 5. Associations by admixture and pre and post-menopausal status | | | | | | | | | | | | |  |  |  |  |  |
|  |  | Pre / Peri - Menopause | | | | | | | Post - Menopause | | | | |  |  |  |  |
|  |  | Controls | | | Cases |  |  |  | Controls | Cases |  |  |  | 2-way Interaction | |  |  |
|  |  | N | | | N | OR | (95% CI) | | N | N | OR | (95% CI) | | P-value | Holms |  |  |
|  |  | 0 - 28% Native American Ancestry | | | | | | | | | | | | | |  |  |
| *ACVR1* (rs1220134) | | | |  | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 274 | | 329 | | 1.00 |  |  | 633 | 579 | 1.00 |  |  | 0.01 | 0.14 |  |  |
|  | TA/AA | 290 | | 247 | | 0.69 | (0.54, | 0.88) | 592 | 538 | 0.99 | (0.84, | 1.17) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | <.01; 0.02 |  |  |  |  | 0.92; 1.00 |  |  |  |  |  |  |
| *ACVR2A* (rs3768688) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 199 | | 208 | | 1.00 |  |  | 400 | 374 | 1.00 |  |  | 0.90 | 0.90 |  |  |
|  | CT/TT | 366 | | 368 | | 0.99 | (0.77, | 1.26) | 825 | 743 | 0.97 | (0.82, | 1.16) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.92; 0.92 |  |  |  |  | 0.76; 1.00 |  |  |  |  |  |  |
| *ACVR2A* (rs10497025) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 313 | | 360 | | 1.00 |  |  | 693 | 629 | 1.00 |  |  | 0.05 | 0.15 |  |  |
|  | CG/GG | 252 | | 215 | | 0.73 | (0.58, | 0.93) | 532 | 488 | 1.01 | (0.86, | 1.19) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.01; 0.03 |  |  |  |  | 0.93; 1.00 |  |  |  |  |  |  |
| *ACVR2B* (rs928813) | | | |  | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 113 | | 119 | | 1.00 |  |  | 235 | 225 | 1.00 |  |  | 0.78 | 0.78 |  |  |
|  | GT/TT | 447 | | 455 | | 0.97 | (0.72, | 1.30) | 989 | 883 | 0.95 | (0.77, | 1.17) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.82; 0.82 |  |  |  |  | 0.61; 0.61 |  |  |  |  |  |  |
| *ACVR2B* (rs2276541) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 181 | | 202 | | 1.00 |  |  | 476 | 382 | 1.00 |  |  | 0.03 | 0.05 |  |  |
|  | AG/GG | 384 | | 374 | | 0.85 | (0.67, | 1.10) | 749 | 733 | 1.20 | (1.01, | 1.43) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.22; 0.43 |  |  |  |  | 0.03; 0.07 |  |  |  |  |  |  |
| *ACVR2B* (rs503327) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 449 | | 465 | | 1.00 |  |  | 974 | 909 | 1.00 |  |  | 0.89 | 0.89 |  |  |
|  | GA/AA | 116 | | 111 | | 0.97 | (0.72, | 1.30) | 250 | 208 | 0.90 | (0.73, | 1.11) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.82; 0.82 |  |  |  |  | 0.32; 0.32 |  |  |  |  |  |  |
| *BMP4* (rs17563) | | | |  | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 118 | | 116 | | 1.00 |  |  | 271 | 193 | 1.00 |  |  | 0.21 | 0.35 |  |  |
|  | TC/CC | 424 | | 433 | | 1.03 | (0.77, | 1.38) | 923 | 869 | 1.35 | (1.09, | 1.66) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.86; 1.00 |  |  |  |  | <.01; 0.01 |  |  |  |  |  |  |
| *BMP4* (rs762642) | | | |  | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 187 | | 184 | | 1.00 |  |  | 436 | 389 | 1.00 |  |  | 0.96 | 0.96 |  |  |
|  | TG/GG | 378 | | 392 | | 1.05 | (0.82, | 1.35) | 788 | 728 | 1.04 | (0.87, | 1.23) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.71; 1.00 |  |  |  |  | 0.68; 0.68 |  |  |  |  |  |  |
| *BMP4* (rs2761887) | | | |  | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 171 | | 188 | | 1.00 |  |  | 403 | 326 | 1.00 |  |  | 0.09 | 0.23 |  |  |
|  | AC/CC | 394 | | 388 | | 0.88 | (0.68, | 1.13) | 821 | 790 | 1.21 | (1.01, | 1.44) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.31; 0.84 |  |  |  |  | 0.04; 0.07 |  |  |  |  |  |  |
| *BMP7* (rs7273197) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 267 | | 258 | | 1.00 |  |  | 560 | 514 | 1.00 |  |  | 0.33 | 1.00 |  |  |
|  | CT/TT | 298 | | 318 | | 1.13 | (0.89, | 1.43) | 665 | 603 | 0.99 | (0.84, | 1.16) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.32; 1.00 |  |  |  |  | 0.85; 1.00 |  |  |  |  |  |  |
| *BMPR1B* (rs1863652) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 259 | | 219 | | 1.00 |  |  | 494 | 489 | 1.00 |  |  | 0.002 | 0.03 |  |  |
|  | CT/TT | 306 | | 357 | | 1.41 | (1.11, | 1.79) | 730 | 628 | 0.87 | (0.73, | 1.02) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | <.01; 0.08 |  |  |  |  | 0.09; 1.00 |  |  |  |  |  |  |
| *BMPR2* (rs17199235) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 435 | | 436 | | 1.00 |  |  | 969 | 880 | 1.00 |  |  | 0.79 | 1.00 |  |  |
|  | AG/GG | 130 | | 140 | | 1.06 | (0.80, | 1.40) | 256 | 237 | 1.03 | (0.84, | 1.26) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.70; 1.00 |  |  |  |  | 0.79; 1.00 |  |  |  |  |  |  |
| *GDF10* (rs1902725) | | | |  | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 366 | | 357 | | 1.00 |  |  | 756 | 700 | 1.00 |  |  | 0.22 | 0.66 |  |  |
|  | GA/AA | 199 | | 219 | | 1.15 | (0.90, | 1.47) | 469 | 417 | 0.95 | (0.80, | 1.13) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.26; 0.85 |  |  |  |  | 0.55; 1.00 |  |  |  |  |  |  |
|  |  |  | |  | |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  | 29 - 70% Native American Ancestry | | | | | | | | | | | | | |  |  |
| *ACVR1* (rs1220134) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 400 | | | 320 | 1.00 |  |  | 601 | 473 | 1.00 |  |  | 0.74 | 1.00 |  |  |
|  | TA/AA | 242 | | | 210 | 1.07 | (0.84, | 1.37) | 365 | 328 | 1.14 | (0.94, | 1.39) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.57; 1.00 |  |  |  |  | 0.18; 1.00 |  |  |  |  |  |  |
| *ACVR2A* (rs3768688) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 219 | | | 190 | 1.00 |  |  | 347 | 291 | 1.00 |  |  | 0.79 | 0.79 |  |  |
|  | CT/TT | 423 | | | 341 | 0.90 | (0.70, | 1.15) | 620 | 510 | 0.95 | (0.78, | 1.16) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.39; 0.39 |  |  |  |  | 0.59; 0.81 |  |  |  |  |  |  |
| *ACVR2A* (rs10497025) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 442 | | | 322 | 1.00 |  |  | 616 | 489 | 1.00 |  |  | 0.07 | 0.21 |  |  |
|  | CG/GG | 200 | | | 209 | 1.49 | (1.16, | 1.91) | 351 | 312 | 1.09 | (0.89, | 1.33) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | <.01; <.01 |  |  |  |  | 0.41; 0.81 |  |  |  |  |  |  |
| *ACVR2B* (rs928813) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 267 | | | 229 | 1.00 |  |  | 394 | 290 | 1.00 |  |  | 0.10 | 0.26 |  |  |
|  | GT/TT | 375 | | | 299 | 0.92 | (0.72, | 1.17) | 570 | 509 | 1.25 | (1.02, | 1.52) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.51; 0.80 |  |  |  |  | 0.03; 0.07 |  |  |  |  |  |  |
| *ACVR2B* (rs2276541) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 167 | | | 134 | 1.00 |  |  | 271 | 225 | 1.00 |  |  | 0.87 | 1.00 |  |  |
|  | AG/GG | 475 | | | 397 | 1.05 | (0.80, | 1.38) | 696 | 576 | 1.00 | (0.81, | 1.24) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.71; 0.80 |  |  |  |  | 0.97; 0.97 |  |  |  |  |  |  |
| *ACVR2B* (rs503327) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 564 | | | 479 | 1.00 |  |  | 864 | 725 | 1.00 |  |  | 0.65 | 1.00 |  |  |
|  | GA/AA | 77 | | | 52 | 0.74 | (0.51, | 1.09) | 103 | 76 | 0.91 | (0.66, | 1.25) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.13; 0.33 |  |  |  |  | 0.55; 0.86 |  |  |  |  |  |  |
| *BMP4* (rs17563) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 260 | | | 190 | 1.00 |  |  | 414 | 304 | 1.00 |  |  | 0.83 | 0.83 |  |  |
|  | TC/CC | 300 | | | 252 | 1.09 | (0.84, | 1.41) | 464 | 392 | 1.19 | (0.96, | 1.46) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.53; 0.53 |  |  |  |  | 0.11; 0.20 |  |  |  |  |  |  |
| *BMP4* (rs762642) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 203 | | | 197 | 1.00 |  |  | 328 | 289 | 1.00 |  |  | 0.24 | 0.47 |  |  |
|  | TG/GG | 439 | | | 334 | 0.72 | (0.56, | 0.93) | 639 | 512 | 0.91 | (0.74, | 1.11) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.01; 0.03 |  |  |  |  | 0.36; 0.36 |  |  |  |  |  |  |
| *BMP4* (rs2761887) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 197 | | | 179 | 1.00 |  |  | 325 | 223 | 1.00 |  |  | 0.01 | 0.04 |  |  |
|  | AC/CC | 445 | | | 352 | 0.85 | (0.66, | 1.10) | 641 | 577 | 1.29 | (1.05, | 1.59) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.21; 0.40 |  |  |  |  | 0.02; 0.05 |  |  |  |  |  |  |
| *BMP7* (rs7273197) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 340 | | | 342 | 1.00 |  |  | 581 | 490 | 1.00 |  |  | 0.007 | 0.10 |  |  |
|  | CT/TT | 302 | | | 189 | 0.61 | (0.48, | 0.78) | 386 | 311 | 0.92 | (0.76, | 1.12) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | <.01; <.01 |  |  |  |  | 0.43; 1.00 |  |  |  |  |  |  |
| *BMPR1B* (rs1863652) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 225 | | | 170 | 1.00 |  |  | 360 | 265 | 1.00 |  |  | 0.73 | 1.00 |  |  |
|  | CT/TT | 416 | | | 361 | 1.16 | (0.90, | 1.50) | 607 | 536 | 1.23 | (1.01, | 1.51) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.24; 1.00 |  |  |  |  | 0.04; 0.48 |  |  |  |  |  |  |
| *BMPR2* (rs17199235) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 567 | | | 469 | 1.00 |  |  | 829 | 734 | 1.00 |  |  | 0.03 | 0.16 |  |  |
|  | AG/GG | 75 | | | 62 | 0.97 | (0.67, | 1.40) | 138 | 67 | 0.54 | (0.40, | 0.74) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.86; 1.00 |  |  |  |  | <.01; <.01 |  |  |  |  |  |  |
| *GDF10* (rs1902725) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 445 | | | 370 | 1.00 |  |  | 666 | 555 | 1.00 |  |  | 0.85 | 1.00 |  |  |
|  | GA/AA | 197 | | | 161 | 1.03 | (0.80, | 1.33) | 301 | 246 | 1.00 | (0.81, | 1.23) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.82; 0.82 |  |  |  |  | 0.98; 1.00 |  |  |  |  |  |  |
|  |  |  | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 71 - 100% Native American Ancestry | | | | | | | | | | | | | |  |  | 3-way Interaction | |
| *ACVR1* (rs1220134) | | | | |  |  |  |  |  |  |  |  |  |  |  | P-value | Holms |
|  | TT | 193 | | | 132 | 1.00 |  |  | 250 | 157 | 1.00 |  |  | 0.88 | 1.00 | 0.23 | 1.00 |
|  | TA/AA | 79 | | | 63 | 1.18 | (0.77, | 1.83) | 96 | 71 | 1.08 | (0.73, | 1.60) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.45; 1.00 |  |  |  |  | 0.69; 1.00 |  |  |  |  |  |  |
| *ACVR2A* (rs3768688) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 83 | | | 76 | 1.00 |  |  | 134 | 73 | 1.00 |  |  | 0.01 | 0.03 | 0.05 | 0.14 |
|  | CT/TT | 188 | | | 119 | 0.68 | (0.45, | 1.04) | 212 | 155 | 1.38 | (0.95, | 1.99) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.08; 0.21 |  |  |  |  | 0.09; 0.18 |  |  |  |  |  |  |
| *ACVR2A* (rs10497025) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 179 | | | 136 | 1.00 |  |  | 218 | 158 | 1.00 |  |  | 0.43 | 0.60 | 0.07 | 0.14 |
|  | CG/GG | 93 | | | 59 | 0.87 | (0.57, | 1.34) | 128 | 70 | 0.70 | (0.48, | 1.02) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.53; 0.53 |  |  |  |  | 0.06; 0.18 |  |  |  |  |  |  |
| *ACVR2B* (rs928813) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 159 | | | 95 | 1.00 |  |  | 199 | 116 | 1.00 |  |  | 0.44 | 0.44 | 0.82 | 0.88 |
|  | GT/TT | 113 | | | 100 | 1.71 | (1.14, | 2.57) | 147 | 108 | 1.34 | (0.94, | 1.92) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.01; 0.02 |  |  |  |  | 0.11; 0.19 |  |  |  |  |  |  |
| *ACVR2B* (rs2276541) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 63 | | | 65 | 1.00 |  |  | 75 | 53 | 1.00 |  |  | 0.15 | 0.25 | 0.59 | 0.88 |
|  | AG/GG | 209 | | | 130 | 0.54 | (0.34, | 0.84) | 271 | 175 | 0.82 | (0.54, | 1.25) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | <.01; 0.02 |  |  |  |  | 0.36; 0.36 |  |  |  |  |  |  |
| *ACVR2B* (rs503327) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 257 | | | 184 | 1.00 |  |  | 338 | 213 | 1.00 |  |  | 0.08 | 0.21 | 0.20 | 0.50 |
|  | GA/AA | 15 | | | 11 | 1.20 | (0.51, | 2.86) | 8 | 15 | 3.52 | (1.39, | 8.91) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.68; 0.68 |  |  |  |  | <.01; 0.02 |  |  |  |  |  |  |
| *BMP4* (rs17563) | | | | |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 160 | | | 110 | 1.00 |  |  | 199 | 127 | 1.00 |  |  | 0.64 | 0.86 | 0.39 | 1.00 |
|  | TC/CC | 88 | | | 75 | 1.30 | (0.84, | 1.99) | 137 | 91 | 1.13 | (0.78, | 1.64) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.24; 0.58 |  |  |  |  | 0.51; 1.00 |  |  |  |  |  |  |
| *BMP4* (rs762642) | | |  | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | TT | 101 | 66 | | | 1.00 |  |  | 122 | 79 | 1.00 |  |  | 0.48 | 0.86 | 0.83 | 1.00 |
|  | TG/GG | 171 | 129 | | | 1.17 | (0.77, | 1.79) | 224 | 149 | 0.96 | (0.66, | 1.39) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.47; 0.58 |  |  |  |  | 0.83; 1.00 |  |  |  |  |  |  |
| *BMP4* (rs2761887) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 77 | 67 | | | 1.00 |  |  | 93 | 56 | 1.00 |  |  | 0.13 | 0.37 | 0.59 | 1.00 |
|  | AC/CC | 195 | 128 | | | 0.75 | (0.49, | 1.16) | 253 | 172 | 1.19 | (0.79, | 1.79) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.20; 0.58 |  |  |  |  | 0.40; 1.00 |  |  |  |  |  |  |
| *BMP7* (rs7273197) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 176 | 120 | | | 1.00 |  |  | 202 | 145 | 1.00 |  |  | 0.32 | 1.00 | 0.79 | 1.00 |
|  | CT/TT | 96 | 75 | | | 1.01 | (0.66, | 1.53) | 144 | 83 | 0.81 | (0.56, | 1.16) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.97; 1.00 |  |  |  |  | 0.25; 1.00 |  |  |  |  |  |  |
| *BMPR1B* (rs1863652) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | CC | 90 | 75 | | | 1.00 |  |  | 120 | 66 | 1.00 |  |  | 0.10 | 0.97 | 0.0006 | 0.008 |
|  | CT/TT | 182 | 120 | | | 0.86 | (0.57, | 1.32) | 226 | 162 | 1.28 | (0.87, | 1.87) |  |  |  |  |
|  | P-value: raw; adjusted | |  | | | 0.50; 1.00 |  |  |  |  | 0.21; 1.00 |  |  |  |  |  |  |
| *BMPR2* (rs17199235) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | AA | 263 | 187 | | | 1.00 |  |  | 331 | 219 | 1.00 |  |  | 0.63 | 1.00 | 0.21 | 1.00 |
|  | AG/GG | 9 | 8 | | | 1.22 | (0.41, | 3.64) | 15 | 9 | 0.81 | (0.34, | 1.96) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.72; 1.00 |  |  |  |  | 0.64; 1.00 |  |  |  |  |  |  |
| *GDF10* (rs1902725) | | | | | |  |  |  |  |  |  |  |  |  |  |  |  |
|  | GG | 213 | 158 | | | 1.00 |  |  | 273 | 155 | 1.00 |  |  | 0.02 | 0.09 | 0.02 | 0.09 |
|  | GA/AA | 59 | 37 | | | 0.96 | (0.58, | 1.59) | 73 | 73 | 1.70 | (1.14, | 2.54) |  |  |  |  |
|  | P-value: raw; adjusted | | | | | 0.86; 0.99 |  |  |  |  | <.01; 0.04 |  |  |  |  |  |  |