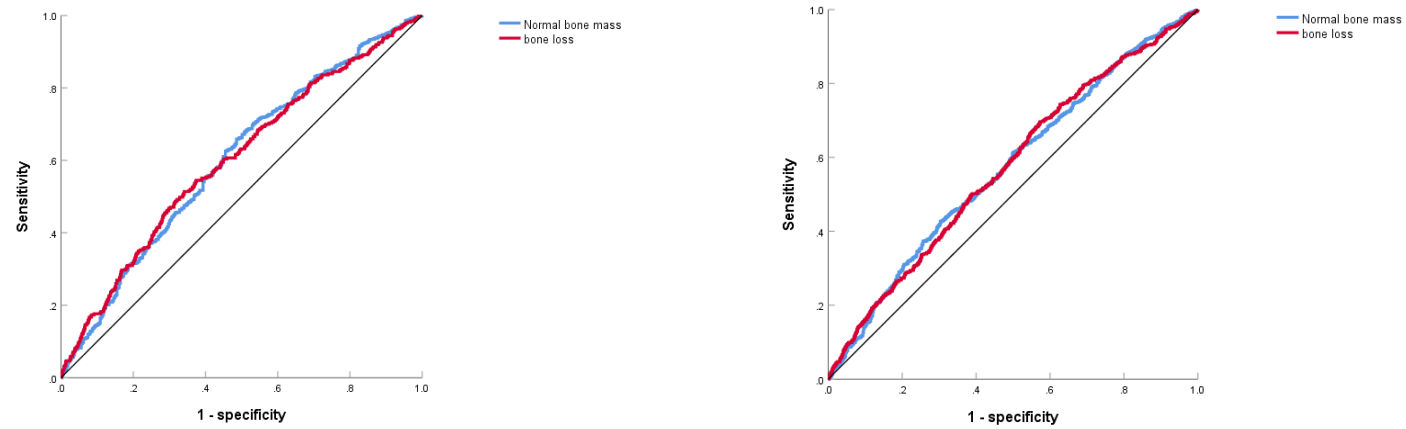


Opposing Effects of Nutritional Supply on Bone Health at Different Ages: Based on the NHANES Database



Supplementary Figure S1: ROC curves of neural network models at different age stages.

Opposing Effects of Nutritional Supply on Bone Health at Different Ages: Based on the NHANES Database
Supplementary Table S1. Logistic regression analysis of bone status in research subjects of different age groups (modal 2).

| | b | Sb | Wald χ^2 | p-Value | OR | 95% CI | |
|-------------------------|--------|-------|---------------|---------|-------|--------|---------|
| | | | | | | lowest | highest |
| ≤20 years | | | | | | | |
| vitamin B ₂ | −0.098 | 0.071 | 1.943 | 0.163 | 0.906 | 0.789 | 1.041 |
| vitamin B ₆ | 0.012 | 0.009 | 1.788 | 0.181 | 1.012 | 0.995 | 1.029 |
| Niacin | 0.001 | 0.105 | 0 | 0.996 | 1.001 | 0.815 | 1.228 |
| vitamin B ₁₂ | 0 | 0.015 | 0 | 0.995 | 1 | 0.971 | 1.03 |
| Carbohydrates stage | | | | | | | |
| Appropriate | | | 1.724 | 0.422 | | | |
| low | 0.233 | 0.247 | 0.89 | 0.346 | 1.263 | 0.778 | 2.05 |
| high | 0.077 | 0.252 | 0.092 | 0.761 | 1.08 | 0.659 | 1.769 |
| Protein stage | | | | | | | |
| Appropriate | | | 3.017 | 0.221 | | | |
| low | 0.193 | 0.142 | 1.851 | 0.174 | 1.212 | 0.919 | 1.6 |
| high | −0.068 | 0.225 | 0.09 | 0.764 | 0.935 | 0.601 | 1.453 |
| HFD stage | | | | | | | |
| Appropriate | | | | | | | |
| high | 1.388 | 0.728 | 3.632 | 0.057 | 4.007 | 0.961 | 16.699 |
| constant | −3.367 | 0.781 | 18.572 | 0 | 0.034 | | |
| <20 years | | | | | | | |
| vitamin B ₂ | 0.142 | 0.053 | 7.327 | 0.007 | 1.153 | 1.04 | 1.278 |
| vitamin B ₆ | 0.004 | 0.007 | 0.299 | 0.584 | 1.004 | 0.991 | 1.017 |
| Niacin | −0.172 | 0.075 | 5.236 | 0.022 | 0.842 | 0.726 | 0.976 |

| | | | | | | | |
|-------------------------|--------|-------|---------|-------|-------|-------|-------|
| vitamin B ₁₂ | −0.003 | 0.006 | 0.16 | 0.689 | 0.997 | 0.985 | 1.01 |
| Carbohydrates stage | | | | | | | |
| Appropriate | | | 5.718 | 0.057 | | | |
| low | −0.117 | 0.12 | 0.96 | 0.327 | 0.889 | 0.703 | 1.124 |
| high | 0.291 | 0.186 | 2.456 | 0.117 | 1.338 | 0.93 | 1.926 |
| Protein stage | | | | | | | |
| Appropriate | | | 2.066 | 0.356 | | | |
| low | 0.214 | 0.159 | 1.821 | 0.177 | 1.239 | 0.908 | 1.691 |
| high | −0.01 | 0.104 | 0.009 | 0.924 | 0.99 | 0.807 | 1.214 |
| HFD stage | | | | | | | |
| Appropriate | | | | | | | |
| high | −0.051 | 0.272 | 0.035 | 0.852 | 0.95 | 0.558 | 1.62 |
| constant | −1.722 | 0.138 | 156.168 | 0 | 0.179 | | |

Supplementary Table S2. Logistic regression analysis of bone status in research subjects of different age groups (modal 3).

| | b | Sb | Wald χ^2 | p-Value | OR | 95% CI | |
|------------------------------|---------|----------|---------------|---------|-----------------------|-----------------------|-----------------------|
| | | | | | | lowest | highest |
| ≤20 years | | | | | | | |
| home PIR | −0.087 | 0.059 | 2.179 | 0.14 | 0.916 | 0.816 | 1.029 |
| Gender | | | | | | | |
| male | 0 | 0.182 | 0 | 0.998 | 1 | 0.701 | 1.428 |
| female | | | | | 1 | | |
| Country of Birth | | | | | | | |
| Mexican Americans | 0.457 | 0.622 | 0.54 | 0.462 | 1.58 | 0.467 | 5.349 |
| Other Hispanic | −1.395 | 0.72 | 3.754 | 0.053 | 0.248 | 0.06 | 1.016 |
| Non-Hispanic white | | | | | 1 | | |
| Citizenship | | | | | | | |
| Born or naturalized citizens | −1.392 | 0.832 | 2.795 | 0.095 | 0.249 | 0.049 | 1.271 |
| Non-US citizens | | | | | 1 | | |
| marital status | | | | | | | |
| married | −16.849 | 1 | 284.069 | 0 | 4.81×10^{-8} | 6.79×10^{-9} | 3.42×10^{-7} |
| Widowhood | −0.308 | 7908.451 | 0 | 1 | 0.735 | 0 | 3.72×10^{-7} |
| divorce | −16.886 | 1.054 | 256.449 | 0 | 4.64×10^{-8} | 5.88×10^{-9} | 3.67×10^{-7} |
| separation | −16.648 | 0.559 | 888.32 | 0 | 5.89×10^{-8} | 1.97×10^{-8} | 1.76×10^{-7} |
| Never married | −16.363 | 0 | . | . | 7.83×10^{-8} | 7.83×10^{-8} | 7.83×10^{-8} |
| Living with a partner | −1.231 | 7908.451 | 0 | 1 | 0.292 | 0 | 7.23×10^{-8} |

| | | | | | | | |
|------------------------------|--------|-------|-------|-------|-------|-------|-------|
| others | | | | | 1 | | |
| Total number of households | | | | | | | |
| 1 | 0.705 | 0.951 | 0.55 | 0.458 | 2.023 | 0.728 | 4.255 |
| 2 | 0.565 | 0.45 | 1.575 | 0.209 | 1.76 | 0.91 | 4.059 |
| 3 | 0.653 | 0.381 | 2.932 | 0.087 | 1.922 | 0.879 | 3.384 |
| 4 | 0.545 | 0.344 | 2.515 | 0.113 | 1.725 | 0.698 | 2.477 |
| 5 | 0.274 | 0.323 | 0.72 | 0.396 | 1.315 | 0.781 | 3.261 |
| 6 | 0.467 | 0.365 | 1.641 | 0.2 | 1.596 | . | . |
| >6 | | | | | 1 | | |
| high-fat diet | | | | | | | |
| Appropriate | -0.573 | 0.271 | 4.48 | 0.034 | 0.564 | 0.331 | 0.958 |
| high | | | | | 1 | | |
| Total Fat(g) | -0.013 | 0.01 | 1.708 | 0.191 | 0.987 | 0.968 | 1.007 |
| Energy(kcal) | 0 | 0.001 | 0.097 | 0.756 | 1 | 0.998 | 1.001 |
| Carbohydrates(g) | 0.003 | 0.003 | 0.781 | 0.377 | 1.003 | 0.997 | 1.008 |
| Protein(g) | -0.005 | 0.006 | 0.709 | 0.4 | 0.995 | 0.984 | 1.007 |
| Dietary fiber(g) | -0.031 | 0.015 | 4.068 | 0.044 | 0.97 | 0.941 | 0.999 |
| Total Saturated fat acids(g) | 0.033 | 0.019 | 3.191 | 0.074 | 1.034 | 0.997 | 1.072 |
| Cholesterol(mg) | 0.001 | 0.001 | 4.001 | 0.045 | 1.001 | 1 | 1.003 |
| Vitamin C (mg) | 0 | 0.001 | 0.133 | 0.716 | 1 | 0.999 | |
| Vitamin K(μg) | 0.001 | 0.001 | 0.636 | 0.425 | 1.001 | 0.998 | 1.002 |
| Calcium(mg) | 0 | 0 | 0.051 | 0.821 | 1 | 0.999 | 1.004 |
| Phosphorus(mg) | 0 | 0 | 0.114 | 0.736 | 1 | 0.999 | 1.001 |

| | | | | | | | |
|-------------------------|--------|-------|-------|-------|-------|-------|-------|
| Magnesium(mg) | 0.001 | 0.002 | 0.082 | 0.775 | 1.001 | 0.997 | 1.001 |
| Iron(mg) | −0.019 | 0.014 | 1.758 | 0.185 | 0.982 | 0.955 | 1.004 |
| Zinc(mg) | −0.008 | 0.017 | 0.23 | 0.631 | 0.992 | 0.958 | 1.009 |
| Copper(mg) | 0.524 | 0.335 | 2.446 | 0.118 | 1.689 | 0.876 | 1.026 |
| Sodium (mg) | 0 | 0 | 0.307 | 0.58 | 1 | 1 | 3.255 |
| vitamin E | −0.013 | 0.03 | 0.201 | 0.654 | 0.987 | 0.93 | 1.047 |
| vitamin A | −0.001 | 0 | 2.142 | 0.143 | 0.999 | 0.999 | 1 |
| vitamin B ₁ | 0.121 | 0.224 | 0.293 | 0.588 | 1.129 | 0.728 | 1.751 |
| vitamin B ₂ | −0.349 | 0.196 | 3.171 | 0.075 | 0.705 | 0.48 | 1.036 |
| Niacin | 0.061 | 0.021 | 8.097 | 0.004 | 1.062 | 1.019 | 1.108 |
| vitamin B ₆ | −0.466 | 0.22 | 4.507 | 0.034 | 0.627 | 0.408 | 0.965 |
| FA | −0.001 | 0.001 | 3.66 | 0.056 | 0.999 | 0.997 | 1 |
| vitamin B ₁₂ | 0 | 0.023 | 0 | 0.983 | 1 | 0.955 | 1.047 |
| vitamin C | −0.001 | 0.001 | 0.587 | 0.444 | 0.999 | 0.997 | 1.001 |
| vitamin K | 0.001 | 0.001 | 0.2 | 0.655 | 1.001 | 0.998 | 1.003 |
| vitamin E | −0.013 | 0.03 | 0.201 | 0.654 | 0.987 | 0.93 | 1.047 |
| vitamin A | −0.001 | 0 | 2.142 | 0.143 | 0.999 | 0.999 | 1 |

| | | | | | | | |
|-----------------------|---------|--------|---------|-------|-----------------------|-----------------------|-----------------------|
| <20 years | | | | | | | |
| home PIR | 0.028 | 0.043 | 0.444 | 0.505 | 1.029 | 0.946 | 1 |
| Gender | | | | | | | |
| male | 0.1 | 0.137 | 0.531 | 0.466 | 1.105 | 0.845 | 1 |
| female | | | | | | | |
| Country of Birth | | | | | | | |
| Mexican Americans | 0.457 | 0.622 | 0.54 | 0.462 | 1.58 | 0.467 | . |
| Other Hispanic | -1.395 | 0.72 | 3.754 | 0.053 | 0.248 | 0.06 | 5.349 |
| Non-Hispanic white | | | | | | | |
| Citizenship | | | | | | | |
| Born or naturalized | | | | | | | |
| citizens | -1.392 | 0.832 | 2.795 | 0.095 | 0.249 | 0.049 | . |
| Non-US citizens | | | | | | | |
| marital status | | | | | | | |
| married | -16.849 | 1 | 284.069 | 0 | 4.81×10^{-8} | 6.79×10^{-9} | . |
| Widowhood | -0.308 | 7908.4 | 0 | 1 | 0.735 | 0 | 3.42×10^{-7} |
| | | 51 | | | | | |
| divorce | -16.886 | 1.054 | 256.449 | 0 | 4.64×10^{-8} | 5.88×10^{-9} | .C |
| separation | -16.648 | 0.559 | 888.32 | 0 | 5.89×10^{-8} | 1.97×10^{-8} | 3.67×10^{-7} |
| Never married | -16.363 | 0 | . | . | 7.83×10^{-8} | 7.83×10^{-8} | 1.76×10^{-7} |
| Living with a partner | | | | | | | |
| others | | | | | | | |
| Total number of | | | | | | | |
| households | | | | | | | |
| 1 | 0.748 | 0.813 | 0.847 | 0.357 | 2.113 | 0.43 | . |

| | | | | | | | |
|---------------------|--------|-------|-------|-------|-------|-------|--------|
| 2 | 0.26 | 0.373 | 0.484 | 0.487 | 1.297 | 0.624 | 10.394 |
| 3 | 0.339 | 0.323 | 1.1 | 0.294 | 1.404 | 0.745 | 2.695 |
| 4 | 0.316 | 0.31 | 1.035 | 0.309 | 1.372 | 0.746 | 2.645 |
| 5 | 0.017 | 0.305 | 0.003 | 0.955 | 1.017 | 0.56 | 2.52 |
| 6 | 0.275 | 0.351 | 0.613 | 0.434 | 1.317 | 0.661 | 1.848 |
| >6 | | | | | 1 | | |
| high-fat diet | | | | | | | |
| Appropriate | -0.573 | 0.271 | 4.48 | 0.034 | 0.564 | 0.331 | 1.566 |
| high | | | | | 1 | | |
| Total Fat(g) | -0.013 | 0.01 | 1.708 | 0.191 | 0.987 | 0.968 | 1.029 |
| Energy(kcal) | 0 | 0.001 | 0.097 | 0.756 | 1 | 0.998 | 1.007 |
| Carbohydrates(g) | 0.003 | 0.003 | 0.781 | 0.377 | 1.003 | 0.997 | 1.001 |
| Protein(g) | -0.005 | 0.006 | 0.709 | 0.4 | 0.995 | 0.984 | 1.008 |
| Dietary fiber(g) | -0.031 | 0.015 | 4.068 | 0.044 | 0.97 | 0.941 | 1.007 |
| Total Saturated fat | | | | | | | |
| acids(g) | -0.998 | 2.427 | 0.169 | 0.681 | 0.369 | 0.003 | . |
| Cholesterol(mg) | 0.033 | 0.019 | 3.191 | 0.074 | 1.034 | 0.997 | 42.932 |
| Vitamin C (mg) | 0.001 | 0.001 | 4.001 | 0.045 | 1.001 | 1 | 1.072 |
| Vitamin K(μg) | 0.001 | 0.001 | 0.636 | 0.425 | 1.001 | 0.998 | 1.002 |
| Calcium(mg) | 0 | 0 | 0.051 | 0.821 | 1 | 0.999 | 1.004 |
| Phosphorus(mg) | 0 | 0 | 0.114 | 0.736 | 1 | 0.999 | 1.001 |
| Magnesium(mg) | 0.001 | 0.002 | 0.082 | 0.775 | 1.001 | 0.997 | 1.001 |
| Iron(mg) | -0.019 | 0.014 | 1.758 | 0.185 | 0.982 | 0.955 | 1.004 |
| Zinc(mg) | -0.008 | 0.017 | 0.23 | 0.631 | 0.992 | 0.958 | 1.009 |
| Copper(mg) | 0.524 | 0.335 | 2.446 | 0.118 | 1.689 | 0.876 | 1.026 |

| | | | | | | | |
|-------------------------|--------|-------|--------|-------|-------|-------|-------|
| Sodium (mg) | 0 | 0 | 0.307 | 0.58 | 1 | 1 | 3.255 |
| vitamin E | −0.009 | 0.013 | 0.445 | 0.505 | 0.991 | 0.965 | 1.018 |
| vitamin A | 0 | 0 | 0.188 | 0.665 | 1 | 1 | 1 |
| vitamin B ₁ | 0.134 | 0.083 | 2.635 | 0.105 | 1.143 | 0.973 | 1.344 |
| vitamin B ₂ | 0.253 | 0.08 | 10.077 | 0.002 | 1.288 | 1.102 | 1.506 |
| Niacin | 0.003 | 0.01 | 0.089 | 0.765 | 1.003 | 0.984 | 1.022 |
| vitamin B ₆ | −0.125 | 0.091 | 1.897 | 0.168 | 0.883 | 0.739 | 1.054 |
| FA | −0.001 | 0 | 4.546 | 0.033 | 0.999 | 0.998 | 1 |
| vitamin B ₁₂ | −0.005 | 0.013 | 0.153 | 0.696 | 0.995 | 0.97 | 1.021 |
| vitamin C | −0.001 | 0.001 | 1.403 | 0.236 | 0.999 | 0.998 | 1.001 |
| vitamin K | 0 | 0 | 0.649 | 0.421 | 1 | 0.999 | 1.001 |