In comparison of the two types of hemoglobin readings in terms of prediction power, we only included the main effects in the models. This allows us to have straightforward way to interpret the coefficients of the main effects, and evaluate their impact on the outcome. Adding the interactions may change the interpretations of coefficients of main effects, and may complicate the comparison. A further reason that we did not include interaction terms is because parsimonious models are generally more robust and further reduce overfitting.

We did examine the effects of interaction terms in those models. For the three models (BaseHR+SpHb, BaseHR+labHb, and BaseHR+otherLab) predicting the pRBC1-3hr (without and with interaction terms), we can observe that the interaction terms are not significant in those models.

Model performance comparison with interaction allowed.

**Model: Base(HR)+SpHb: predicting pRBC1-3hr**

**Without interaction terms:**

Deviance Residuals:

<table>
<thead>
<tr>
<th>Min</th>
<th>1Q</th>
<th>Median</th>
<th>3Q</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.7249</td>
<td>-0.2823</td>
<td>-0.2470</td>
<td>-0.1460</td>
<td>3.0053</td>
</tr>
</tbody>
</table>

Coefficients:

|                | Estimate | Std. Error | z value | Pr(>|z|) |
|----------------|----------|------------|---------|----------|
| (Intercept)    | -4.7734  | 0.7649     | -6.241  | 4.36e-10 *** |
| SpHb1minPmin   | 0.1836   | 0.1267     | 1.450   | 0.1472   |
| Gender         | 1.4897   | 0.7994     | 1.863   | 0.0624   |
| Age            | 0.1848   | 0.2301     | 0.803   | 0.4219   |
| PreH_HR        | 0.2703   | 0.2305     | 1.173   | 0.2409   |

Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

**Model: Base(HR)+SpHb: predicting pRBC1-3hr**

**With interaction terms:**

Deviance Residuals:

<table>
<thead>
<tr>
<th>Min</th>
<th>1Q</th>
<th>Median</th>
<th>3Q</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.9175</td>
<td>-0.2711</td>
<td>-0.2318</td>
<td>0.0000</td>
<td>2.7210</td>
</tr>
</tbody>
</table>

Coefficients:

|                | Estimate | Std. Error | z value | Pr(>|z|) |
|----------------|----------|------------|---------|----------|
| (Intercept)    | -1.493e+02 | 1.443e+04 | -0.010  | 0.992    |
| SpHb1minPmin   | 6.664e+00  | 1.176e+03 | 0.006   | 0.995    |
| Gender         | 1.460e+02  | 1.443e+04 | 0.010   | 0.992    |
| Age            | 3.314e+00  | 1.021e+04 | 0.000   | 1.000    |
| PreH_HR        | 5.711e+01  | 5.834e+03 | 0.010   | 0.992    |
| SpHb1minPmin:vGender | -6.201e+00 | 1.176e+03 | -0.005  | 0.996    |
| SpHb1minPmin:vAge  | -5.975e-01 | 7.799e-01 | -0.766  | 0.444    |
SpHblminPmin:vPreH_HR -4.881e-01 6.381e-01 -0.765 0.444
Gender:vAge -3.111e+00 1.021e+04 0.000 1.000
Gender:vPreH_HR -5.723e+01 5.834e+03 -0.010 0.992
Age:vPreH_HR -5.542e-02 2.406e-01 -0.230 0.818
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Model: Base(HR) + lab Hb: predicting pRBC1-3hr
Without interaction terms:

Deviance Residuals:
            Min       1Q   Median       3Q      Max
-0.7518  -0.2709  -0.2245  -0.1476   3.1805

Coefficients:
             Estimate Std. Error    z value  Pr(>|z|)  
(Intercept)  -5.04562    0.75171  -6.712   1.92e-11 ***
Gender        1.77260    0.77571   2.285   0.0223 *
Age           -0.57244    0.22865  -2.505   0.0116 *
PreH_HR       0.33173    0.22429   1.479   0.1391
HGB           -0.52150    0.21546  -2.420   0.0155 *
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Model: Base(HR) + other lab: predicting pRBC1-3hr
With interaction terms:

Deviance Residuals:
            Min       1Q   Median       3Q      Max
-0.9161  -0.2695  -0.2020   0.0000   3.1616

Coefficients:
             Estimate Std. Error    z value  Pr(>|z|)  
(Intercept)  -1.174e+02  8.412e+03  -0.014   0.9889
Gender       -9.216e-01  4.181e+03   0.000   0.9998
Age           4.425e+01  3.777e+03   0.013   0.9895
PreH_HR      2.287e+00  1.836e+03   0.001   0.9990
Gender:vAge  -3.407e+00  4.181e+03   0.000   0.9998
Gender:vPreH_HR  6.407e+01  3.777e+03   0.002   0.9897
Gender:vHGB  -2.790e+00  1.836e+03   0.002   0.9997
Age:vPreH_HR -1.363e-02  2.568e-01  -0.001   0.9997
Age:vHGB     -2.900e-01  2.002e-01   1.450   0.1470
PreH_HR:vHGB  3.691e-01  2.068e-01   1.785   0.0742 .
---
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Model: Base(HR) + lab Hb: predicting pRBC1-3hr
Without interaction terms:

Deviance Residuals:
Coefficients:

|           | Estimate | Std. Error | z value | Pr(>|z|) |
|-----------|----------|------------|---------|----------|
| (Intercept) | -5.5376  | 0.9269     | -5.974  | 2.31e-09 *** |
| PTT        | 0.3283   | 0.1272     | 2.582   | 0.009831 ** |
| FIBRINOGREN | -1.2295  | 0.3642     | -3.376  | 0.000735 *** |
| LACTATE    | 0.4242   | 0.1540     | 2.755   | 0.005876 ** |
| GLUCOSE    | 0.4933   | 0.1511     | 3.264   | 0.001099 ** |
| Gender     | 1.2602   | 0.8969     | 1.405   | 0.159985 |
| Age        | 0.5312   | 0.2757     | 1.927   | 0.054028 . |
| PreH_HR    | 0.1358   | 0.2325     | 0.584   | 0.559016 |

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Model: Base(HR) + other lab: predicting pRBC1-3hr

Without interaction terms:

Deviance Residuals:

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>1Q</th>
<th>Median</th>
<th>3Q</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1.36539</td>
<td>-0.16349</td>
<td>-0.09936</td>
<td>0.00000</td>
<td>3.04707</td>
</tr>
</tbody>
</table>

Coefficients:

<p>|           | Estimate | Std. Error | z value | Pr(&gt;|z|) |
|-----------|----------|------------|---------|----------|
| (Intercept) | -5.873e+01 | 8.100e+03 | -0.007  | 0.994    |
| PTT        | 9.379e+00 | 4.521e+03 | 0.002   | 0.998    |
| FIBRINOGREN| -9.768e+00| 3.321e+03 | -0.003  | 0.998    |
| LACTATE    | -6.292e+00| 1.442e+04 | 0.000   | 1.000    |
| GLUCOSE    | 1.080e+01 | 2.958e+03 | 0.004   | 0.997    |
| Gender     | 5.448e+01 | 8.100e+03 | 0.007   | 0.995    |
| Age        | -1.250e+01| 4.832e+03 | -0.003  | 0.998    |
| PreH_HR    | 1.237e+01 | 4.008e+03 | 0.003   | 0.998    |
| PTT:FIBRINOGREN | -5.929e-01 | 5.476e-01 | -1.083  | 0.279    |
| PTT:LACTATE | 8.617e-01 | 5.734e-01 | 1.503   | 0.133    |
| PTT:GLUCOSE | 4.783e-01 | 4.267e-01 | 1.121   | 0.262    |
| PTT:Gender | -9.406e+00| 4.521e+03 | -0.002  | 0.998    |
| PTT:Age    | -8.983e-02| 4.386e-01 | -0.205  | 0.838    |
| PTT:PreH_HR| 5.643e-01 | 4.974e-01 | 1.134   | 0.257    |
| FIBRINOGREN:LACTATE | 1.506e-03 | 3.744e-01 | 0.004   | 0.997    |
| FIBRINOGREN:GLUCOSE | -2.199e-01| 4.596e-01 | -0.478  | 0.632    |
| FIBRINOGREN:Gender | 9.086e+00 | 3.321e+03 | 0.003   | 0.998    |
| FIBRINOGREN:Age    | -9.083e-01| 5.710e-01 | -1.591  | 0.112    |
| FIBRINOGREN:PreH_HR| 5.681e-01 | 3.688e-01 | 1.540   | 0.123    |
| LACTATE:GLUCOSE   | -3.563e-02| 1.983e-01 | -0.180  | 0.857    |
| LACTATE:Gender    | 6.671e+00 | 1.442e+04 | 0.000   | 1.000    |
| LACTATE:Age       | 4.817e-01 | 3.538e-01 | 1.362   | 0.173    |
| LACTATE:PreH_HR   | -8.925e-02| 2.633e-01 | -0.339  | 0.735    |
| GLUCOSE:Gender    | -1.009e+01| 2.958e+03 | -0.003  | 0.997    |</p>
<table>
<thead>
<tr>
<th>Interaction</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-Value</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLUCOSE:Age</td>
<td>-6.940e-01</td>
<td>4.297e-01</td>
<td>-1.615</td>
<td>0.106</td>
</tr>
<tr>
<td>GLUCOSE:PreH_HR</td>
<td>1.460e-01</td>
<td>2.803e-01</td>
<td>0.521</td>
<td>0.603</td>
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<tr>
<td>Gender:Age</td>
<td>1.262e+01</td>
<td>4.832e+03</td>
<td>0.003</td>
<td>0.998</td>
</tr>
<tr>
<td>Gender:PreH_HR</td>
<td>-1.236e+01</td>
<td>4.008e+03</td>
<td>-0.003</td>
<td>0.998</td>
</tr>
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<td>Age:PreH_HR</td>
<td>-7.571e-02</td>
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<td>-0.269</td>
<td>0.788</td>
</tr>
</tbody>
</table>