Estimating Target Heart Rates:

“The Karvonen Formula”
(Ron Jones, MS, ACSM Health/Fitness Instructor, Corporate Wellcoach)

*The Karvonen Formula* is more accurate for estimating target heart rate (THR) intensity. This method factors not just maximum heart rate and aerobic capacity (VO₂ max), but the resting heart rate as well; thus, one can estimate the actual heart rate reserve (HRR) that is present for increasing cardiac output. When using the 220-age formula only, optimal heart rate intensity can be overestimated by ≈10-15%. For example, if target intensity was 65% of maximum heart rate (max HR) with the basic formula only, then this 10-15% margin of error would place one well below the 65% of max HR needed for optimal fitness improvements.

To estimate your target heart rate (THR) you need the following:

1. **Resting Heart Rate**: (RHR) Take your resting pulse on three different mornings *before rising* from bed. Add the three readings and divide by three to get an average heart rate value.
2. **Max Heart Rate**: (max HR) Use the basic 220-age formula.

*The Karvonen Formula*

\[
\text{THR} = (\text{Max HR} - \text{RHR}) \times \text{Desired Intensity\%} + \text{RHR}
\]

<table>
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<tr>
<th>THR=Target Heart Rate</th>
<th>RHR=Resting Heart Rate</th>
<th>HRR=Heart Rate Reserve</th>
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<td>BPM=Beats per Minute</td>
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**Example**: What is the target heart rate (THR) for a 40 year old with a resting heart rate (RHR) of 80 beats per minute (BPM) who wants to exercise at a 70% intensity level?

220-40=180 (“predicted” max HR)

180 (max HR)
-80 (RHR)
100 (HRR)
\[ \times \] .70 (desired intensity of training)
70
+80 (RHR)

150 (Target Heart Rate BPM at 70% of HRR) *Also estimate for 50, 65, 75, 85, & 90+% of HRR

♥ Note that the 220-age formula for MHR is an approximate estimate that can vary up to 12-24 BPM depending upon age, fitness level, genetics, etc. For an “exact” max HR, a supervised *functional capacity test or stress test* should be performed.

♥ If your RHR is elevated on any given day, this can be an indication of overtraining without sufficient rest or other types of physical and/or psychological problems that can compromise your central nervous system. Listen to your body and either take a day of rest or exercise at a lower intensity until your RHR returns to normal.

♥ More is not always better with heart rate training! For example, if you push above 85-90% VO₂ max (maximum aerobic capacity for utilizing oxygen) to the point of being anaerobic (cannot provide sufficient oxygen to muscle tissues) for more than 2-4 minutes, you will be unable to continue with a quality effort due to severe lactate build up and lowering of blood and muscle pH. Proper anaerobic interval training (high intensity efforts of 85-90+) always necessitates short rest periods in-between the intervals which allow for lower heart rates and aerobic recovery from efficient diaphragmatic breathing which re-oxygenates the body.

Ron Jones (9.5.07)