Health during arduous and long duration work during wildland firefighting is important for the efficacy of crews. In this study we monitored a group of 11 elite (hotshot crew members) wildland firefighters during the first 10 days of a 14 day duty cycle. Average caloric activity output was about 3,800 Kcal per day with activities including fire-line construction in steep mountainous terrain, chainsaw work, brushing, mop-up duties and two days of lighter duties (days 3 and 4). Actical activity monitors were used to measure daily work which is represented by the red bars. Bars reaching the center red line represent 4,000 kcal of daily activity energy expenditure (right hand scale).

Salivary IgA was depressed at the end of each workshift and recovered, partially or fully, following 10-12 hours of sleep and inactivity before the next morning. Note that following moderate and light work shifts of less than 3,000 kcal (days 3, 4, and 5), immune function recovery reached baseline values. Following days of heavy work, greater than 3,000 Kcal (days 1, 2, 6, 7 and 8), recovery was incomplete and by the 10th morning, even following a moderate workday, immune function remained depressed.

The fatigue index was calculated as the sum of heart rates collected after five minutes of rest, following 1 minute of stepping on an 8 inch (20cm) bench at a cadence of 120 beats/min. and following 30 seconds of recovery post stepping. The fatigue index mirrored (Pearson product correlation between slga and Fatigue Index r =-0.8189) the slgA values showing a similar pattern of recovery to baseline following easy and moderate workdays, but not following sustained periods of multiple hard days of work.

These data suggest the wildland firefighters can sustain multiple days of arduous activity, but require lighter activity to fully recovery immune function and reduce fatigue. Further, the fatigue index test, using bench stepping, is a good indicator of fatigue and suppressed immune function.