Maintaining physical readiness is critical to preserve tactical performance capabilities and prevent musculoskeletal injuries. Identification of service- and age-related changes in strength and physiological characteristics and implementation of specific interventions may promote career longevity and readiness, directly impacting operational performance. **PURPOSE:** To assess strength and physiological differences in cohorts of US Army Soldiers based on age and years of service. **METHODS:** A total of 253 Soldiers participated. Individual subject cohorts were created based on age (20-44 years, 5 year increments) and years of service (1-15 years, 5 year increments). Soldiers performed tests to measure knee and shoulder strength, aerobic capacity/lactate threshold, anaerobic power/capacity, and body composition. One-way analyses of variance with Tukey Post-Hoc comparisons were used to determine differences between groups. **RESULTS:** Soldiers age 30-34 had more body fat than those age 20-24 (p = 0.005) and 25-29 (p = 0.012). Soldiers with 11-15 years of service had significantly more body fat than those with 1-5 (p < 0.001) and 6-10 (p = 0.016) years of service. Aerobic capacity was higher in 20-24 year olds than 30-34 year olds (p = 0.041), 35-39 year olds (p = 0.047) and 40-44 year olds (p = 0.041). Soldiers with 1-5 (p < 0.001) and 6-10 (p < 0.001) years of service had higher VO2max than those with 11-15 years of service. Knee flexion/extension strength ratio was higher in those with 11-15 years of service than those with only 6-10 or 1-5 years of service, and higher in those with 6-10 years of service than those with 1-5 years of service (p < 0.001 for all three comparisons). Shoulder internal/external rotation strength ratios were significantly greater in those with 1-5 years of experience compared to those with 6-10 years of experience (p = 0.001). **CONCLUSIONS:** Age and years of service have a significant effect on Soldier’s strength and physiological performance. This may be greater than the age related changes observed in a civilian population due to the physical demand of operational training and deployments. Physical training interventions should focus on maintaining physiological characteristics in those age 30-34 years and with more years of service. Funded by USAMRMC #W81XWH-11-2-0097