

Pregnancy and Postpartum Periods and Risk of Musculoskeletal Injury in Active Duty Service Women

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Musculoskeletal Injuries in the Military

- For all Active Duty Service Members MSKI are the number 1 reason for
 - Outpatient health care
 - Duty-limiting profiles
 - Medical evacuation from combat theaters
 - Early medical discharge from the military
- MSKI injuries can threaten military readiness



Pregnancy and MSKI

- Women report increase musculoskeletal pain, strains, and joint instability.
- Surges in relaxin and estrogen are hypothesized to increase MSKI through decreased joint stability
 - Softer ligaments and increased joint laxity may make joints vulnerable to sprains, strains, and misalignment
 - Increased weight overall and abdominal weight gain are thought to increase MSKI
 - Nutritional deficits may impact bone health



Pregnancy and MSKI in ADSW

- Pregnancy is the second most common reason for Limited Duty Days among Army Soldiers
- Minimal evidence suggest elite athletes may be at increased risk for postpartum stress fractures
- Canadian military - women who have had a child are more likely to have a repetitive strain injury
- Little is known about the risk of MSKI for **Pregnant or Postpartum ADSW**



Study Objective

- To explore the risk of MSKI in ADSW during pregnancy and postpartum periods as compared to non-pregnant women/periods



Study Design

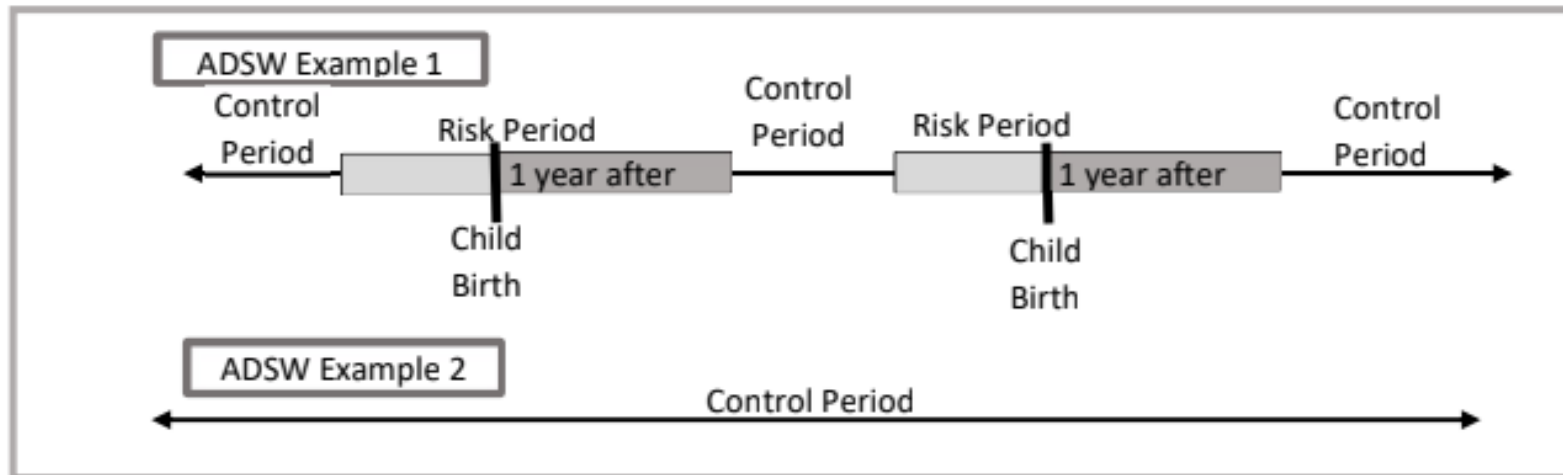
Population: All ADSW 2013-2025

Data Source: Military Health System Data Repository (MDR)

Pregnancy: Identified by ICD-9/10 code in Inpatient and Outpatient Record

- Counted back from birth
- When no Birth record used algorithm to estimate pregnancy window

Postpartum: 365 following childbirth or end of pregnancy



Analysis

MSKI: Categorized using a variation of the Hando Matrix using ICD-9/10 codes

- 6 Body Regions
 - Head/Neck
 - Spine/Back
 - Torso
 - Upper Extremity
 - Lower Extremity
 - Other
- Included Incident Injuries (60 days without follow-up)

Analysis: Unadjusted and Adjusted Poisson Regression

Analysis Clustered by Person

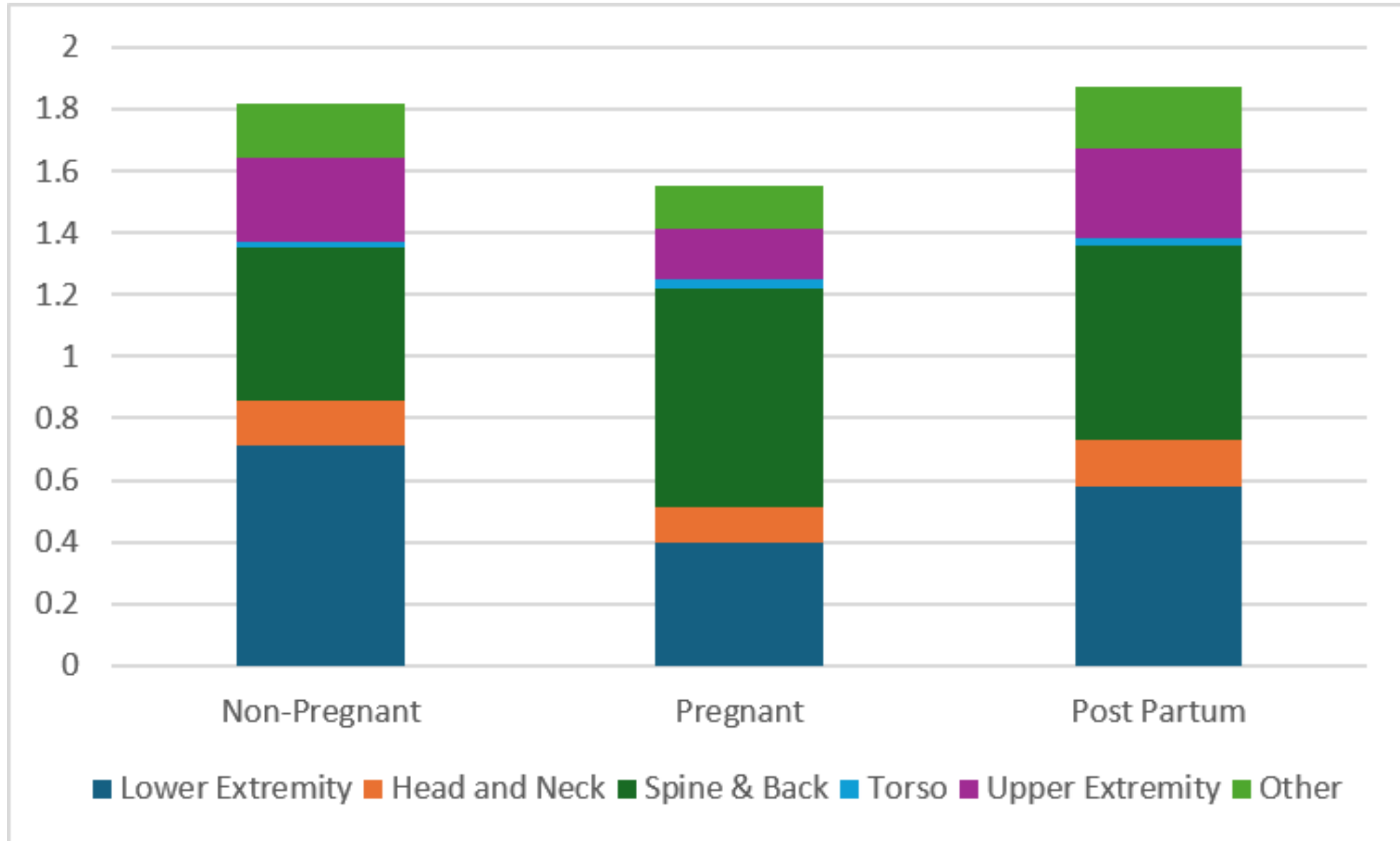


Results - Included ADSW Demographics

		Non-Pregnant (2,510,182)*	Post Partum (208,028)*	Pregnant (164,190)*	P
Rank	Senior Enlisted Jr. Enlisted Officer Warrant Officer	947,289 (35.0%) 1,186,799 (44.0%) 547,111(20.0%) 22,368 (1.0%)	97,507 (37.0%) 118,683 (45.0%) 44,023(16.0%) 1,435 (1.0%)	93,792 (33.0%) 140,574 (50.0%) 45,715(17.0%) 1,447 (1.0%)	<.0001
	Age (Median, SD)	27.5 (7.6)	27.2 (5.6)	26.5 (5.5)	<.0001
Race	White Black Hispanic Asian/Pacific Islander American Indian/Alaska Native	1,160,910 (44.0%) 681,517 (26.0%) 482,794 (18.0%) 185,665 (7.0%) 27,645 (1.0%)	109,791 (42.0%) 69,949 (27.0%) 50,340 (19.0%) 15,634 (6.0%) 3,029 (1.0%)	119,614 (43.0%) 74,007 (26.0%) 54,786 (20.0%) 16,435 (6.0%) 3,197 (1.0%)	<.0001
Branch	Army Navy Air Force/Space Force Marines	889,192 (33.0%) 807,696 (30.0%) 815,811 (30.0%) 191,056 (7.0%)	95,125 (36.0%) 72,764 (28.0%) 73,499 (28.0%) 20,267 (8.0%)	104,879 (37.0%) 76,733 (27.0%) 77,892 (28.0%) 22,038 (8.0%)	<.0001
	Married	1,214,893 (45.0%)	192,824 (74.0%)	188,424 (67.0%)	<.0001

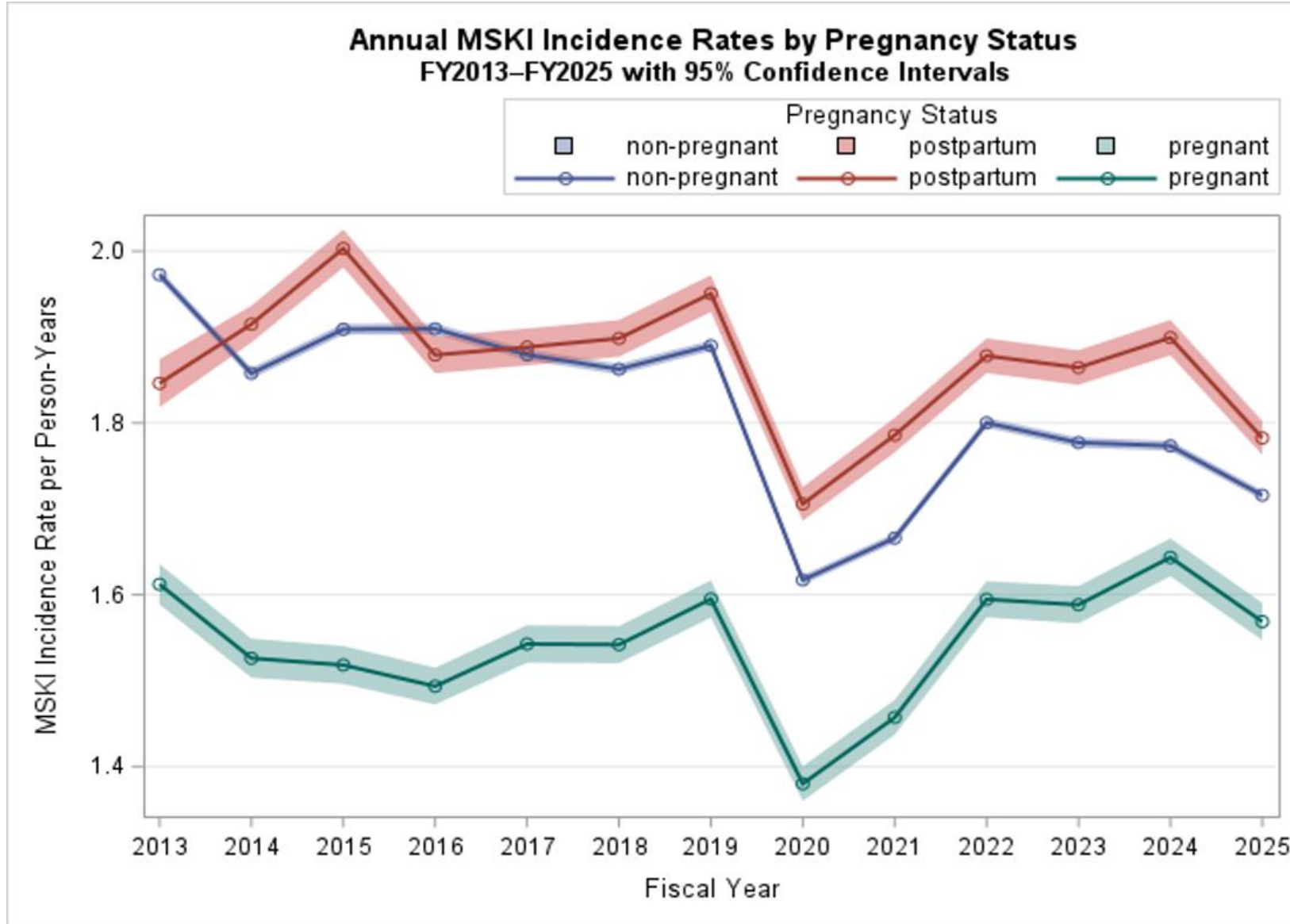
*Time in Person Years

Results - MSKI Rates

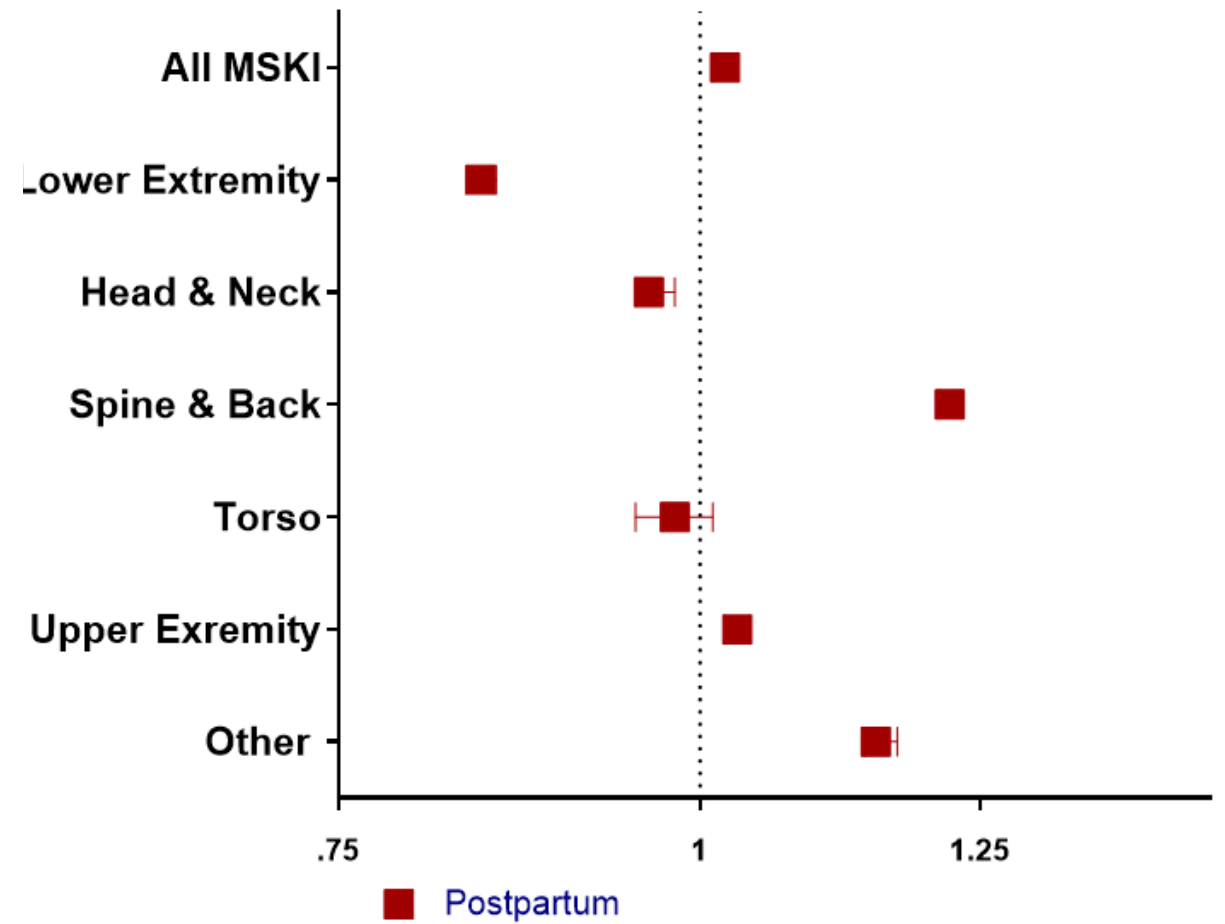
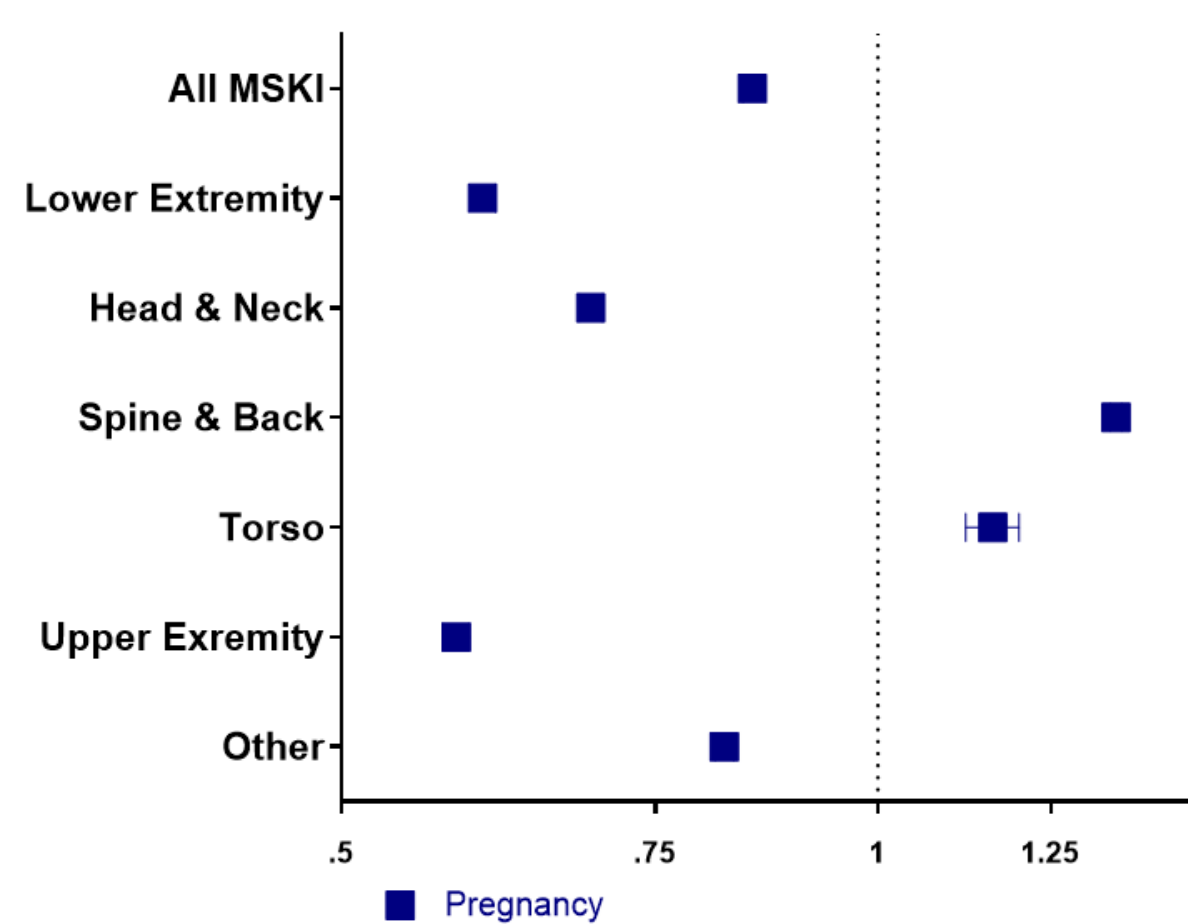


Results -

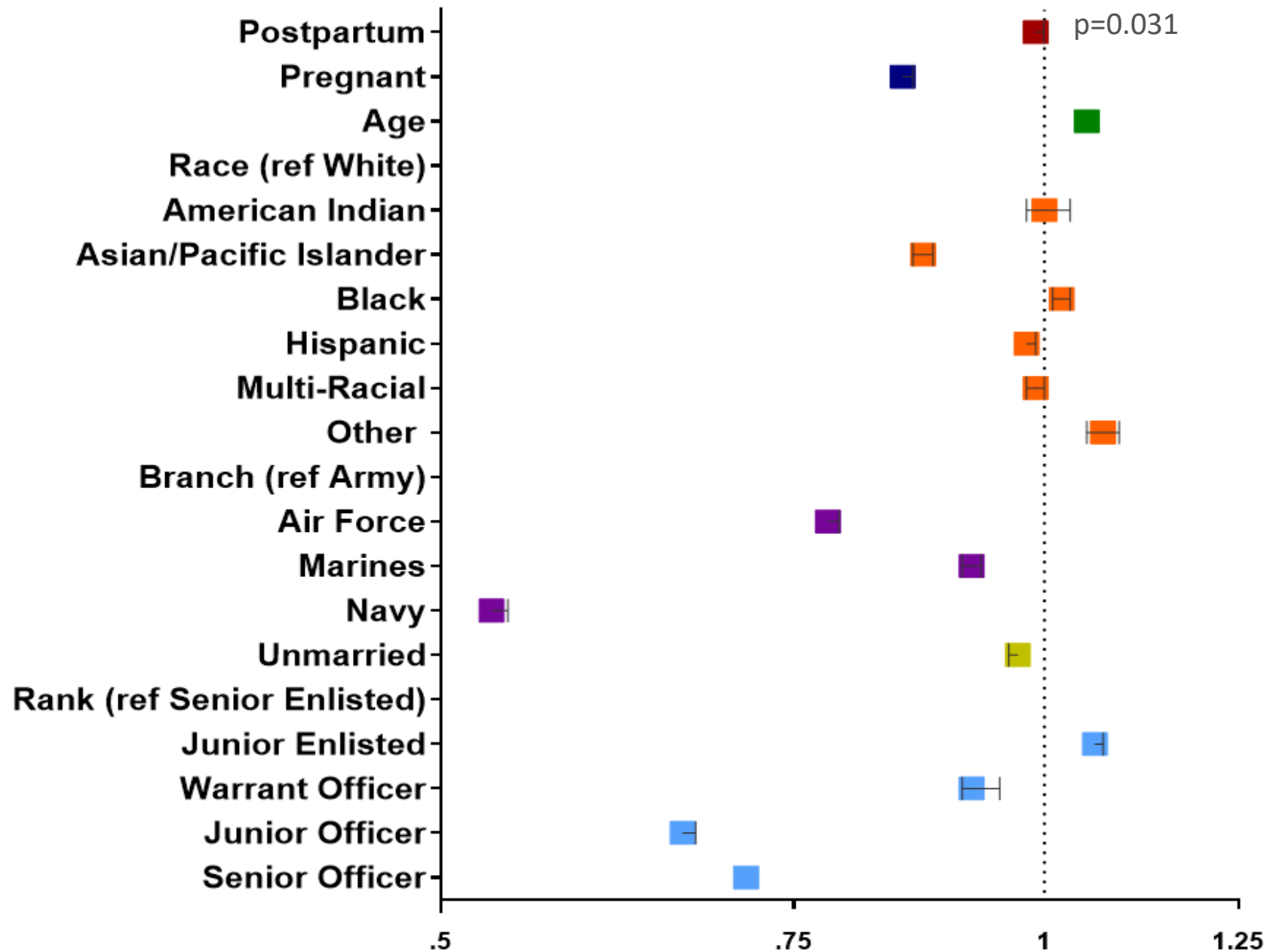
MSKI Rates by Pregnancy Status Over Time



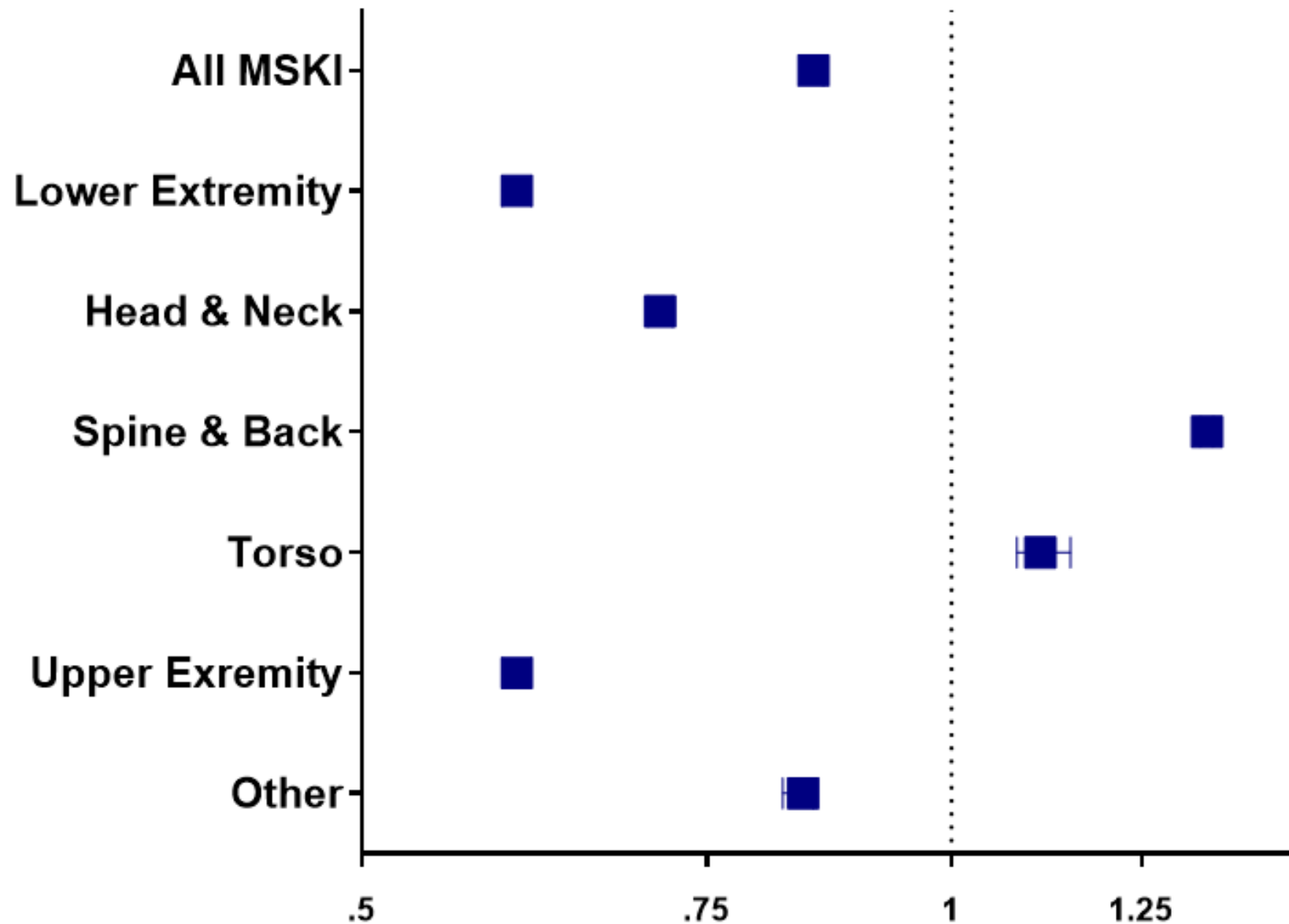
Results - Unadjusted



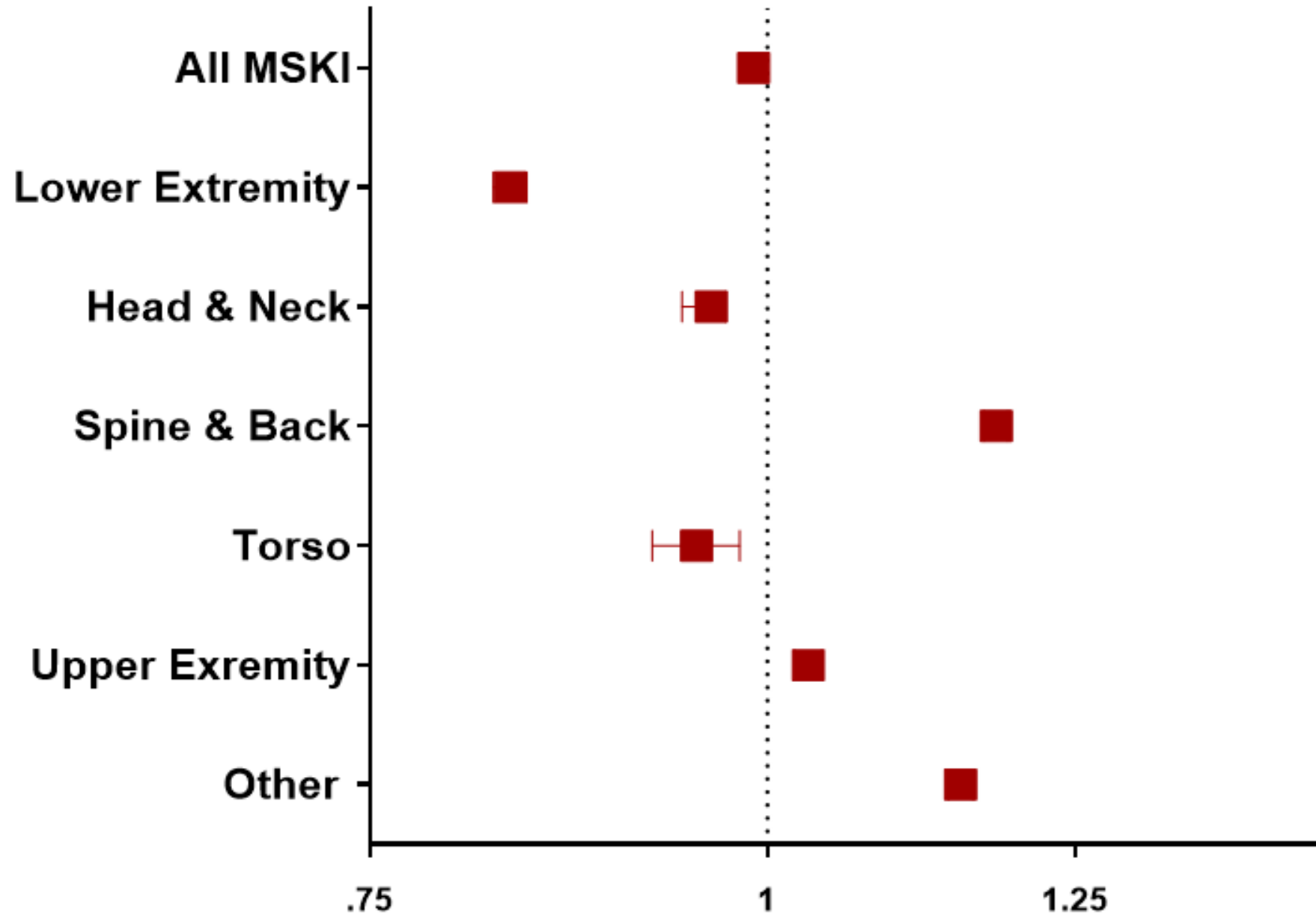
Results - Adjusted



Results - Pregnancy Adjusted



Results - Adjusted



Physical Requirements for ADSW during Pregnancy

*Upon the diagnosis of pregnancy, the **Soldier is exempt from regular unit physical fitness training and APFT testing/weight standards for the duration of the pregnancy and 180 days past pregnancy termination.** After receiving medical clearance from their health care provider to participate in physical training, commanders will enroll Soldiers who are pregnant or postpartum to take part in the **Army Pregnancy/Postpartum Physical Training (PPPT) program**, an element of the Army Physical Fitness Training Program, in accordance with AR 350–1, Army Training and Education. The PPPT Program is **designed to maintain health and fitness levels of pregnant Soldiers, and successfully integrate postpartum** Soldiers back into unit physical fitness training programs with emphasis on achieving the APFT standards in accordance with guidance provided in the Army Physical Fitness Training Program, and meeting height/weight standards in accordance with guidance provided in the Army Weight Control Program.*

Pregnant and postpartum

Soldiers must be cleared by their health care provider prior to participating in physical fitness training. Once pregnancy has been confirmed, the **Soldier is exempt from wearing load bearing equipment (LBE)** to include the web belt, individual body armor (IBA) and/or any other additional equipment. Wearing of individual body armor and/or any other additional equipment is not recommended and must be avoided after 14 weeks gestation.

Discussion - Pregnancy

- Pregnancy was associated with decreased risk of MSKI in ADSW
- For ADSW Lower Extremity and Spine & Back are the most common injury types
- MSKI increased during Pregnancy
 - Spine and Back
 - Torso
- MSKI decreased during pregnancy
 - Lower extremity
 - Upper extremity
 - Head & Neck
 - Other

Discussion - Postpartum

- In adjusted models Postpartum was associated with decreased risk of MSKI in ADSW, however risk was increased in unadjusted analysis
- MSKI increased during Postpartum period
 - Spine and Back
 - Other
 - Upper extremity
- MSKI decreased during Postpartum period
 - Lower extremity
 - Torso
 - Head & Neck

Conclusions

- ADSW almost 2 MSKI each year
- Pregnancy and Postpartum are not associated with increased MSKI overall
- The reason for the decreased MSKI risk is unclear
- Spine and Back injuries were increased across Pregnancy and Postpartum periods - suggesting a care providers focus on injury prevention for the back and torso
- Risk increased with with older Age, Junior Enlisted rank, Army, White race

Questions