



MSMR

Medical Surveillance Monthly Report

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Data in the MSMR is provisional, based on reports and other sources of data available to the Medical Surveillance Activity. Notifiable conditions are reported by date of onset (or date of notification when date of onset is absent). Only cases submitted as confirmed are included.

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Epidemiologic Investigation**Injuries Among Women and Men in Gender Integrated BCT Units
Ft Leonard Wood 1995**

In September 1995, the US Army Center for Health Promotion and Preventive Medicine (USACHPPM) received a request for assistance to determine the impact of gender integrated Basic Combat Training (BCT) on injury rates among women at Ft Leonard Wood, MD. Concern at Ft Leonard Wood arose because the physical therapy department had noted that in one continuous series of 276 basic trainees, 70% (193) of those treated were women. At that time, however, women represented only 30% of the soldiers undergoing basic training. These numbers suggested that training rates among women were more than 5 times higher than for men. As a consequence of on-going concern at Ft Leonard Wood, a team was organized and an investigation was conducted in December of 1995.

The investigation was a joint endeavor involving personnel from the CHPPM, the Army Research Institute of Environmental Medicine (USARIEM), and the Ft Leonard Wood Army Community Hospital. The team reviewed medical records on every trainee in each of six basic training companies. Company rosters identified 787 trainees. Medical records on 761 (97%) were located and screened for documentation of injuries and illnesses. Four hundred and seventy trainees (62%) surveyed were men and 284 (38%) were women. At the time of the survey 2 companies were in their 8th week of BCT, 2 in the 7th, and 2 in the 6th, so the cumulative incidence of injury were calculated and compared for men and women in pairs of companies within the same week of training.

Table 1 shows the cumulative incidence (%) of injury for women compared to men. Risk ratios indicate that the incidences of any injury for women were 1.6 to 1.8 times higher than for men, while the risk ratios for stress fractures show that women were at 1.6 to 3.6 times greater risk than men in the same units. These risk ratios for all types of injuries and for stress fracture are similar those documented in past studies of men and women in non-integrated training. Studies conducted in the 1980s reported relative risks for women verses men ranging from 1.8 to 2.1, while relative risks of stress fractures ranged from 2.0 to 6 times greater for women in BCT. These historical comparisons suggest integrated training for the women observed in this survey did not increase the risk of injury relative to men.

The risk of injury among women documented in this investigation were also similar to those reported for female trainees in non-integrated training in the late 1980s and early 1990s further suggesting that integrated training has not increased the

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risk of injury for women. LTC Reynolds (USARTEM) reported a cumulative incidence of injuries of 67% for women in the 8th week of training in a non-integrated company at Ft Jackson, SC in 1993. LTC Jones (USARTEM) documented a cumulative incidence of 62% among women in three non-integrated companies of BCT at Ft Jackson in the 8th week of training in 1988.

This investigation concluded that, although the incidence of injury for women were significantly higher than for men, integrated training did not elevate the incidence of injuries for women. Furthermore, this study demonstrated that risks of injury for both men and women were high and that these risks could probably be lowered through modifications of training that would not adversely affect final physical fitness levels at the end of BCT. The next issue of the MSMR will discuss the association of physical fitness and injuries among men and women observed in this survey.

Submitted by COL BH Jones, MC, Chief, Injury and Occupational Disease Programs, USA Center for Health Promotion and Preventive Medicine, APG, MD, 21010

Editorial Comment: Data collected by the Physical Therapy Department at Fort Leonard Wood from January through July 1995, following implementation of integrated BCT, raised concern that injury rates among women might have increased. The Physical Therapy study suggested that the risks for stress related injury in women were more than five times higher than their male counterparts. However, the previous investigation of six integrated BCT companies in December 1995 found that the risk ratio for women versus men was less than two. These rates from December were comparable to historical reports for both genders in non-integrated training (see Table 2, on page 7).

Continued on page 7

Table 1: Cumulative Incidence (Risk, %) of Any Musculoskeletal Injury and Stress Fractures for Women Compared to Men During the 6th, 7th and 8th Week of Basic Combat Training, Ft Leonard Wood, 1995.

| <i>Injury Type</i> | <i>Units (Week of BCT)</i> | <i>Number of Women (W) Men (M)</i> | <i>Women % Injured</i> | <i>Men % Injured</i> | <i>Risk Ratio W/M 95% CI*</i> | <i>P-value</i> |
|--------------------|--------------------------------|--|----------------------------|--------------------------|---------------------------------------|----------------|
| Any Injury | Company A & B (Week 8) | W = 84 M = 159 | 65.50% | 41.50% | 1.6 (1.3,2.8) | 0.001 |
| | Company C & D (Week 7) | W = 101 M = 169 | 57.40% | 35.50% | 1.6 (1.3,2.4) | 0.001 |
| | Company E & F (Week 6) | W = 99 M = 142 | 41.10% | 23.90% | 1.8 (1.2,2.1) | 0.005 |
| Stress Fractures | Company A & B (Week 8) | W = 84 M = 159 | 6.00% | 3.80% | 1.6 (0.7,2.6) | 0.300 |
| | Company C & D (Week 7) | W = 101 M = 169 | 8.90% | 3.60% | 2.5 (1.1,2.6) | 0.060 |
| | Company E & F (Week 6) | W = 99 M = 142 | 5.10% | 1.40% | 3.6 (1.1,2.9) | 0.090 |

* CI = 95% Confidence Intervals

**TABLE I. Cases of selected notifiable conditions, United States Army*
January, 1996**

| Reporting MTF/Post** | Total number of reports submitted December 1995 | Environmental Injuries | | | Viral Hepatitis | | | Malaria | Varicella | |
|----------------------------|---|------------------------|--------------|--------------|-----------------|--------------|--------------|----------------|----------------|----------------|
| | | Active Duty | | CO intox. | A | B | C | Active Duty | Active Duty | Other Adult |
| | | Heat | Cold | | | | | | | |
| | | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 |
| NORTH ATLANTIC HSSA | | | | | | | | | | |
| Walter Reed AMC | 34 | - | - | - | 1 | - | - | - | - | - |
| Aberdeen Prov. Ground | 3 | - | - | - | - | - | - | - | - | - |
| FT Belvoir, VA | 13 | - | - | - | - | - | - | - | - | - |
| FT Bragg, NC | 10 | - | - | - | - | - | - | - | - | - |
| FT Drum, NY | 55 | - | 20 | - | - | - | - | 1 | 1 | - |
| FT Eustis, VA | 7 | - | - | - | - | - | - | - | - | - |
| FT Knox, KY | 14 | - | - | - | - | - | - | - | - | - |
| FT Lee, VA | 20 | - | - | - | - | - | - | - | - | - |
| FT Meade, MD | 0 | - | - | - | - | - | - | - | - | - |
| USMA, West Point, NY | 0 | - | - | - | - | - | - | - | - | - |
| CENTRAL HSSA | | | | | | | | | | |
| Fitzsimons AMC | 0 | - | - | - | - | - | - | - | - | - |
| FT Carson, CO | 92 | - | 21 | - | - | - | - | - | - | - |
| FT Leonard Wood, MO | 26 | - | - | - | - | - | - | - | 6 | - |
| FT Leavenworth, KS | 0 | - | - | - | - | - | - | - | - | - |
| FT Riley, KS | 0 | - | - | - | - | - | - | - | - | - |
| SOUTH CENTRAL HSSA | | | | | | | | | | |
| Brooke AMC | 0 | - | - | - | - | - | - | - | - | - |
| FT Hood, TX | 77 | - | - | - | - | - | - | - | 2 | - |
| FT Polk, LA | 13 | - | - | - | - | - | - | - | - | - |
| FT Sill, OK | 18 | - | - | - | - | - | - | - | - | - |
| Panama | 11 | - | - | - | - | 1 | 1 | - | - | - |
| SOUTHEAST HSSA | | | | | | | | | | |
| Eisenhower AMC | 32 | - | - | - | - | - | - | - | - | - |
| FT Benning, GA | 0 | - | - | - | - | - | - | - | - | - |
| FT Campbell, KY | 84 | - | - | - | - | - | - | - | - | - |
| FT Jackson, SC | 21 | - | - | - | - | - | - | - | - | - |
| FT McClellan, AL | 0 | - | - | - | - | - | - | - | - | - |
| FT Rucker, AL | 0 | - | - | - | - | - | - | - | - | - |
| FT Stewart, GA | 0 | - | - | - | - | - | - | - | - | - |
| SOUTHWEST HSSA | | | | | | | | | | |
| Wm Beaumont AMC | 31 | - | - | - | - | - | - | - | - | - |
| FT Huachuca, AZ | 0 | - | - | - | - | - | - | - | - | - |
| FT Irwin, CA | 11 | - | - | - | - | - | - | - | - | - |
| NORTHWEST HSSA | | | | | | | | | | |
| Madigan AMC | 0 | - | - | - | - | - | - | - | - | - |
| FT Wainwright, AK | 28 | - | 10 | - | - | - | - | - | - | - |
| PACIFIC HSSA | | | | | | | | | | |
| Tripler AMC | 34 | - | - | - | - | - | - | - | - | - |
| OTHER LOCATIONS | | | | | | | | | | |
| Europe | 17 | - | - | - | - | - | - | - | - | - |
| Korea | 14 | - | 1 | - | - | - | - | - | - | - |
| Total | 665 | 0 | 52 | 0 | 1 | 1 | 1 | 1 | 9 | 0 |

* Based on date of onset.

** Reports are included from main and satellite clinics. Not all sites reporting.

Date of Report: 7-Feb-96

**TABLE I. Cases of selected notifiable conditions, United States Army* (continued)
January, 1996**

| Reporting MTF/Post** | Salmonellosis | | | Shigella | | | Campylobacteriosis | | | Tuberculosis | |
|----------------------------|----------------|--------------|--------------|----------------|--------------|--------------|--------------------|--------------|--------------|----------------|--------------|
| | Active Duty | Other | | Active Duty | Other | | Active Duty | Other | | Active Duty | Other |
| | | Adult | Child | | Adult | Child | | Adult | Child | | |
| | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 | Cum. 1995 |
| NORTH ATLANTIC HSSA | | | | | | | | | | | |
| Walter Reed AMC | - | - | - | - | - | - | - | 1 | - | - | - |
| Aberdeen Prov. Ground | - | - | - | - | - | - | - | - | - | - | - |
| FT Belvoir, VA | - | - | - | - | - | - | - | - | - | - | - |
| FT Bragg, NC | - | - | - | - | - | - | - | - | 1 | - | - |
| FT Drum, NY | - | - | - | - | - | - | - | - | - | - | - |
| FT Eustis, VA | - | - | - | - | - | - | - | - | - | - | - |
| FT Knox, KY | - | 1 | - | - | - | - | - | - | - | - | - |
| FT Lee, VA | - | - | - | - | - | - | - | - | - | - | - |
| FT Meade, MD | - | - | - | - | - | - | - | - | - | - | - |
| USMA, West Point, NY | - | - | - | - | - | - | - | - | - | - | - |
| CENTRAL HSSA | | | | | | | | | | | |
| Fitzsimons AMC | - | - | - | - | - | - | - | - | - | - | - |
| FT Carson, CO | - | - | - | - | - | - | - | - | - | - | - |
| FT Leonard Wood, MO | - | - | - | - | - | - | - | - | - | - | - |
| FT Leavenworth, KS | - | - | - | - | - | - | - | - | - | - | - |
| FT Riley, KS | - | - | - | - | - | - | - | - | - | - | - |
| SOUTH CENTRAL HSSA | | | | | | | | | | | |
| Brooke AMC | - | - | - | - | - | - | - | - | - | - | - |
| FT Hood, TX | - | - | - | - | - | - | - | - | - | - | - |
| FT Polk, LA | - | - | - | - | - | - | - | - | - | - | - |
| FT Sill, OK | - | - | - | - | - | - | - | - | - | - | - |
| Panama | - | 2 | 1 | - | - | - | - | - | 3 | - | - |
| SOUTHEAST HSSA | | | | | | | | | | | |
| Eisenhower AMC | - | - | - | - | - | - | - | - | - | - | - |
| FT Benning, GA | - | - | - | - | - | - | - | - | - | - | - |
| FT Campbell, KY | - | - | - | - | - | - | - | - | - | - | - |
| FT Jackson, SC | - | - | - | - | - | - | - | - | - | - | - |
| FT McClellan, AL | - | - | - | - | - | - | - | - | - | - | - |
| FT Rucker, AL | - | - | - | - | - | - | - | - | - | - | - |
| FT Stewart, GA | - | - | - | - | - | 1 | - | - | - | - | - |
| SOUTHWEST HSSA | | | | | | | | | | | |
| Wm Beaumont AMC | - | - | - | - | - | - | - | - | - | - | - |
| FT Huachuca, AZ | - | - | - | - | - | - | - | - | - | - | - |
| FT Irwin, CA | - | - | - | - | - | - | - | - | - | - | - |
| NORTHWEST HSSA | | | | | | | | | | | |
| Madigan AMC | - | - | - | - | - | - | - | - | - | - | - |
| FT Wainwright, AK | - | - | - | - | - | - | - | - | - | - | - |
| PACIFIC HSSA | | | | | | | | | | | |
| Tripler AMC | - | - | - | - | - | - | - | - | - | - | - |
| OTHER LOCATIONS | | | | | | | | | | | |
| Europe | - | - | 1 | - | - | - | 1 | - | - | - | - |
| Korea | - | - | - | - | - | - | - | - | - | - | - |
| Total | 0 | 3 | 2 | 0 | 0 | 1 | 1 | 1 | 4 | 0 | 0 |

* Based on date of onset.

** Reports are included from main and satellite clinics. Not all sites reporting.

Date of Report: 7-Feb-96

**TABLE II. Cases of notifiable sexually transmitted diseases, United States Army
January, 1996**

| Reporting MTF/Post* | Chlamydia | | Gonorrhea | | Herpes Simplex | | Syphilis Prim/Sec | | Syphilis Latent | | Urethritis non-spec. | | Other STDs** | |
|----------------------------|---------------|--------------|---------------|--------------|-------------------|--------------|----------------------|--------------|--------------------|--------------|-------------------------|--------------|-----------------|--------------|
| | Cur. Month | Cum. 1995 | Cur. Month | Cum. 1995 | Cur. Month | Cum. 1995 | Cur. Month | Cum. 1995 | Cur. Month | Cum. 1995 | Cur. Month | Cum. 1995 | Cur. Month | Cum. 1995 |
| NORTH ATLANTIC HSSA | | | | | | | | | | | | | | |
| Walter Reed AMC | 1 | 1 | 5 | 5 | 11 | 11 | - | - | - | - | - | - | - | - |
| Aberdeen Prov. Ground | - | - | 2 | 2 | - | - | - | - | - | - | 1 | 1 | - | - |
| FT Belvoir, VA | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Bragg, NC | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Drum, NY | 8 | 8 | 7 | 7 | 1 | 1 | - | - | - | - | 2 | 2 | - | - |
| FT Eustis, VA | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Knox, KY | 4 | 4 | 2 | 2 | - | - | - | - | - | - | - | - | - | - |
| FT Lee, VA | 11 | 11 | 6 | 6 | 1 | 1 | - | - | - | - | 1 | 1 | - | - |
| FT Meade, MD | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| USMA, West Point, NY | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| CENTRAL HSSA | | | | | | | | | | | | | | |
| Fitzsimons AMC | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Carson, CO | 20 | 20 | 6 | 6 | 2 | 2 | - | - | - | - | 15 | 15 | - | - |
| FT Leonard Wood, MO | 4 | 4 | 3 | 3 | 1 | 1 | - | - | - | - | 4 | 4 | - | - |
| FT Leavenworth, KS | - | - | 1 | 1 | 1 | 1 | - | - | - | - | - | - | - | - |
| FT Riley, KS | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| SOUTH CENTRAL HSSA | | | | | | | | | | | | | | |
| Brooke AMC | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Hood, TX | 11 | 11 | 2 | 2 | 1 | 1 | - | - | - | - | 1 | 1 | - | - |
| FT Polk, LA | 6 | 6 | 5 | 5 | 1 | 1 | - | - | - | - | - | - | - | - |
| FT Sill, OK | 14 | 14 | 7 | 7 | - | - | - | - | - | - | 3 | 3 | - | - |
| Panama | - | - | 1 | 1 | - | - | - | - | - | - | - | - | 3 | 3 |
| SOUTHEAST HSSA | | | | | | | | | | | | | | |
| Eisenhower AMC | 4 | 4 | 4 | 4 | 1 | 1 | 1 | 1 | - | - | - | - | - | - |
| FT Benning, GA | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Campbell, KY | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Jackson, SC | 10 | 10 | 2 | 2 | 3 | 3 | - | - | - | - | - | - | - | - |
| FT McClellan, AL | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Rucker, AL | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Stewart, GA | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| SOUTHWEST HSSA | | | | | | | | | | | | | | |
| Wm Beaumont AMC | 14 | 14 | 2 | 2 | 2 | 2 | - | - | - | - | - | - | - | - |
| FT Huachuca, AZ | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Irwin, CA | 5 | 5 | 2 | 2 | - | - | - | - | - | - | - | - | - | - |
| NORTHWEST HSSA | | | | | | | | | | | | | | |
| Madigan AMC | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| FT Wainwright, AK | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| PACIFIC HSSA | | | | | | | | | | | | | | |
| Tripler AMC | 17 | 17 | 3 | 3 | 10 | 10 | - | - | - | - | - | - | - | - |
| OTHER LOCATIONS | | | | | | | | | | | | | | |
| Europe | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Korea | 1 | 1 | - | - | 2 | 2 | - | - | - | - | - | - | - | - |
| Total | 133 | 133 | 60 | 60 | 37 | 37 | 1 | 1 | 0 | 0 | 27 | 27 | 3 | 3 |

* Reports are included from main and satellite clinics. Not all sites reporting.

Date of Report: 7-Feb-96

** Other STDs: (a) Chancroid (b) Granuloma Inguinale (c) Lymphogranuloma Venereum (d) Syphilis unsp. (e) Syph, tertiary (f) Syph, congenital

Continued from page 3

Because of the importance of the problem with injuries during BCT, a retrospective effort was made to determine why the data collected by the Physical Therapy Department during the first seven months of the year differed from that found during this investigation covering the October to December time frame. Many factors could have contributed to the discrepancy in results. These factors include training changes implemented from season to season, different levels of initial entry fitness at different times of the year and differences in study methodology. However, one in particular became the focus of our attention; differential referral patterns for different types of injuries. The source of the case (numerator) data for the earlier survey was physical therapy referrals, while the later investigation analyzed all clinic visits for injury among the trainees studied.

The original survey employed what amounted to a case-control design. Among the cases, 70% of trainees with stress related injuries were women, while only 30% of trainees in the integrated companies (the controls) were women. The odds ratio calculated from this distribution of women among the cases and controls is over five to one for stress related injury in women versus men.

Subsequent investigation revealed that tibial stress injuries accounted for roughly 60% of referrals to the Physical Therapy clinic for stress injuries. Furthermore, four times as many women as men experienced these tibial stress injuries, thus making it more likely that women would be referred. Men, on the other hand, experienced more foot injuries which were generally sent to podiatry if they required specialty care.

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Table 2. Incidence of Women and Men Injured During Basic Training reported in Previous Studies from 1980 to 1995

| Author | Post | Year | Wks | Women | | Men | | RR* | 95% CI |
|---|--------------|------|-----|-------|-----|------|-----|-----|------------|
| | | | | n | % | n | % | | |
| -- | Leonard Wood | 95 | 8 | 84 | 66% | 159 | 42% | 1.6 | (1.3, 2.8) |
| -- | Leonard Wood | 95 | 7 | 101 | 57% | 169 | 36% | 1.6 | (1.3, 2.4) |
| Reynolds | Jackson | 93 | 8 | 163 | 67% | -- | -- | -- | -- |
| Bell | Jackson | 88 | 8 | 293 | 62% | 452 | 29% | 2.1 | (1.9, 2.7) |
| Jones | Jackson | 84 | 7 | 186 | 50% | 124 | 28% | 1.8 | (1.2, 1.7) |
| Bensel | Jackson | 83 | 8 | 767 | 42% | 2074 | 23% | 1.8 | (1.6, 2.1) |
| Kowal | Jackson | 80 | 8 | 347 | 54% | 770 | 26% | 2.1 | (1.9, 2.6) |
| * Relative risk = incidence in women / incidence in men | | | | | | | | | |
| Bell, N et al: (abstract) APHA Annual Meeting, 1993 | | | | | | | | | |
| Jones, BH et al: National Academy Press, 1992 | | | | | | | | | |
| Bensel, C: Army Tech Report, Natick, MA, 1983 | | | | | | | | | |
| Kowal, D: Am J Sp Med; Vol 8(4), 1980 | | | | | | | | | |

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In addition to the high incidence of injuries among both men and women during BCT past studies suggest that the disproportionately high number of days of limited duty caused by injury should be of concern. The December investigation documented 2654 days of limited duty due to injuries compared to only 296 for illness among the 761 basic trainees in our series. Thus, nine times as many days of limited duty were attributable to injuries as illness.

In summary, although the findings of this investigation suggest that integrated BCT does not elevate incidence of injury for women, injury rates for both genders are high during BCT. Injuries exert a significant negative impact in terms of performance of

injured trainees, readiness of training companies, and potentially preventable government expenditures for medical care, board actions, and compensation for disability. The results of this and other studies warrant a concerted effort to lower injury rates among men and women in BCT and should be a top priority among military health promotion and preventive medicine personnel, as well as commanders.

Editorial comment submitted by MAJ(P) William H Candler, MC, Chief, Preventive Medicine Service, Fort Wainwright, AK

Report from the Field

Cold Weather Injuries, Ft. Drum, NY

There have been 33 confirmed cold weather injuries (CWI) at Ft. Drum during the 1995-6 winter season as of 31Jan96 (see Table 3). Of the total, 7 (21%) occurred in December (mean maximum temperature 25°F, mean minimum temperature 12°F) and 26 (79%) occurred in January (mean maximum temperature 25°F, mean minimum temperature 6°F through 30 January). Two clusters account for 14 (54%) of the 26 CWI in January. Of those CWI in both December and January not included in the two clusters, approximately half were incurred while on duty and half while off duty.

One cluster occurred during a funeral detail involving six soldiers dressed in Class A uniforms in Albany, NY, on 03Jan96. The maximum temperature in Albany that day was 9°F; the peak wind recorded was

24 mph. The soldiers state they were outside no longer than 20 minutes. Of the 6 injuries, 5 were chilblains, four of which involved the ear and one which involved the foot. The sixth injury was first degree frostbite of the ear. Though duties which require soldiers to work outdoors, even for short periods, in uniforms other than

Table 3. Categories of Cold Weather Injuries Observed

| <i>Cold Injury</i> | <i>n</i> | <i>percent</i> |
|-------------------------|----------|----------------|
| Chilblains | 14 | 42% |
| First Degree Frostbite | 12 | 36% |
| Second Degree Frostbite | 5 | 15% |
| Third Degree Frostbite | 1 | 3% |
| Hypothermia | 1 | 3% |

EDU's during the winter are rare, the command corrected this situation by locating the last 100 black pile caps which are allowed by regulation to be worn with the Class A uniform and which were in storage at the manufacturer because they are out of production. These caps are now loaned routinely to soldiers involved in such duties and are worn over a concealed paper surgical cap used as a sanitary liner.

The second cluster involved 8 soldiers and occurred on 08 Jan 96. The minimum temperature with wind chill on 08 Jan was -60°F ; the maximum temperature without wind chill was 5°F . Four of the eight injuries occurred in the members of one infantry company who were firing at an M-16 range. All four sustained CWI to the nose, three with first degree frostbite and one with chilblains. All four reported touching their noses to their weapon while sighting it. Those diagnosed with first degree frostbite were given that diagnosis because their noses stuck to the weapons and they tore skin off attempting to remove them. These injuries occurred in spite of the fact that they were wearing balaclavas to protect the face.

Three injuries were separate incidents involving running during PT (first degree frostbite of the nose), a road march (chilblains of the ear), and working in a motor pool (chilblains of the toe). The eighth injury was second degree frostbite of all ten fingertips with one small area of third degree frostbite on one fingertip and is the most serious CWI to date this winter. This injury occurred in a soldier who was attending the Cold Weather Survival Course. He spent most of a 3-day period outdoors involved in such activities as skiing, snowshoeing, building shelters, and setting snares. One night was spent in a tent and one in a shelter built of branches and other materials found in the area. He removed his Extreme Cold Weather Mittens three times, to chop wood, start a fire, and pack his rucksack. He smokes one pack of cigarettes a day and did smoke on the first day in the field.

Editorial Comment: In the Army experience, most on-duty injuries consist almost entirely of chilblain, 1st or 2nd degree freezing injury. Clinically severe freezing injury (3rd or 4th degree) and hypothermia have fortunately remained uncommon. The spectrum of freezing injury in the Army has remained very consistent for many years. The experience of this winter at Ft Drum demonstrates this pattern well.

On-duty injuries usually occur in clusters. Clusters occur because groups of soldiers are all exposed to the same potentially injurious levels of cold stress. Also, groups of soldiers may be effected by inadequate training, planning, judgment or inappropriate equipment. The low incidence of 2nd degree freezing injury in these Ft Drum clusters are likely due to the short period of exposure in most cases: either brief exposure to cold wind (the funeral detail) or direct contact with a cold metal surface during M-16 practice or PT

The severity of injury is related to the length of exposure. Clusters that occur during tactical exercises involving exposures of many hours to several days frequently include a number of 2nd degree injuries and occasionally more severe ones. Severe injuries, however, are relatively uncommon in on-duty clusters because of the "sentinel" role of the lesser degrees of injury, as well as command, self and buddy awareness. In the operational environment the discovery of a cold injury produces an immediate surveillance for other injuries and action to stop the hazardous exposure. In the Ft Drum experience, the one case of severe injury occurred in the setting of prolonged cold exposure. There is a possibility that the initial injury was unrecognized, however, there is also a possibility that it was ignored and progressed slowly. These are the injuries that are especially tragic.

Most severe freezing injuries occur off-duty either through careless recreational exposure or through accidental exposure due to storm or stranding. In the author's experience severe on-duty injuries occur when individuals who have sustained a 1st or 2nd degree injury are permitted to continue exposure in the mistaken belief that their injury can be adequately protected from further cold exposure in the field.

Submitted by MAJ L Keep, MC, Chief, Preventive Medicine Service, Fort Drum, NY

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One under appreciated and fortunately infrequent source of severe freezing injury is skin exposure to spilled POL or antifreeze at subfreezing temperatures. These materials will remain liquid but have the capacity to freeze skin on contact. Spills can get inside gloves and boots and cause injury. Awareness of this significant hazard and cautious handling of these dangerous cold liquids is required to avoid injury.

Other factors associated with increased risk of freezing injury include: changes in weather (either rapid warming or cooling), lack of training or experience with cold, tobacco use, dehydration, weight loss, and being black.

The cost of freezing injuries is substantial. Even a 1st degree injury will preclude a soldier from exposure to subfreezing temperatures for 2-3 weeks. Second degree injuries usually sideline a soldier for the remainder of the cold season, which at Ft. Drum can mean well into spring. Third and fourth degree injuries often result in disability and separation from the service for medical reasons.

Because cold injuries are all so disabling once they occur, emphasis should be placed on prevention. Freezing injuries are, in particular, preventable. Prevention is a command responsibility. Essential steps in prevention include: awareness of the risk (knowing

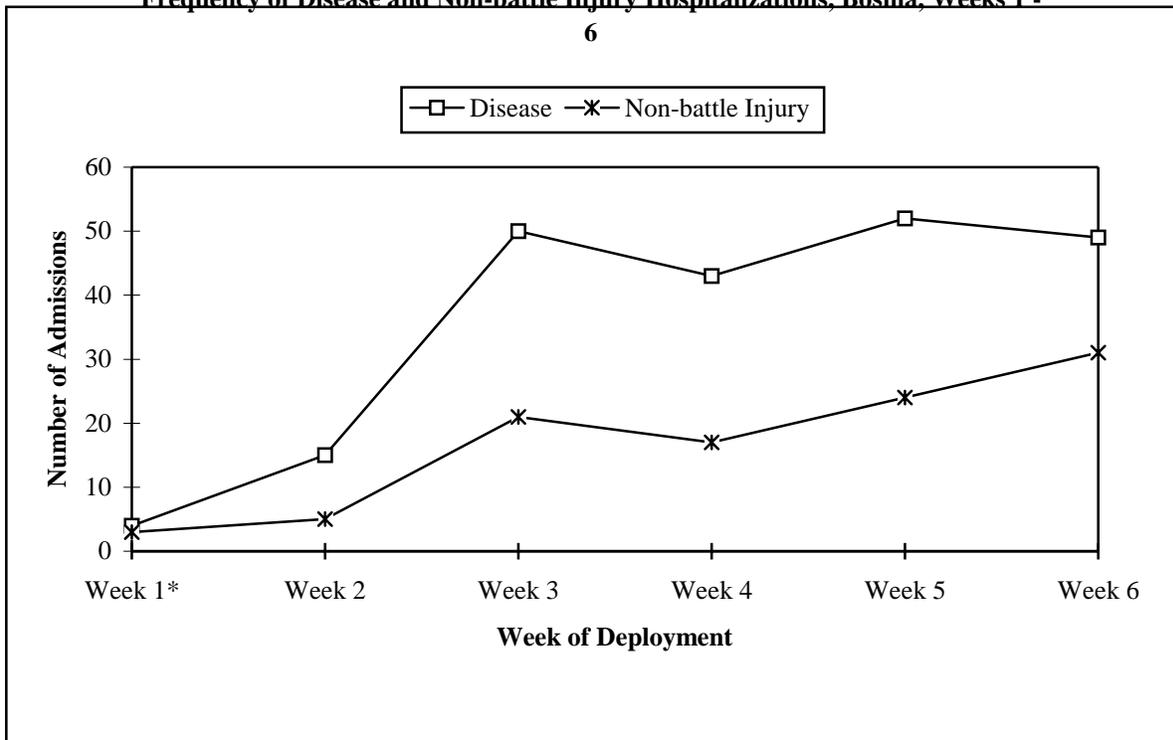
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Surveillance Trends, Bosnia

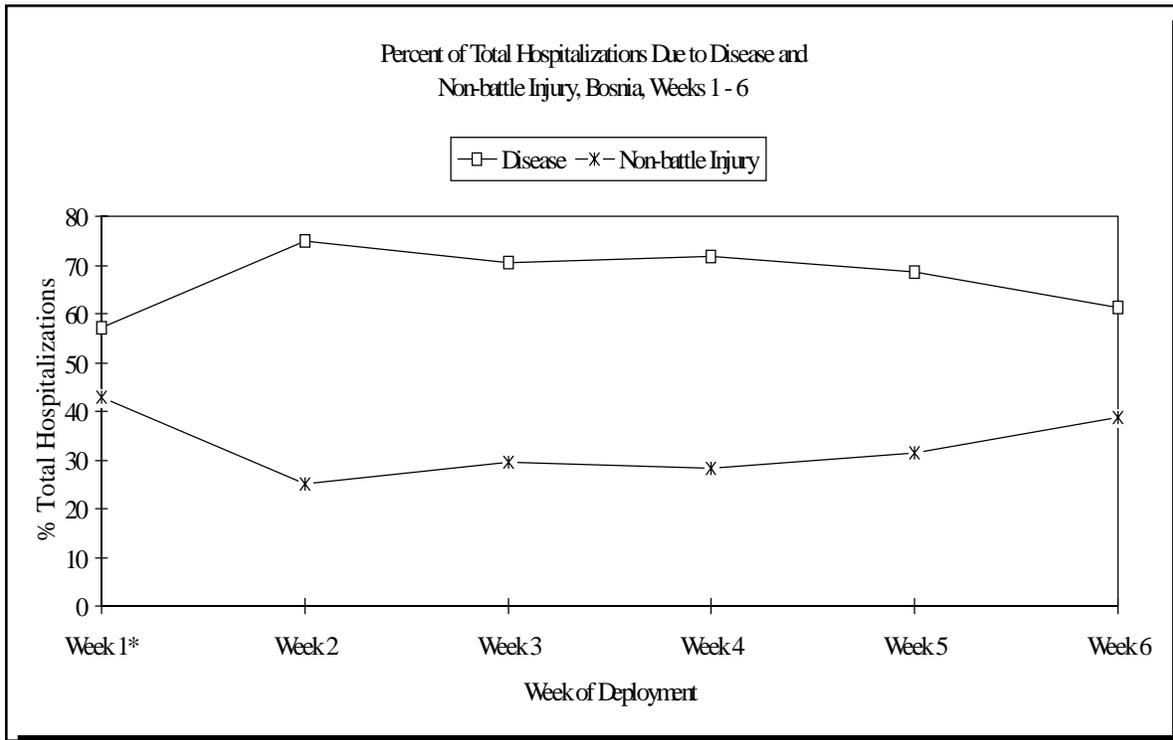
| Disease and Injury Hospitalizations, Deployed Forces, Bosnia 16Dec95 - 25Jan96* | | | |
|---|------------|-------------------|----------------|
| Disease | n | % Disease | % Total |
| Psychiatric Disorders | 18 | 8.53 | 5.59 |
| Asthma/Reactive Airways | 8 | 3.79 | 2.48 |
| Pneumonia/Bronchitis | 15 | 7.11 | 4.66 |
| Diarrhea/Gastroenteritis | 23 | 10.90 | 7.14 |
| Viral Exanthema | 21 | 9.95 | 6.52 |
| Other Infectious Diseases | 21 | 9.95 | 6.52 |
| Other Diseases | 105 | 49.76 | 32.61 |
| Sub-total | 211 | 100% | 65.5% |
| Non-Battle Injuries | n | % Injuries | |
| Knee Injury | 11 | 9.91 | 3.42 |
| Back | 23 | 20.72 | 7.14 |
| Fracture | 24 | 21.62 | 7.45 |
| Head Injury | 9 | 8.11 | 2.80 |
| Cold Injuries | 7 | 6.31 | 2.17 |
| Other Injuries | 37 | 33.33 | 11.49 |
| Sub-total | 111 | 100% | 34.5% |
| Total Hospitalizations | 322 | | 100% |
| * Data obtained from PARRTS, USA Patient Administration and Biostatistical Activity, Fort Sam Houston, TX | | | |

Bosnia Update

Frequency of Disease and Non-battle Injury Hospitalizations, Bosnia, Weeks 1 - 6



Percent of Total Hospitalizations Due to Disease and Non-battle Injury, Bosnia, Weeks 1 - 6



* Week 1 only contains two days of data. Data obtained from PARRTS.

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wind chill and close attention to weather change, for example), provision of appropriate cold weather clothing, close supervision and direct inspection of exposed skin and the feet and hands, assurance of periodic access to shelter and warming, maintenance of hydration and nutrition, minimizing tobacco use and organized cold weather training with experienced cadre. In addition, since the most severe injuries usually occur

off-duty, education to increase awareness and appropriate behavior and command policies that control the risk in very hazardous conditions are essential.

Editorial comment submitted by LTC RE Burr, MC, Medical Advisor, US Army Research Institute of Environmental Medicine, Natick, MA.

Epidemiologic Investigation

Preliminary Report of TB Skin Test Results, Fort Leavenworth, Kansas

In November 1995, an inmate of Fort Leavenworth prison received a semi-annual physical exam and was found to have a positive tuberculosis skin test (TST) and chest x-ray negative for active TB. This individual had previously been negative upon several TST screenings, thus was considered a TB converter alerting medical staff of the possibility of an active TB case within the prison or base.

By January 16, 1996 all prisoners and members of the 705th MP Bn who did not have previous positive Purified Protein Derivative (PPD) intradermal TSTs participated in mass screenings for TB skin test conversions and active cases. Fourteen inmates (1.8%), including the sentinel conversion, and 21 members of the cadre (3.7%) had changes in their TSTs of at least 10 mm induration upon reliable testing and reading methods and were thus considered TB converters. The minimum amount of time between last negative PPD test and first positive test was one month. All converters had chest radiographs taken: none of which showed active TB disease.

Because of the increased percentage of conversion among the cadre compared to the inmates, a case-control study was designed to identify potential

risk factors for conversion. Cadre converters were more likely to be black, older, males. Information on inmate domicile and work detail since April 1995 was gathered on each inmate converter and four inmate non-converters who arrived at the disciplinary barracks (DB) around the same time as the converter. At this time, the only factors statistically significantly associated with conversion among the cadre are arrival onto the base in June 1995 (OR=7.52, Fisher exact 2-tailed test p:0.02) and being assigned to either Bravo or Charlie companies after arrival in June 1995 (compared to being assigned to Alpha or HHC, OR=14.5, Fisher exact 2-tailed test p : 0.01). The number of months on duty, percentage of work hours spent in the prison, age, race, marital status, travel outside the U.S., having had a foreign-born roommate, known exposure to an active TB case in the past two years, and a variety of self-identified leisure time activities were not associated with a greater odds of conversion among cadre members.

The In-Patient Database System (IPDS) and the Medical Surveillance System (MSS) are being used to identify all active TB cases among military beneficiaries treated within the past year looking for a possible active

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TB case among former cadre members stationed at Fort Leavenworth. No matches have yet been found. The Kansas Department of Health and Environment Tuberculosis Section registry of TB cases reported to the State includes military members living in Kansas and was searched for cadre members or other possible contacts that would have had access to Fort Leavenworth or a cadre member (i.e. spouse). No matches were found.

Because of the high percentage of converters and the very short time period between the last negative test and subsequent positive test for some people tested, we believe that either a highly contagious active case of TB was not detected and is no longer present in this relatively closed population or there a problem with the mass screening positive tests. Given that it is unlikely that an active TB case capable of disseminating infection to 35 people within a short time period was asymptomatic and not identified by either the standard health surveillance at Fort Leavenworth or by an active

attempt to find the case since the conversions were found, we are exploring the possibility of false positive readings during the screening.

The past negative tests had been obtained using PPD produced by Connaught Laboratories. The mass screenings were conducted using two lots of PPD produced by Parke Davis. There have been documented cases in California and Alaska of false-positives resulting from the Parke Davis product. A retest is planned for the near future using Connaught and Parke Davis products in different arms in an attempt to identify differences in reactions due to the antigen preparation.

Submitted by COL J Karwacki, MC, Chief, Preventive Medicine Service, Brooke Army Medical Center, Fort Sam Houston, Tx, CPT W Corr, Preventive Medicine Resident, Walter Reed Army Institute of Research, Washington DC, and Dr. Sarah Patrick, EIS Officer, Kansas Health Dept.

ARD Surveillance Update*Legend*

| | | |
|-------|----------|--------------------------------|
| — | ARD Rate | = (ARD cases / Trainees) * 100 |
| ■ ■ ■ | SASI* | = ARD Rate / Strep Rate** |

FT Benning

Ft Jackson

Ft Knox

Ft Leonard
Wood

Ft McClellan

Ft Sill

Table IV. ARD surveillance rates, submitted by Army TRADOC posts

* Strep/ARD Surveillance Index (SASI)

**Strep Rate = (GABHS(+)) / Cultures 100

Note: SASI has proven to be a reliable predictor of serious strep-related morbidity, especially acute rheumatic fever.

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