Army Injury Surveillance Reports: Explanation of Injuries and Causes

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PowerPoint slides are available upon request from the APHC Injury Prevention Division at email address: usarmy.apg.medcom-aphc.mbx.injuryprevention@mail.mil
Purpose

This presentation is for Army personnel who are charged with interpreting injury surveillance data to support Installation injury reduction goals. This presentation describes:

1) APHC sources of Active Duty Army* Installation injury rate information

2) How injuries are defined and injury rates calculated

3) Activities and causes that installations and units may need to investigate to reduce these injuries

4) Prevention strategies

*Installation Civilian Injury rate information is currently available by request – because Civilian injury rates are based on Workers Compensation claims, the definitions and rate calculations are different than those described in this slide deck
* To access Installation specific slides, when in SMS go to:
Dashboards>User Workspace>OTSG/MEDCOM HQ>DCS, Public Health>Public
Health>Epidemiology and Disease Surveillance Portfolio (EDS)>Active Duty Injuries
by Installation and MEDCOM Region (Quarterly)

SMS and PH360 rates are calculated from same data using similar definitions as
described in this presentation, AFHSB (DHA) rates are calculated differently per
example below:

**PH360 annual rates, 2014**

\[
\text{Number of injuries during specified year} = 48,196 \\
\text{Total deployment – adjusted person – years} = 44,625 \\
= 1,080 \text{ injuries per 1,000 person – years}
\]

**SMS annualized quarterly rates, Q12014**

\[
\text{Number of injuries during specified quarter} = 11,823 \\
\text{Total deployment – adjusted person – years} = 10,841 \\
= 1,091 \text{ injuries per 1,000 person – years}
\]
DHA/AFHSB Installation Injury Report monthly rates, March 2014
(NOT calculated like SMS and PH360)

\[
\frac{\text{Number of injuries during specified month}}{\text{Total number of Soldiers with personnel record at Installation in specified month}} = \frac{4,939}{46,796} = 106 \text{ injuries per 1,000 Soldiers}
\]
Installation Injury Rates

- Installation-specific injury rates are routinely reported as a metric for the Army Medicine Campaign.

- Current injury rates and trends are shown relative to an installation’s historical average injury rate, with red, amber, and green ranges.

Metric Background:
Surveillance data shown is based on quarterly rates of medical encounters for injuries among active duty Soldiers.

The red and green thresholds shown on Public Health 360 installation’s specific surveillance slides represent three standard deviations above and below the historical process mean (“average”) injury rates. Rate values in the amber area are consistent with historical trends, which does not imply acceptable performance. Injury rates currently in the amber or red areas should be improved, and the green threshold can be used as a long-term target value. Lines representing 2 standard deviations from the historical mean provide an intermediate warning indication (red line) and an indication of potential improvement (green line).
Vast majority of injuries are from mechanical exposures and include:

- Acute trauma injuries (e.g., fractures, open wounds, contusions, cuts, bites)
- Cumulative micro-traumas (e.g., tendonitis, stress fractures, back pain, noise-induced hearing loss)

Most common Active Duty Army injury = cumulative micro-traumas, e.g.,

- Overuse injuries to lower back and to knees, lower legs, and ankles/feet
- Most presumed to physical-training-related injuries


* For complete list see the description and code list for the at Information pertaining to AFHSB Installation Injury Report (IIR) injuries under 'Documentation' at http://www.health.mil/Military-Health-Topics/Health-Readiness/Armed-Forces-Health-Surveillance-Branch/Reports-and-Publications/Installation-Injury-Reports
Primary medical code series used*

- Acute traumatic mechanical ICD-10-CM S-00-S99, select T-codes, H-codes (eye, hearing)
- Environmental, Electrical/Radiant/Thermal - select T-codes
- Poisons – select T-codes
- Cumulative injuries: selected musculoskeletal conditions from ICD-10-CM M00-M99 series; friction blisters (select S-codes)

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Incidence of Injury = determined through queries of inpatient and outpatient medical records (direct MTF care and TRICARE purchased care) for primary diagnoses indicative of an injury or injury-related musculoskeletal condition. A 60-day incident rule was used to identify new or incident injuries and to exclude follow-up visits associated with the same incident.

Rates were adjusted to remove deployment time, given the lack of in-theater medical data.
How are injury “causes” determined?

External cause codes: Surveillance tracks additional codes in the medical records that can provide information regarding external factors or conditions associated with injury. Though there are limitations these codes are used determine leading “causes.”

- Cause codes are not well documented in medical records (especially outpatient)
- Cause codes are not always specific - many describe a general mechanism (e.g., “falling from a surface” or “exhaustion”, or “struck by something”) and do not describe the specific activity (e.g., falling while walking on a sidewalk, excessive running, improper lifting technique for work task) or conditions (e.g. black ice) that lead to the incident
- Much of what is known about specific “causes” of various injuries is based on more in-depth investigations and site-specific assessments

➢ NOTE: Installations should investigate leading “causes” of their injuries to identify potentially problematic activities or conditions
A “Cause code” is required for inpatient traumatic injuries.

CAUSES SHOWN: from 2012 hospitalization data (provided to APHC Injury Prevention Program from the Armed Forced Health Surveillance Center). Cause codes were derived from the required STANAG cause coding. Leading causes are similar to other years evaluations; also similar to those discussed Ruscio et al, AJPM 2010.
Prior surveillance and studies (AJPM Supplement 1, 2010; Marshall, 2014) have shown that the most common Active Duty Army injuries are musculoskeletal injuries treated on an outpatient basis. These injuries have primarily been to the lower back and lower extremities (e.g., knees, lower legs, and ankles/feet). This past evidence has suggested these are typically due to cumulative microtrauma, or "overuse," and can most often be associated with some form of physical military training. Prior to 2016, medical cause-code terminology for these overuse injuries used the term "Overexertion." As result of recent changes in coding terminology (ICD-10), "Overexertion" may be changed, such as to "Overuse".

Example shown from Army Public Health 360 reports for Army-wide injury causes attributed to outpatient medical encounters. Installation-specific injury data are available from PH360: https://pasba.army.mil/MEDCOM360/Dashboard/Map/PH360

NOTE: as opposed to ICD 9 coding requirements, ICD-10 requires cause codes for all dx codes – this may lead to better cause/activity info in future (if enforced)
Additional Explanation of Selected Leading Injury “Causes”
Prior surveillance and studies (AJPM Supplement 1, 2010; Marshall, 2014) have demonstrated that the most common Active Duty Army injuries are musculoskeletal injuries treated as outpatient injuries. These injuries have primarily been to the lower back and lower extremities (e.g., knees, lower legs, and ankles/feet. This past evidence has suggested these are typically cumulative micro-traumas, or “overuse injuries” and can most often be associated with some form of physical military training. Prior 2016 medical cause-code terminology for these Overuse injuries used the term “Overexertion.” As result of recent changes in coding terminology “Overexertion” may be changed, such as to “Overuse”

EXAMPLE RECOMMENDED CODES: ICD10 activity codes including Y93.07 (Running), Y93.67 (Basketball), Exercise machine (Y93.A1); Muscle strengthening (Y93.B2)
ICD9 cause code E885 “Falls”

§ SOURCE: APHC Report S.0032427, Etiology of Fall Related Injuries in the Army: Review of narrative Incident Reports Jan-Dec 2011. NOTE: While associated with other types of injuries, Physical Training and Combat Training resulted in only a small percentage of fall-related injuries
Example suggested ICD10 sport activity code: use Y93.67 for Basketball

SOURCE: APHC Report S.0032427, Etiology of Fall Related Injuries in the Army: Review of Narrative Incident Reports Jan-Dec 2011. NOTE: While associated with other types of injuries, Physical Training and Combat Training resulted in only a small percentage of fall-related injuries
Parachuting (Airborne Operations)

- Military parachuting training operations cause many nonfatal injuries
- **Injury types**: fractures, sprains, strains of knee, leg, foot (especially **ankle**)
- **Effective means to reduce injuries**:
  - Studies repeatedly confirm effectiveness of outside-of-the-boot ankle braces to reduce frequency and severity of ankle-related injuries.
  - Recent studies show use of T-11 parachute is safer than T-10

**RECOMMENDATIONS:**

- Recommend/require outside-of-boot ankle braces
- Recommend/require use of T11 parachute
- Improve medical CAUSE coding at MTFs to track and assess (example in notes)

**Example of ICD 10 cause code:** Parachute landing ICD10 code =**V97.22XA**

**SOURCE:** APHC Report S.0032427, Etiology of Fall Related Injuries in the Army: Review of Narrative Incident Reports Jan-Dec 2011.
Example ICD10 cause codes for snow/ice:

**W00.1XXA** (same level),
**W00.2XXA** (stairs/steps),
**W00.2XXA** (different level not stairs)

ICD10 code V87.8XXA (non collision vehicle injury); also require type of vehicle/circumstance in narrative

Walking, Marching, and Climbing

- **Primary hazard**: uneven surfaces (indoors and outdoors)
  - *Other common hazards*: substances on surfaces, carrying heavy loads (e.g., rucks), poor lighting, fatigue

- **Primary injury types**:
  - Fractures; strains/strains
  - Upper & lower extremities (hands/wrist/arm; knee/leg/ankles/feet)

**RECOMMENDATIONS**

- *Minimize presence of* surfaces and substances on the surfaces
- *Improve lighting* in work areas, parking lots and sidewalks
- *Other for deployment and military training*: Improve night vision, reduce load, improve balance/stability, and reduce fatigue during patrols and marching
- *Improve medical CAUSE coding at MTFs to track and assess* (examples in notes)

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**Example ICD10 CAUSE codes:**
- walking/marching **Y93.01**;
- fall from Curb/sidewalk **W10.1XXA**, and or LOCATION - **Y92.XXX**

Army personnel charged with interpreting injury surveillance data to support Installation injury reduction goals should:

- Investigate location- and unit-specific causes of leading injuries to identify specific activities/hazards
- Encourage the use of more detailed medical cause-coding to enhance future surveillance and prevention

See the APHC Injury Prevention Website
http://phc.amedd.army.mil/topics/discond/ptsaiip/Pages/default.aspx
or
contact the APHC Injury Prevention Division at Email Address:
usarmy.apg.medcom-aphc.mbx.injuryprevention@mail.mil
Telephone: 410-436-4655    DSN: 584-4655

APHC has recommendations for specific ICD-10 codes and has Factsheets and technical references regarding various activities and associated injuries.
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