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A Proposed Revision to the U.S. Navy's Body Composition Program

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A Proposed Revision to the U.S. Navy's Body Composition Program

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Presentation Overview

- Discuss BCA programs used by the other Services
- Discuss the previous as well as the current BCA program used by the Navy
- Discuss why the Navy uses circumference measurements
- Discuss some possible recommendations for how the Navy could improve its BCA program

Why Change?

Need for Change

- 20 y/o male MIDN
- 69.5 in.
- 221 lbs.
- 19 in. neck
- 40.5 in. waist
- 22% BF?


CORPS
Marine Times
4 June 2012
COMPANY
5-hour energy shots New safety concerns OFFduty 4
$$$ for PCS moves Who gets it, who doesn't 34
Bonus outlook New rates next month 35
TAPE TEST
HORROR STORY
How the fine line between fit & 'fat' is hurting good Marines 28
NOT A USMC PUBLICATION


CORPS
Marine Times
19 AUGUST 2013
A GANNETT COMPANY
MAD AS HELL ABOUT THE TAPE TEST
Staff Sergeant's fight to end the unfairness 18
NOT A USMC PUBLICATION
SMITH
U.S. MARINES

DoDI 1308.3

DoD Instruction 1308.3

- Initial guidance provided 3 considerations for services to consider:
  - Body composition is an integral part of physical fitness
  - Body composition plays an important role in professional military appearance
  - Body composition is a good indicator of general health

DoD Instruction 1308.3

- Additional considerations for method selection:
  - Measurements need to be easily obtained from the field
  - Minimal amount of skill required to take the measurements
- As a result, all four services opted to use circumference measurements (at least initially) as the basis for their BCA programs

DoD Instruction 1308.3

- Establish percent body fat standards using the circumference-based method

- Circumference-based methods are inextricably linked to military body fat standards and have been carefully evaluated against other methods

How were the current BCA standards determined?

NHRC Studies

- The Naval Health Research Center (NHRC) conducted a series of studies to determine which consideration to implement. Specifically:
  - Body composition and Physical fitness
  - Body composition and Military appearance
  - Body composition and General health

Body Composition and Physical Fitness

- In 1987, Hodgdon & Beckett investigated the association between body composition, PRT items, and load carriage performance

- The results showed a modest correlation between body fat and load carriage performance (-0.43)

Body Composition and Military Appearance

- In 1990, Hodgdon, Fitzgerald, & Vogel conducted a study to rate the military appearance of 1,075 male and 251 female Soldiers

- Although the inter-rater reliability was high (0.86), there was only a modest correlation between appearance and percent body fat (0.53).

Body Composition and General Health

- In 1991, NHRC conducted a study to determine whether the Metropolitan Life Insurance tables could be used to develop percent body fat standards
- Interestingly, the “critical” percent fat values were constant across heights
- Mean critical percent fat values were 22.0 $\pm$ 1.20 for males and 33.5 $\pm$ 0.18 for females

Is circumference measurements the preferred method for the military?

Accuracy of BCA Methods

Method	Std. Error (%)
Autopsy	.01
Hydrostatic Weighing / BodPod	1.5 - 3.0
Circumference (Navy)	3.5
Calipers	3.0 - 5.0
Height / Weight	5.0
Bio-impedance	4.0 - 5.0
Near Infrared	7.0

* Data provided by the Naval Health Research Center

Skinfold vs. Circumference Measurements

- In 1998, NHRC conducted a study to determine the number of practice trials required to become proficient at performing skinfold and circumference measurements
- For skinfolds, the technical error of measurement (TEM) went from 3.0914 mm (18% error) after 15 trials to 1.2758 mm (7.43% error) after 120 trials
- For circumference measurements, the TEM went from 0.9493 cm (1.15% error) after 15 trials to 0.5643 cm (0.7% error) after 75 trials

Skinfold vs. Circumference Measurements

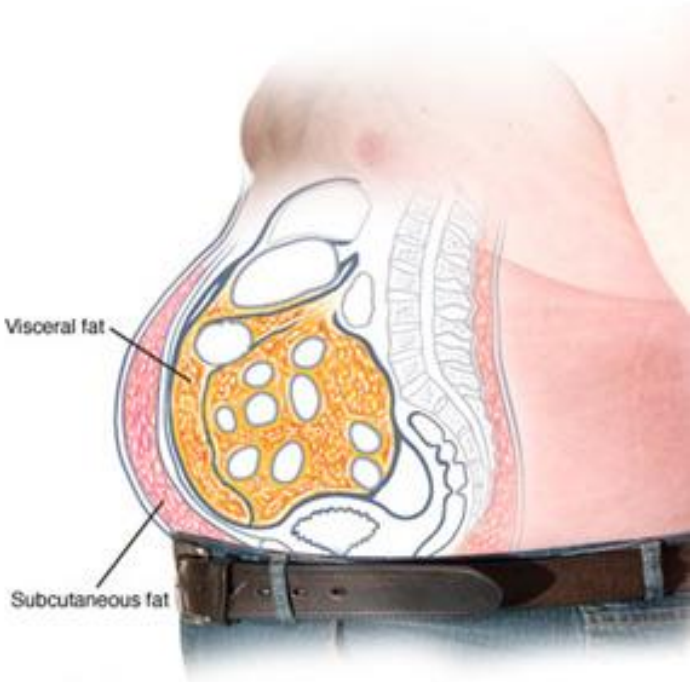
- NHRC also conducted a feasibility study using 38 Command Fitness Leaders (CFL)
- After six one-hour training sessions (75 measurements), only 24% of the CFLs were proficient

Skinfold vs. Circumference Measurements

- In 1999, NHRC conducted a third study to compare the accuracy of Navy's equation to that of several skinfold equations and one bioimpedance equation
- It was determined that the Navy's circumference based method was preferred over the other methods as it proved to be more precise and easier to learn than skinfolds and offered a significant cost advantage over bioimpedance

Subcutaneous vs. Visceral Fat

- Skinfolds only measure subcutaneous fat
- Circumference measurements measure both subcutaneous and visceral fat
- Visceral fat poses the greater health risk



BCA Programs of the Other Services

U.S. Marine Corps

- First service to use circumference measurements to assess body composition

U.S. Army

- Initially, used 4-site skinfolds to assess body composition
  - Bicep
  - Tricep
  - Subscapular
  - Suprailiac
- In 1986, transitioned to circumference-based equations similar to those used by the Navy and Marine Corps

U.S. Air Force

- Initially, used circumference measurements similar to the other services
- In 2009, received DoD approval to transition to a single abdominal circumference measurement
  - Superior border of the iliac crest

U.S. Navy

- In 1982, used the current circumference sites for males but different sites for females
  - Neck
  - Waist (umbilicus)
  - Bicep
  - Forearm
  - Thigh
- Prior to 1994, all Sailors were required to participate in the BCA

Service BCA Standards

Maximal Allowable Body Fat Percentages (%BF) / Abdominal Circumference (AC) by Service

Service	Age	%BF Men	%BF Women	AC Men	AC Women
Air Force	-	-	-	>39	>35.5
	-	-	-	35	31.5
Army	17-20	20%	30%	-	-
	21-27	22%	32%	-	-
	28-39	24%	34%	-	-
	40+	26%	36%	-	-
Marine Corps	17-26	18%	26%	-	-
	27-39	19%	27%	-	-
	40-45	20%	28%	-	-
	46+	22%	29%	-	-
Navy	17-39	22%	33%	-	-
	40+	23%	34%	-	-
					High Risk
					Moderate Risk

Proposed Revisions to the Navy's BCA Program

Abdominal Circumference

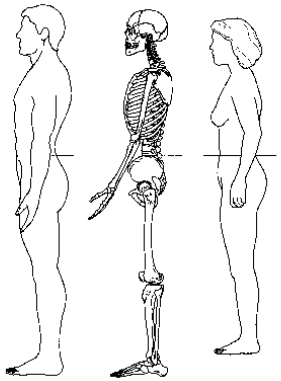
- Research * has shown a strong correlation between excess abdominal fat and certain metabolic diseases
  - Insulin resistance
  - Impaired glucose tolerance
  - Type 2 diabetes
  - Dyslipidemia
  - Cancer
- Research † has also shown that abdominal circumference is a good predictor of these risks

** Cerhan et al. (2014). A pooled analysis of waist circumference and mortality in 650,000 adults.*
† Hodgdon, J.A. (2012). A revised equation for prediction of body fat content in Navy women.

Abdominal Circumference

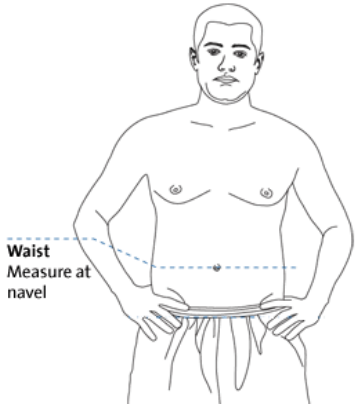
U.S. Air Force / National Institutes of Health:

- Iliac Crest
- Males: 40 in.
- Females: 35 in.

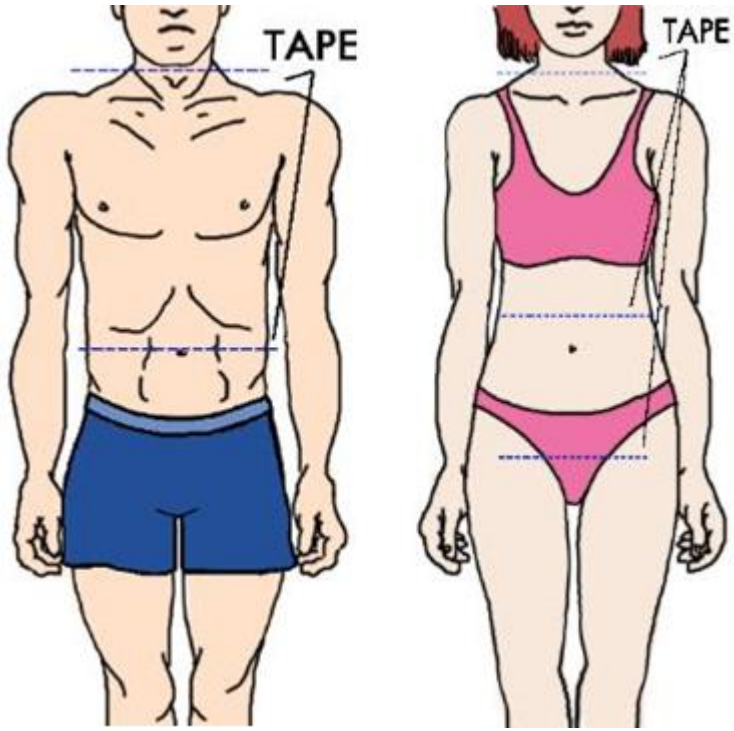


Naval Health Research Center (NHRC):

- Umbilicus
- Males: 40.2 in.
- Females: 36 in.

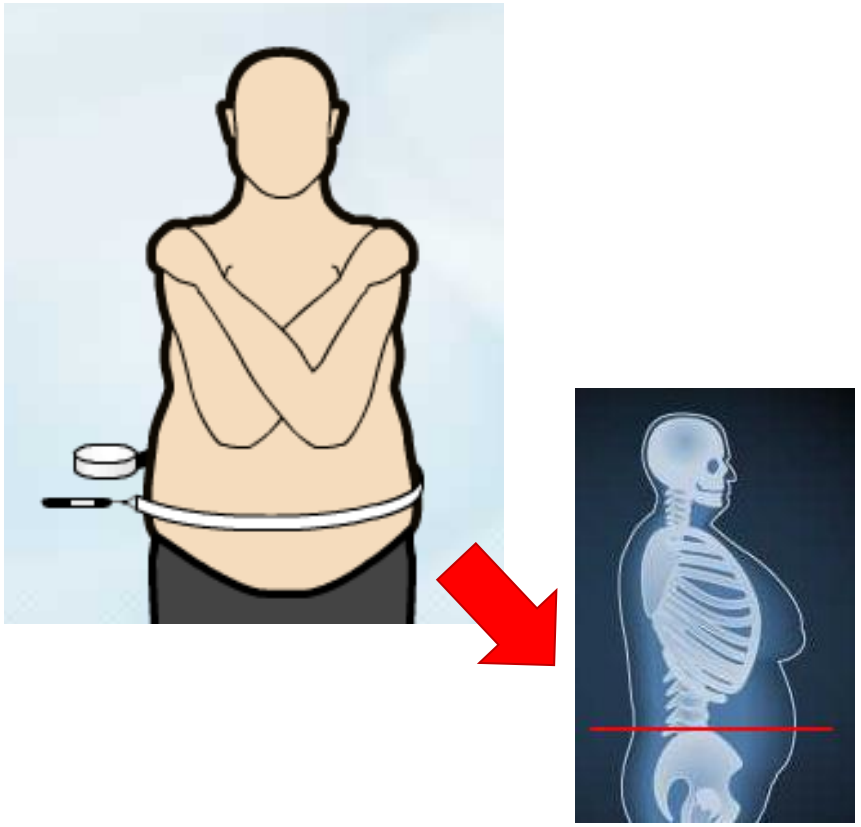


Circumference Measurements



DoD Circumference Sites

NIH Circumference Site



Proposed BCA Standards

Health Risk Category	Pass/Fail BCA	Male (in.)	Female (in.)
Low Risk	Pass	≤ 35	≤ 30
Moderate Risk	Pass	> 35 - 40	> 30 - < 36
High Risk	Fail	≥ 40	≥ 36

* Requires medical evaluation/consultation

Impact if Implemented

Percent Failure Increase if Proposed BCA Standards were Implemented

PFA Cycle	USN Males (%)	USNR Males (%)	USN Females (%)	USNR Females (%)
1, 2012	2.28	2.28	3.34	3.76
2, 2012	2.01	2.12	2.98	3.44
1, 2013	1.99	2.36	2.86	3.52

Implementation Recommendations

- All Sailors would be required to participate in the BCA portion regardless of whether they are within Ht/Wt standards
- Sailors classified as **high risk** would fail the BCA and be sent to medical for evaluation
- Sailors classified as **moderate risk** would pass the BCA and be sent to medical for evaluation
- Make BCA portion of the PFA unannounced

Questions?