

Assessing the Implications of Possible Changes to Women in Service Restrictions: Practices of Foreign Militaries and Other Organizations

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Photo credit line: Young Israeli women undergo tough, initial pre-army training at Zikim Army Base in southern Israel. REUTERS/Nir Elias

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Contents

Executive summary	1
Foreign militaries	3
Australia	4
ADF composition	4
Women in the ADF	4
Law and policy	5
Attitudes	7
Physical standards	8
Studies and reviews	11
Current situation	18
United Kingdom	21
Composition of the British Armed Forces	21
Women in the British Armed Forces	22
Law and policy	22
Physical standards	24
Studies and reviews	31
Current situation	38
Canada	39
Composition of the CF	39
Women in the CF	39
Women in combat roles	42
Law and policy	43
Attitudes	47
Physical fitness standards	48
Studies and reviews	55
Current situation	56
Israel	58
Composition of the IDF	58
Women in the IDF	58
Law and policy	60
Studies and reviews	61

Current situation	63
Wrap-up.	63
Other physically demanding professions.	65
Fire fighters.	66
Women in fire fighting	67
Fire-fighting duties	67
Becoming a fire fighter	68
Legal action involving physical fitness tests	76
Smokejumpers	78
Overview.	78
Qualifications	78
Women smokejumpers	80
Special Weapons and Tactics (SWAT) teams	80
Overview and qualifications	80
Women in SWAT	81
Wrap-up.	82
Glossary	83
References	87
List of figures	103
List of tables	105

Executive summary

As part of its review of restrictions to women's service in certain military occupations and assignments, the Assistant Commandant of the Marine Corps asked CNA to examine the practices of foreign militaries and other physically demanding professions. In this report, we review the policies and practices of four foreign militaries—Australia, the United Kingdom, Canada, and Israel—and two physically demanding professions—fire fighting (including smokejumpers) and Special Weapons and Tactics (SWAT) policing—to determine what can be learned about women's physical abilities and the effects of gender integration on unit (or organizational) dynamics.

Australia recently repealed its policies excluding women from certain ground combat positions and will begin assigning women to ground combat trades by 2013. The Australian Defence Force (ADF) will rely on gender-neutral Physical Employment Standards (PESs) to determine who is eligible to serve in each of its trades, including ground combat. With appropriate training, most men and women have passed the All-Corps Soldier PES. The ADF has not yet tested any women using the Combat Arms PES or any of the ground combat trade PESs, so it is unclear what percentage of women can meet the physical standards of these professions.

The United Kingdom recently upheld its policies excluding women from ground close combat occupations. It did find that a small percentage of women (no more than 1 percent of trained women and 0.1 percent of women in general) could meet its requirements for service in ground combat. The Minister of Defence maintains that gender-integrating such units could have potentially harmful effects on cohesion, which could in turn hurt combat effectiveness. Despite these concerns, however, the United Kingdom allows women to serve in the attached arms (as supporting personnel, such as medics, clerks, and logisticians) for units that engage in ground close combat in the British Army and Royal Marines at the battalion level and below.

In Canada, which allows women to serve in all military occupations and units, women make up only 2 percent of the combat arms occupations, and no woman has served in the elite Joint Task Force 2 (i.e., the antiterrorist unit). Studies showed that, in the early years of gender-integrated combat units, recruiting and attrition were both problematic. According to a 1997 study, some reasons for this were women's lower physical strength/endurance, negative instructor attitudes toward women, and social and psychological barriers. In recent years, however, women have successfully led ground combat units in combat in Afghanistan.

Israel allows women to serve in non-close-combat roles voluntarily. The majority of women who fill these roles serve in the Caracal combat unit or the Border Patrol. Despite the policy allowing such service, evidence suggests that women in combat units are sometimes removed from these units based on the objections of religious male soldiers in the unit.

Unlike the U.S. military, commercial professions such as fire fighting and SWAT policing cannot—by law—exclude women. The physical demands of these professions, however, make them unattractive or out of reach to many, though not all, women.

Overall, the evidence from our review of other countries and professions shows that at least a small percentage of women were able to meet the physical demands of ground combat service or physically taxing occupations. We also found, however, that gender-integrating units and occupations can be challenging.

Foreign militaries

The United States does not employ women in combat arms occupations or ground combat units below the regimental level, but some other countries do.¹ The experiences of these countries in allowing women to serve in close ground combat roles may provide insights that are relevant to the United States. For that purpose, we reviewed information from four countries—Australia, the United Kingdom, Canada, and Israel—that have analyzed the role of women in ground combat. We chose these four countries not only because they have studied the matter but also because they are somewhat similar to the United States in terms of military employment.² Canada has allowed women to serve in all occupations and units for more than 20 years. Australia is poised to allow women in all trades, including all combat arms trades, by 2013. The remaining two countries—the United Kingdom and Israel—restrict women from serving in at least some ground close combat positions and units.

For each country, beginning with Australia, we summarize military structure and composition, law and policy governing women's roles in the military, the physical standards or assessments used by the military, and any scientific or academic studies of issues related to women's service in such roles. We conclude each discussion with a brief description of the current state of affairs with respect to women in the military.³

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1. Some countries that allow women in all or most combat roles include Australia, Canada, Denmark, Finland, France, Germany, New Zealand, Norway, Poland, Spain, and Sweden [1].
 2. The Marine Corps requested that we review Australia and the United Kingdom.
 3. Because each country has approached women's roles in the military somewhat differently, the specific format and content of the subsections is not exactly the same across countries.

Australia

On September 27, 2011, the Australian government and Department of Defence announced that they had developed a five-year plan to phase women into the combat arms trades, including Special Forces, starting in 2013. This decision is said to have two drivers. First, it appeased those who said that doing so would be a step toward greater equality; second, it had the potential to increase the number of young people interested in military service in a country that has struggled with recruiting [2]. The Australian Defence Force (ADF) is relying on the findings of its decade-long study of Physical Employment Standards (PESs) to implement this change in policy.

ADF composition

The Australian military is significantly smaller than the U.S. military. There are approximately 55,000 active-duty servicemembers and 20,000 active reservists across the entire ADF [3]. The ADF is composed of three branches: the Australian Army, the Royal Australian Navy (RAN), and the Royal Australian Air Force (RAAF). There also are several triservice (i.e., joint) commands and institutions.

The Australian Army includes about 27,500 active-duty personnel, 15,000 active reservists, and 12,000 standby reservists [4]. The active-duty force is expected to increase to 30,000 personnel by 2014 or 2015 [4]. The RAN comprises approximately 13,000 full-time permanent and 1,700 reserve personnel [5]. The RAAF has about 14,000 permanent full-time personnel and 2,600 reservists [6]. The ADF also includes a small number of gap-year personnel in all three branches.⁴

Women in the ADF

Women make up about 13.8 percent of the ADF's active-duty force. By service, their representation is 9.9 percent of the Army, 18.5 percent of the RAN (including on submarines), and 17.1 percent of the RAAF [7].

4. Gap-year personnel commit to only a 12-month enlistment instead of the usual 4-year commitment.

In early 2010, women could serve in 93 percent of all employment categories and 84 percent of billets in the ADF. According to official ADF statistics, however, women were participating in only 16 percent of the categories open to them across the active-duty force; this percentage was the lowest for the Army (14.4 percent).

Women constitute a significantly higher percentage of gap-year personnel (i.e., 37 percent) than they do of the permanent active-duty force [7].

Law and policy

Like most countries, including the United States, Australia historically had excluded women from certain combat roles but has—over time—opened up more military positions to women. In 1990, the Army set up the Combat Related Employment of Women Evaluation Team (CREWET) to study how women were and could be employed in the ADF, and the Chief of the Naval Staff agreed to allow women to serve in some combat-related positions and on all ships (with the exception of submarines) in peacetime [8]. One year later, in 1991, the Chief of the Naval Staff agreed that women could serve on board Collins-class submarines and that other classes of submarines would be integrated in subsequent years.⁵

Around the same time, the Chiefs of Staff Committee began reviewing the employment of women in the ADF with the goal of expanding the number of combat-related positions available to women. Initially, despite a recommendation that the defence exemptions to the Sex Discrimination Act be eliminated, they were retained.⁶ In December 1992, in response to the Review of the Employment of Women in Combat and Combat-Related Positions that had been submitted to the Chiefs of Staff Committee, the government announced that women could serve in all military positions except the following:

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5. Female officers began serving on submarines in the ADF in 1998.
 6. Australians cited reasons similar to those that have been given in the United States for women's combat exclusion, such as physical ability and sociological, religious, and political pressures.

- As Navy Clearance divers
- In Armour, Artillery, Infantry, and as Combat Engineers in the Army
- In Air Force-Ground Defence

These changes resulted in 87 percent of the ADF being open to women.

This policy is codified in Australian Defence Instruction 32-1 (issued in 1994), which requires that men and women compete equally for all employment except those involving “Direct Combat Duties,” defined as those

requiring a person to commit, or participate directly in the commission of an act of violence against an armed adversary; and exposing a person to a high probability of direct physical contact with an armed adversary [9].

The policy specifically allows the ADF to exclude women from the positions listed above. Women can, however, serve in open trades in combat arms units. To do so, they must be in compliance with the Army Individual Readiness Notice (AIRN) and must have passed any specific certification requirements.⁷

In response to a recruitment crisis and other efforts (e.g., a continued emphasis on the elimination of workplace discrimination), the policy excluding women from certain trade specialties (specifically, combat arms) became the subject of debate and discussion several years ago. This effort to open all trades to women was further fueled by an ongoing Department of Defence initiative to develop gender-neutral standards called Physical Employment Standards [2, 10]. The tests are designed to be scientific benchmarks. If you can pass, you are eligible for service in specific trades; otherwise, you're not. The PES project initially was intended to better match recruits to trades and to reduce injuries, not to inform the debate on removing gender restrictions on

7. AIRN is the system that the Australian Army uses to ensure that members are ready to deploy from a medical, dental, fitness, and weapon proficiency perspective.

certain combat roles in the ADF, but it quickly became apparent that these standards were well suited for that purpose [11].

In April 2011, Defence Minister Stephen Smith issued a decision that women would be allowed to serve in frontline combat roles [11]. The decision led the ADF to fast-track the completion of the PESs.

Attitudes

Not everyone in Australia supports the upcoming changes in women's military roles. Opponents of removing the exclusion maintain that women's presence will be a distraction to men in battle and that society is not yet ready to accept large-scale female casualties or female prisoners of war (POWs) [12].

The Australian Defence Association (ADA), an advocacy organization for ADF members, opposes lifting the ban and has argued that women will face disproportionate casualties in combat requiring one-on-one physical confrontation. According to news reports, Neil James, the ADA's executive director, maintains that recent overseas experience has shown that less than 3 percent of female soldiers would be able to pass the current combat fitness test standards [13]. He further maintains that women most often fail on the rope (climb a 16-foot rope twice without touching the ground while carrying a rifle and wearing a helmet) because it requires considerable upper-body strength [13].

If the ADF is going to allow women to serve in ground combat trades, the ADA believes that women should have the option to choose whether to accept the extra risks that might accompany participating in combat roles (e.g., additional risks for women due to their gender include disproportionate casualties, more disabling injuries generally, or sexual assault if captured). However, the ADA believes that the exercise of such choice requires careful monitoring to ensure that it is truly free and reasonable in the circumstances and that it does not result in unintended, inequitable, or unfair outcomes for women in practice [14].

Others opposed to the removal of gender restrictions also argue that the ADF historically has done a poor job of managing media relations

and communications. For example, reports that the upcoming changes had been discussed with soldiers in the spring and that those who “were unable to adapt to huge cultural change have been advised to find another job” were refuted by Defence Media Operations, which maintained that soldiers were briefed as part of an “Army Culture Stand-Down Day [15]. Opponents also point to the ADF's poor performance integrating women into the Combat Support branches in the early 1990s. They argue that it took a decade for those changes to be accepted. They further argue that the current situation is even less forgiving than the environment back then:

- During 1991 through 1994, unemployment was high (between 8 and 10 percent). In 2011, unemployment in Australia was under 5 percent. Therefore, it may be more likely that some will consider leaving the military.
- From 1991 to 1994, many soldiers had not experienced high operational tempo because things had been relatively peaceful since Vietnam, making the military a relatively “safe” employment choice. Currently, many mission-critical soldiers have significant operational experience, which has been accompanied by familial strain, making it more likely that they will consider leaving the military. This may be especially true for soldiers with 8 to 15 years of experience—in general, those age 25 to 35 who may seek employment in other booming sectors, such as energy and infrastructure.

Physical standards

The ADF does not currently have trade-specific tests that must be passed before accession; rather, it uses a series of physical assessments.⁸ The Australian Army has three primary fitness assessments: the Pre-enlistment Physical Fitness Assessment (PFA), the Basic Fitness Assessment (BFA), and the Combat Fitness Assessment (CFA). As in many countries, standards for some of these assessments vary

8. According to [16], there is an intent to amend pre-enlistment fitness testing so that personnel can only enlist into trades for which they are physically capable. This will be informed by an ongoing study.

based on age and gender. The new gender-neutral PESs are expected to replace the CFA in the future [16]. We summarize the Australian Army’s physical standards, including the PESs, in table 1.

Table 1. Australian Army’s physical assessments^a

	PFA	BFA	CFA	PESs ^b
Purpose	Pre-enlistment/ appointment	Semiannual physical assessment	Combat assessment	Enlistment and annual assessment
Description	General fitness test (e.g., shuttle run, push-ups, and sit-ups)	General fitness test (e.g., run, push-ups, and sit-ups)	Combat fitness oriented (e.g., 15-km march and Run Dodge Jump test)	Ability to meet physical demands of specific occupation
Application	Potential recruits	All soldiers	Deploying soldiers	All soldiers
Gender neutral	All except push-ups	No	Technically yes, but age, weight, and occupation (combat versus noncombat) biased	Yes

a. Source: [17-20].

b. The PESs have not yet been implemented.

PFA

The PFA is the fitness standard that must be met before enlistment (soldiers) or appointment (officers) in the Australian Army. The standards for the push-up component of this assessment vary by gender.

The assessment consists of three parts: push-ups, sit-ups, and a shuttle run. The shuttle run is a series of back-and-forth 20-meter sprints with aerobic capacity measured when the recruit can no longer keep up with the increasing speed required for a leg. The only PFA standard on which men and women differ is the number of required push-ups.^{9, 10} Table 2 summarizes the standards.

9. There do not appear to be different PFA standards by age.

10. Special Forces have more stringent PFA requirements.

Table 2. Physical Fitness Assessment standards for enlistment and appointment

Test	Pass standard ^a		
	Men	Women	Special Forces
Shuttle run (number of shuttles)	7.5	7.5	10.1
Push-ups (number)	15	8	30
Sit-ups (number)	45	45	60

a. Source: [17].

BFA

The BFA is a semiannual fitness assessment for soldiers. It assesses the general health and well-being of servicemembers, but it is not reflective of the demands of military service or a specific trade. Furthermore, it is not gender neutral [17].

The BFA consists of push-ups, sit-ups, and a 2.4-km run (or a 5-km walk). The soldier is allotted 2 minutes of rest between components. Standards vary by both age and gender (see table 3).

Table 3. Basic Fitness Assessment standards^a

Age (years)	Number of push-ups		Number of sit-ups		Maximum times			
					2.4-km run (minutes)		5-km walk (minutes)	
	Men	Women	Men	Women	Men	Women	Men	Women
25 and under	40	21	70	70	11:18	13:30		
26–30	35	18	65	65	11:48	14:00		
31–35	30	15	57	57	12:18	14:30		
36–40	25	10	50	50	12:42	15:00		
41–45	20	7	30	30	13:12	15:30	44:00	45:00
46–50	10	3	20	20	13:48	16:00	44:00	47:00
51 and over	6	3	15	15	14:30	16:30	45:00	47:00

a. Source: [18].

CFA

The CFA is a combat assessment that only personnel assigned to Forces Command units are required to take. Standards vary by age and type of unit (combat versus noncombat). In addition, while the

assessment is technically gender neutral, the amount of weight a soldier must carry during the march can vary based on his or her body mass.

As of 2005, Land Headquarters stipulated that the CFA should be conducted once a year. It also should be completed by Army units within 90 days of deployment to a combat zone. The first part of the test involves a Run Dodge Jump (RDJ) course. The second part is a 15-km endurance march. As summarized in table 4, pass standards vary by age for the RDJ and by occupation for the march.

Table 4. Combat Fitness Assessment standards^{a, b}

Standard	RDJ course	15-km march
Age 40 and under	50 seconds	N/A
Age 41 and older	70 seconds	N/A
Noncombatant troops	N/A	2 hours 45 minutes carrying 20 kg
Combatant troops	N/A	2 hours 45 minutes carrying 30 kg

a. Source: [19].

b. For soldiers with a body mass of less than 70 kg (155 pounds), the carried weight for the march is 30 percent of their body mass.

Note that the CFA was developed a number of years ago and is not considered relevant to “contemporary operations” [16].

Specific trade assessments

Some trades also have their own fitness tests, or physically demanding exercises, that must be passed as part of initial employment training [16]. In addition to physical tests, each trade has a range of technical standards that must also be met.

Studies and reviews

As discussed, Australia has been studying the physical capabilities of male and female soldiers for several years. In 2005, the Department of Defence conducted a study of men’s and women’s abilities to complete a modified CFA before and after specialized training. In

addition, the ADF has been studying and developing gender-neutral physical standards (known as the PESs) for over a decade.

Gender and physical training effects on soldier physical competencies and physiological strain

The ADF experimented with the CFA in 2005 in a study examining the effects of gender and physical training on soldier physical fitness. Researchers used a modified CFA to assess infantry-related occupational capabilities. Both male and female participants were tested initially and after receiving specialized training. Before the specialized physical training was implemented, men had greater muscular strength and endurance, and greater aerobic and anaerobic capacities, than women. One hundred percent of the men and 57 percent of the women could complete the RDJ in a rested state. The majority of men (91 percent) completed the 15-km march in 165 minutes, and 36 percent of women did so. All infantry soldiers and the majority of combat-corps soldiers completed the RDJ after the march in less than the required 70 seconds, but the fastest woman required 73 seconds to do so.¹¹ The specialized physical training improved strength and aerobic capacity for women and strength only for the men. The study concluded that a small number of female soldiers would likely be able to complete this assessment at the same performance levels as current infantry soldiers and that, at most, 7 percent of the assessed women could be expected to pass the RDJ standard after the 12 weeks of specialized physical training [19].

PES: A new gender-neutral approach

The ADF decided that all servicemembers should have the physical ability—regardless of rank, age, or gender—to perform certain critical tasks. The main driver of PES development was to inform decisions on employment category selection, training, injury prevention, and occupational health and safety, not to inform the debate as to whether women should be allowed in combat units. Only later did it become apparent that the PESs also could facilitate women’s integration into all trades.

11. One woman in the control group, not the testing group, was able to complete the after-march RDJ in less than the required 70 seconds.

PES development. In the early 2000s, the ADF began formally studying the development of gender-neutral standards. The initial focus was on developing a set of standards for Navy clearance divers in the hopes of preventing injuries. In 2002, the focus shifted to developing standards for the Australian Army infantry and RAAF airfield defence guards; the main driver was potentially eliminating gender combat exclusions. In 2003, the Department of Defence awarded a consortium of universities (headed by the University of Ballarat) a 27-month project to examine the physical requirements of the ADF's combat arms trades and to develop competency-based PESs. The project analyzed the ergonomic, human performance, and physical capacity requirements of combat arms trades to assist in developing new PESs for the ADF [21]. The ADF never implemented the standards developed by the University of Ballarat [16, 20].

In 2006, a new effort began. The Australian Army asked the Defence Science and Technology Organisation (DSTO) to develop scientifically valid and defensible PESs for the Australian Army All-Corps Soldier (ACS) as well as for each of the employment categories.¹² Table 5 shows the timing of the various trade PESs.

In 2006, the focus was on the ground-based air defence trades (GBAD) with injury prevention as the driver; in 2007, it was on combat service support with retention as a driver. From 2008 through 2012, the focus shifted to developing an All-Corps Soldier PES (ACS PES), a Combat Arms PES (CA PES), and PESs for the remaining employment categories.

In August 2009, the Department of Defence announced the “establishment of a Centre of Expertise to accurately evaluate the physical requirements of service in military occupations” [22]. The Center first focused on the Army. To do so, it funded the University of Wollongong to establish a National Centre of Excellence in Physical Employment Standards. The Centre was to focus specifically on the development of physical standards for the Army’s combat arms trades

12. Employment categories can be composed of several specific trades. Trades are similar to military occupational specialties (MOSs) in the U.S. Marine Corps.

[23]. As part of the development of PESs, a series of reports were published [24 through 27]. In [27], Dr. Billings of the DSTO described the methodology used to develop PESs for the Australian Army All-Corps Soldier (i.e., the ACS PES).

Table 5. Trade-specific PES schedule^a

Employment category/trade	Start ^b	Completion
RAA: ground-based air defence	June 2006	August 2007
RACT: driver, operator specialist	September 2007	June 2009
RAAOC: operator supply, operator admin		
RAAMC: medical operator / technician		
RAADC: dental assistant		
AACC: cook, steward		
RAAC: all trades	July 2009	December 2010
RAE: all trades		
RACT: air dispatcher		
RAAOC: petrol operator, parachute rigger		
RAEME - all ground trades		
RAA: offensive support	November 2010	December 2011
RAINF: all trades (less SF)		
NAVY: clearance diver		
AIR FORCE: airfield defence guards		
AAAVN: all trades (+ RAEME aeroskill trades)		
RAA: operator radar, operator Unmanned Aerial System	November 2011	December 2012
RASIGS: all trades		
AUSTINT: analyst intelligence operations		
RACMP: military police, investigator		
RAINF: SF trades		
RACT: cargo specialist, marine specialist		
RAAOC: ammunition technician		
RAAMC: preventative medicine, Physical Training Instructor (PTI)		

a. Source: [16].

b. The start and end dates refer to the month and year development of the specific PESs began and ended.

Methodology. The ACS PESs are quantifiable physical demands required by all soldiers to do their jobs effectively. They were determined through rigorous scientific study and are based entirely on performance-essential trade tasks.

According to [27], researchers used a group of 125 soldiers, broadly representative of all corps and ranks, which included 95 men and 30 women ranging in age from 18 to 47 (average of 25.8 years old) to develop the ACS PES [28].

The study followed four steps:

1. Identified a series of tasks that were physically demanding, critical, and common to all soldiers regardless of trade classification, rank, age, or gender
2. Identified the key physical capacities required to perform the physically demanding tasks
 - a. Observed and quantified tasks under simulated operational conditions, which involved the collection of a number of measures¹³
 - Heart rate and metabolic cost (i.e., amount of energy consumed) were measured to quantify the physiological response
 - Global positioning system (GPS) data were collected to quantify task characteristics (location, route, distance, speed, altitude, barometric pressure, air temperature, time-to-task completion, and work-rest ratios)
 - b. Assessed and documented sensory perception (rating of perceived exhaustion and discomfort) and cognitive demands
3. Designated a benchmark or criterion task (i.e., most physically demanding) for each physical capacity
4. Developed assessments to test each physical capacity

Researchers identified the key physical capacities required to perform the tasks using observations and the measurements described above. They further designated benchmarks by determining the most demanding measure for each capacity. They ultimately selected the four most important capacities— aerobic power, anaerobic power, muscular endurance, and muscular strength—and designed a test (or assessment) for each. These are [28]:

1. Aerobic power: Force March (FM) Assessment
2. Anaerobic power: Break Contact Drill (BCD) Assessment

13. Information was cross-referenced to time-in-motion analyses to add context to the quantitative and qualitative data gathered.

3. Muscular endurance: Lift and Carry (LC) Assessment

4. Muscular strength: Box Lift and Place (BLP) Assessment

These tests were chosen because they use the movement patterns, muscle groups, and energy systems needed to perform actual ACS tasks. Researchers concluded that the implementation of ACS PES would ensure that all Australian Army personnel have the physical capacity commensurate with the performance of critical tasks.

It is our understanding that DSTO has used the methodology described here to develop trade-specific PESs on which a person's suitability for a specific trade will be based. For trade-specific standards, researchers used Corps category managers and subject matter experts to identify job-specific tasks and to identify criterion/benchmark trade tasks for each occupational specialty. Researchers then formed task-related "activity clusters" that spanned a range of occupational specialties. Finally, they developed physical assessments and standards that replicated the capacities required for each cluster.

Although PESs are being developed for every trade in the Australian Army, it is widely accepted that the physical demands of some trades are lower than the demands of others. Therefore, the Australian Army has decided to institute two baseline tests to serve as the minimum standards for any trade. In addition to the ACS PES discussed above, there also will be a CA PES. All trade PESs will have one of these two PESs as their minimum baseline. If a certain trade has higher physical demands than the baseline, the trade-specific PES will apply. If, however, the physical requirements associated with a specific trade are lower than the appropriate baseline, the baseline standard (not the trade-specific standard) will be required.¹⁴

The standards that must be met are higher for the CA PES than for the ACS PES. The specific standards for these two baseline tests are shown in table 6. Table 7 shows the recently completed PESs for the four combat arms trades. Unless otherwise noted, the assessments for

14. It is unclear whether combat service support (CSS) soldiers posted to or deployed with combat arms units will be required to meet the CA PES or the ACS PES.

anaerobic power, muscular endurance, and muscular strength are all done wearing 22-kg fighting order.

Table 6. All-Corps Soldier and Combat Arms PES^a

Assessment	Test	All-Corps Soldier Standard	Combat Arms Standard
Aerobic power	Forced March	5-km march in 55 min in fighting order (22 kg)	10-km march in 110 min in marching order (38 kg)
Anaerobic power	Fire & Movement	To be determined	16 legs of 16 meters plus an 18-m leopard crawl
Muscular endurance	Jerry Can Carry ^b	Conduct a 125-m jerry can carry (22 kg)	Conduct a 275-m jerry can carry (22 kg)
Muscular strength	Box Lift and Place	Lift 25 kg to 150 cm (i.e., the height of a military vehicle tray)	Lift 30 kg to 150 cm (i.e., the height of a military vehicle tray)

a. Source: [16, 20, 29].

b. This test is used to assess the stretcher carry requirement.

Table 7. PESs for combat arms employment categories^a

Assessment	Artillery	Engineer	Armour	Infantry
Aerobic power	CA PES	CA PES	CA PES	15-km march with 40-kg load
Anaerobic power	CA PES	CA PES	CA PES	Run 1 km in 8 min followed by CA PES test for Fire & Move
Muscular endurance	Repetitive lift and carry (10 m) (43-kg round x 26 repetitions)	CA PES	CA PES	CA PES plus a 10-m body drag ^b
Muscular strength	N/A	45 kg	45 kg	35 kg

a. Source: [16, 29].

b. The weight to be used for the 10-m drag has not yet been published.

Although notionally complete, the ACS PES, CA PES, and trade specific PESs may undergo further refinement going forward.

Initial results. According to a report in *Army*, initial trials show that, given appropriate lead-up training, the average male or female soldier is capable of passing the ACS PES [30]. Based on initial results, the ADF recommends that soldiers participate in a 6-week lead-up program in order to pass the ACS PES [16]. In addition, because dif-

ferent trades maintain different fitness levels, it will be recommended that units conduct a two- to three-month PES lead-up program [16]. To date, women have not been tested using the CA PES or for the categories/trades that have been gender restricted, such as infantry and armour. The ADF is conducting testing and trials for these throughout 2012.

Current situation

Much is changing within the ADF. New physical standards are being developed and women will soon be afforded the opportunity to serve in trades and units that were formerly closed to them.

PES implementation

The plan is for full PES testing to begin in January 2013. There will be a trial and testing period, and the Army is developing transition and physical conditioning programs to ensure that soldiers can meet the new standards. Once the PESs are fully implemented, all soldiers will be required to meet their respective PESs. Soldiers transferring trades will be required to meet the PESs of their new trades before they will be considered for transfer and retraining. In addition, the PESs will be used at the Army Recruit Training Centre (ARTC) and the Royal Military College (RMC). By the end of Initial Entry Training or officer basic training, the PESs will have to be met. Employment category (or trade-specific) PESs will have to be met at the end of initial employment training.

There may also be an “Operational PES” that will have to be met before deployment. Operational characteristics (e.g., environment, threat, expected missions) will drive which PESs soldiers will have to meet. For example, in some instances, combat support and combat service support soldiers assigned to an infantry unit may be required to meet the CA PES or the infantry PES.

The new PESs will eventually replace the CFA as the annual fitness assessment for deployable units [16]. Only those units that currently are required to conduct the CFA (i.e., those assigned to Forces Command) will be expected to complete PES testing [29].

Several implementation considerations are outstanding. One is to determine how the new PESs will affect reservists. The PES policy for reservists is expected to reflect their limited training opportunities. They may not have to maintain their trade PESs all of the time. Rather, with appropriate training and conditioning, reservists will achieve their trade PESs between deployment notification and movement. Other outstanding issues include the following [29]:

- Officer standards
- Resource/equipment availability and standardization for testing
- Action upon failure (i.e., what happens if a soldier does not meet his or her trade PESs?)
- Conditioning/training programs

Women in ground combat trades

The Australian government is not waiting for all of the new PESs to be completed before moving ahead with plans to allow women to serve in all combat arms units. In 2013, Australia will join Canada, New Zealand, and a few other countries in permitting women in direct combat, including ground combat positions, within the next few years. In late 2011, the Cabinet agreed on a plan to allow women to be phased into combat arms over a five-year period [31]; the current exclusions are expected to be eliminated by 2013 [16, 32].

For the remainder of 2012, Defence will continue to plan for a five-year phase-in by completing research and development, conducting any remaining PES trials, amending current policies that limit women's service in such trades, and publishing a Chief of Army Directive [29].¹⁵ Starting in 2013, restrictions for in-service personnel will

15. Although defence policies need to be amended (e.g., Defence Instruction 32-1 must be eliminated), Australia's Sex Discrimination Act does not require the ADF to discriminate against women in relation to their employment in direct combat duties; it permits it. So, the ADF can employ women in combat trades if it chooses. Therefore, the Act does not need to be repealed for women to serve in combat. It remains to be seen whether the language permitting the ADF to discriminate in such a way is ultimately removed [16].

be eliminated, with the first postings in January 2014 [16, 32].¹⁶ This will continue through 2015, with the Army gradually allowing more female soldiers already in service to transfer to ground combat trades [16].¹⁷ Female personnel wishing to transfer to the ground combat trades will be required to meet certain requirements [32]:

- Obtain commander recommendation.
- Meet the PES for the new trade.
- Receive Career Management Agency approval.
- Successfully complete Initial Employment Training (enlisted) or Regimental Officer Basic Course (officers).

By 2016, the ADF expects to recruit women directly into combat arms trades [16].

It remains to be determined whether women will be assigned to units in “clusters.” According to [16], this will likely depend on the level, rank, and number of women within the unit and how the commander wishes to array his or her forces. Employment in all combat arms trades will remain voluntary for both men and women [16].

Reactions to the news that women will be allowed in combat arms trades have been mixed. The annual Defence Attitude Survey has shown both positive and negative responses to questions on this initiative [16].

Women on submarines

In June 2011, the Minister for Defence Science and Personnel, Warren Snowdon, announced that men and women would be able to share berthing areas [33]. This was done as part of an effort to ensure that female submariners had access to the same training and career-progression opportunities as their male crewmates.

16. In-service transfers will start with Royal Military College-Duntroon graduates and soldiers/officers with at least 12 months of Army service [32].

17. This phased process is designed to ensure that the ADF assigns only suitable candidates and allows time to test and adjust procedures [32].

United Kingdom

The British military is a far smaller force than the U.S. military; its active-duty force is approximately one-eighth the size of the U.S. active-duty force. Like the United States, however, it does have an infantry component to its naval service: the Royal Marines. The United Kingdom also is similar to the United States in that it restricts women from certain combat roles in its armed forces, which has been a subject of recent debate and study. The U.K. government has undertaken at least two studies assessing the physiological differences between men and women and two studies specifically reviewing its combat restrictions. All have resulted in a reaffirmation of these restrictions. In contrast to the United States, however, the United Kingdom allows women to serve in open specialties (e.g., medical personnel) in support of ground combat trades (e.g., infantry battalions) as attached arms at the battalion and lower unit levels [34, 35].

Composition of the British Armed Forces

The British Armed Forces comprise three branches: the British Army, the Royal Air Force (RAF), and the Royal Navy (which also includes the Royal Marines). Together, these three branches make up a relatively small force of approximately 174,000 active-duty personnel and 36,500 volunteer (or active) reservists [36].¹⁸

The Royal Navy is part of the naval service, which also includes the Royal Marines, Royal Naval Reserve, and Royal Marines Reserve. The Royal Navy is composed of 28,300 active-duty personnel and 1,900 Royal Naval Reservists who actively train [37]. In addition to these personnel, approximately 7,200 active-duty personnel and 600 reservists are part of the Royal Marines and the Royal Marines Reserve [37]. By 2015, the Royal Navy and Royal Marines are expected to shrink to approximately 23,000 and 6,800 active-duty personnel, respectively [37].

18. These numbers do not include reservists who are not assigned to units and who do not train regularly (sometimes referred to as regular reserves).

The British Army is composed of approximately 99,000 active-duty personnel, and the Territorial Army (reserve) has about 32,000 personnel [38]. The Territorial Army is expected to grow to about 36,000 by 2015. The RAF is composed of approximately 38,800 active personnel, plus about 2,100 volunteer (active) reservists [39].

Women in the British Armed Forces

Women make up about 9 percent of the active-duty force. By service, their representation is as follows [40]:

- 8.2 percent of the Army
- 9.3 percent of the Navy
- 12.3 percent of the Air Force

As of 2006, women could serve in 71 percent of the positions in the Royal Army and Royal Navy, and 96 percent of the positions in the RAF [40].

Law and policy

The Sex Discrimination Act of 1975 allows the armed forces to exclude women from posts where military judgment is that the employment of women would undermine and degrade combat effectiveness.¹⁹ Women can serve in all specialties, except those where the primary duty is "to close with and kill the enemy." Women are, therefore, excluded from the Royal Marines General Service (as Royal Marine Commandos), the Household Cavalry and Royal Armoured Corps, the Infantry, and the Royal Air Force Regiment.²⁰ These exclusions do not, however, prevent them from serving as part of such units in administrative and support roles. For example, women can serve as medics or clerks at any level (even with companies and platoons) in units that engage in ground close combat. Female medics may go on patrol with their platoon or company in combat. However, while they

19. This has been codified even more recently in the Equality Act of 2010, which includes a similar provision.

20. Women can serve in the Royal Marines Band Service.

serve on a daily basis with the infantry regiment or battalion, they are still technically part of the Royal Army Medical Corps, not the ground combat units. In the Royal Marines, women who pass the All Arms Commando Course can serve in support roles (e.g., medical personnel, logisticians, and chefs) in 3 Commando Brigade as part of the Commando Logistics Regiment.²¹ Personnel, including female personnel, in these supporting units are “attached” to commando units even when deployed. Finally, although women had been excluded from serving aboard submarines, this restriction is being lifted.

The U.K.’s combat exclusion policy has been challenged. It was upheld by the European Court of Justice in October 1999, which ruled in *Sirdar versus the Army Board and the Secretary of State* that the European Council Equal Treatment Directive (EC ETD 76/207 9 Feb 1976) did not preclude the exclusion of women from certain posts in the armed forces, where such exclusions were proportionate, necessary, and appropriate to ensure operational effectiveness and public security. It did, however, maintain that there was a duty to periodically reassess the activities concerned to decide whether, in light of social developments, the exclusions should remain in effect. Such periodic assessments are required at least every eight years. This policy has been the subject of two separate reviews in the past 20 years. Both reviews recommended that the policy remain in effect.

The United Kingdom has expanded the number of positions in which women can serve in its armed forces over the last 20 years. In 1990, the United Kingdom removed exclusions preventing women from going to sea. Since 1991, women have been able to serve in fast jet aircrews as well as in multi-engined aircraft and helicopters. In 1997, the Secretary of State for Defence announced that additional employment opportunities for women in the armed forces would be opened, which led to the Army’s opening of all posts in the Royal Artillery (RA), the Royal Engineers (RE), and the Royal Electrical and Mechanical Engineers (REME). Together these changes allowed women to serve in over 70 percent of posts in the Naval Service and Army, and 96 percent of posts in the Royal Air Force [41].

21. We discuss women’s service in the Royal Marines later in this report.

Although women continued to be excluded from ground combat roles, submarines, and some diving positions, the United Kingdom adopted a policy to periodically review the remaining restrictions. To facilitate this review, the Ministry of Defence carried out a detailed study of the performance and suitability of women in close-combat roles. The resulting study, *Women in the Armed Forces*, was released in 2002 [41]. On May 22, 2002, the Secretary of State for Defence announced that the case for lifting the restrictions on women serving in close combat had not been made and that the restrictions would remain in effect [41]. The restrictions were reassessed in 2009 and 2010; they again were reaffirmed.

Physical standards

There are separate physical fitness standards for the Royal Marines and the British Army (see table 8).

Royal Marine Commandos

Although women can and do operate in support of Royal Marines, only men are eligible to become Royal Marine Commandos [42]. Next, we discuss the process men undergo to become Royal Marines.

General Duties Marines (Enlisted). To be accepted to the Potential Royal Marine Course (PRMC) to become a Royal Marine, a recruit must pass the Pre-Joining Fitness Test (PJFT). This requires an applicant to complete two 2.4-km (1.5-mi) runs [42 through 45]. The first run must be completed within 12 minutes and 30 seconds. The second run must be completed as fast as possible, but within 10 minutes and 30 seconds [43, 44, 45]. There is only a 30-second rest between the runs, and both runs are done on a course with a 2-degree incline [43, 44]. The PJFT also includes sit-ups, press-ups (i.e., push-ups), pull-ups, and a bleep test.²² There are no set minimums for the press-ups, pull-ups, and bleep test; rather, a recruit must simply do his best [44].

22. A bleep test is a shuttle run test.

Table 8. Royal Marines and British Army physical standards^a

	Royal Marines			British Army		
	Potential Royal Marine Course (PRMC)	Commando Course/ Test	All Arms Commando Course	Recruit Test	Personal Fitness Assessment (PFA)	Annual Fitness Test (AFT)
Purpose	To determine who will attend Commando Recruit Training Course	To determine who will become a Royal Marine	Non-Royal Marines	Pre-enlistment/ appointment	To measure in-service fitness requirements	To test general physical fitness
Description	Test physical strength and endurance	Test physical strength and endurance, as well as marksmanship	Same as regular Commando course for General Duties Candidates	General fitness assessment	General fitness assessment	General fitness and endurance
Application	Potential General Duties Marines (enlisted)	Potential General Duties Marines (enlisted) and officer recruits	Non-Royal Marines (primarily those who want to serve in units that support Royal Marines)	Potential soldier recruits and officer candidates	All soldiers and officers	All soldiers and officers
Gender neutral	Yes, but only men allowed	Yes, but only men allowed	Yes	Soldier assessments are gender neutral, but vary by unit and occupation; officer standards are gender biased	Yes, but standards vary by age	Technically yes, but load carried is heavier for combat arms (men only)

a. Source: [43 through 53].

After passing the PJFT, an applicant can attend the PRMC, a three-day course designed to test the physical and intellectual ability of those wishing to attend formal recruit training. The PRMC includes physical tests as well as an interview and lectures. While there are set physical requirements, selection is based on overall score at the end of the three-day PRMC; some physical tests must be completed, while others simply contribute to a candidate's overall score. Because the PRMC assesses a recruit's suitability for such training, it decreases the training failure rate during commando training [36].

Specific assessments include [45, 46]:

- Two 2.4-km (1.5-mi) runs (the first run is as a squad and must be completed within 12 minutes and 30 seconds; the second run is a "best effort" run but must be completed in under 10 minutes and 30 seconds)
- VO₂ Max bleep (shuttle run) test, with a targeted score of 13
- Press-ups, with a maximum of 30 within 2 minutes
- Sit-ups, with a maximum of 80 within 2 minutes
- Pull-ups from a full hang position, with a minimum of three and a maximum of eight
- Swimming assessment, which requires a jump from the high board as a "must" and a 100-meter (maximum) breaststroke swim test and climb from pool without any extra steps²³
- Assault Course, including a Commando slide, which is a criterion test (meaning that it is required)
- Endurance course and a 3.5-mi run
- A night in the field

About 50 percent of all recruits taking the PRMC pass and can move forward to attend the 32-week Commando Recruit Training Course.

23. If a recruit completes at least 25 meters and can climb from the pool, he is classified as a weak swimmer but can continue with the PRMC. The designation will affect his overall selection score, however.

The first weeks of the training are spent learning skills to be used later in the course, such as developing the physical strength, endurance, and flexibility needed to carry the weight that will be required if joining an operational unit. This initial period also includes a battle swim test and a “regain” (i.e., climb back onto a rope suspended over a water tank) test, both while wearing the 32 pounds of Personal Load Carrying Equipment (PLCE).

The culmination of recruit training and the Commando course is the Commando test. It is composed of the following four tests, which must be completed within seven days [45, 47]:

- A 14.5-km (9-mi) speed march, wearing full PLCE and weapon, which must be completed within 1.5 hours
- An Endurance Course, composed of a 4-mi march, a 2-mi obstacle course (that includes tunnels, pipes, wading pools, and an underwater culvert), and a 4-mi run back to the training center. The course ends with a marksmanship test in which a recruit must hit 6 out of 10 shots at a 25-meter target simulating 200 meters. This all must be completed within 73 minutes.
- A Tarzan Assault Course that combines an assault course with an aerial confidence test. It starts with a death slide and ends with a rope climb up a 30-foot vertical wall. This must be completed within 13 minutes.
- A 48-km (30-mi) cross-country endurance route wearing full PLCE, weapon, and additional safety equipment (approximately 35 pounds). It must be completed within 8 hours.

A recruit can fail up to one of these tests and is offered one opportunity to pass it on a second attempt. The overall pass rate averages about 55 percent [36]. On completion of the Commando course, a recruit is entitled to wear the green beret and is immediately assigned to a commando unit. After about one to four years, most Marines select a specialty and specialize within the Royal Marines.

Officers. The process to become a Royal Marines Officer is not exactly the same as it is to become a General Duties Marine commando (i.e., enlisted Marine). After passing the PJFT, potential officers attend the

Potential Officers Course (POC), a three-day course of gym tests, an essay, an interview, an assault course, lectures, an endurance course, practical leadership exercises, a discussion exercise, and a swimming test. They must also pass an Admiralty Interview Board (AIB), a three-day course during which a potential officer is reviewed to determine if he has the personal qualities needed to be an effective Marine officer. Those who pass both the PJFT and AIB are eligible to attend the 15-month “Young Officer” training course that begins every September. Just being eligible, however, is no guarantee of a slot in the coming class; only about 55 are selected for each course [36]. Those with the highest scores are selected first until a course is filled.

The Young Officer training course is split into two phases. During the first 32 weeks, one learns advanced tactical skills as well as how to command, motivate, and inspire troops. At about the seven- or eight-month mark, the officers undertake a four-week Commando course and Commando test. Pass standards for officers are more stringent than those for potential General Duties Marines. Potential officers must complete the test within three days (vice seven days for enlisted Marines) [36]. In addition, officer candidates must complete the Endurance course in 71 minutes (vice 73 minutes), the Tarzan course in 12 minutes (vice 13 minutes), and the cross-country march in 7 hours (vice 8 hours).

During the second phase of the Young Officer training course, potential officers put all they have learned into practice. Upon graduation, an officer is assigned to a commando unit as a troop commander, where he serves for one year in a probationary status.

Others. Non-Royal-Marine volunteers may undertake commando training in the form of the All Arms Commando Course (AACC) [48]. It is a gender-neutral course, and two women have passed it. The first, Capt. Tattersall, never served in the Brigade, but the second, Lt. Lara Herbett, served as a doctor in the Logistics Regiment [49].

British Army

There are separate physical fitness tests for officer selection and soldier recruitment in the British Army. Although there are separate physical standards for male and female officer recruits, soldier

recruits generally have the same physical fitness standards regardless of gender, but standards vary by unit and job. For officers, fitness is tested during both stages of the Army Officer Selection Board process; for soldiers, fitness is tested during the two-day selection process at an Army Development and Selection Centre. Tables 9 and 10, respectively, summarize officer candidate and recruit physical standards.

Table 9. British Army officer candidate physical fitness standards^a

Test	Men	Women
Bleep-test ^b	Level of 10.2	Level of 8.1
Sit-ups	50 in 2 minutes	50 in 2 minutes
Press-ups ^c	44 in 2 minutes	21 in 2 minutes

a. Source: [50].

b. Score is based on level and number of shuttle runs completed.

c. Press-ups are equivalent to push-ups.

Table 10. British Army soldier recruit physical fitness standards^a

Test	Description	Standard
Strategic Lift	Lift a weighted bag to a height of 1.45 meters. The weight of the bag will depend on which unit you want to join.	Performance is considered alongside all the other tests to give an overall score. If a recruit is weak in one area he/she can make up for it on another test.
Jerry Can Test	Carry two 20-kg water containers over a set course of between 60 and 150 meters, depending on job specifications ^b	Complete the course in 2 minutes or less.
2.4-km (1.5-mi) run	Run a timed run over a fixed distance on level ground and on a good running surface. Target times depend on gender, age, and the job.	Paras require 9:40; Infantry 12.45; standard entry Royal Artillery, Royal Armoured Corps, Royal Engineers, Household Cavalry, and RLC Logistic Combat Engineers (Pioneers) require 13:15; all other standard entry, 14:00; all Junior Entry less Paras require 14:30; Junior Para, 10:00.

a. Source: [50].

b. Reference [36] cites the distances between 30 and 120 meters.

The British Army has in-service fitness requirements that maintain these standards. For those under 30 years of age, the Personal Fitness Assessment (PFA) requires [51, 52]:

- A 2.4-km run in 10 minutes and 30 seconds or less for men and 13 minutes or less for women
- A minimum of 44 press-ups (men) or 21 press-ups (women) in 2 minutes
- A minimum of 50 sit-ups in 2 minutes, regardless of gender

These standards decrease with age.

In addition, all personnel must complete an Annual Fitness Test (AFT), which includes an 8-mile course (4 of which are off road) in not less than 1 hour and 55 minutes but not more than 2 hours. The weight carried for the AFT varies based on one's Army role and unit, not gender [52]:

- Infantry carry 25 kg.
- Cavalry/Armour, Artillery, and Engineers carry 20 kg.
- All others carry 15 kg.

There are also operational tests that are based on one's role in theater. The British Army now uses the term *Dismounted Close Combat* (DCC) to describe those troops operating in such a manner, including infantry as well as cavalry troops; the term *Basic Close Combat* (BCC) is used to describe troops who deploy with DCC but whose primary role is not to close with and defeat the enemy (e.g., medics) [53]. Both DCC and BCC personnel are required to complete 3 miles carrying 25 kg in less than 39 minutes [53]. DCC personnel are also required to complete the following [53]:

- 5 miles carrying 30 kg within an hour and 21 minutes
- 10 miles carrying 35 kg in 5 hours (BCC troops also must do this, but carrying only 25 kg)
- Two-day test:

- Day 1: 12.4 miles carrying 30 kg within 3 hours and 30 minutes
- Day 2: 12.4 miles carrying 20 kg within 3 hours

The minimum standard for deploying personnel, regardless of their specific role or mission, is a 1.5-mile squad march/run carrying 15 kg within 18 minutes, immediately followed by a 1.5-mile individual march/run carrying the same weight within 15 minutes [53]. Any person who may occasionally leave a main base location must be able to complete an 800-meter march/run in squad carrying 20 kg within 7 minutes and 30 seconds immediately followed by a 1.5-mile individual march/run within 15 minutes [53].

Studies and reviews

Over the course of the last 15 years, the United Kingdom has conducted several studies to inform its decision on women's roles in the armed forces. These include the Physical Selection Standards for Recruits (PSS(R)) in 1998, the Combat Effectiveness Gender study in 2001–2002, the Women in the Armed Forces review in 2001–2002, and the Review of the Exclusion of Women from Ground Close-Combat Roles in 2009–2010. None of them have resulted in the removal of restrictions on women's service in ground close combat or similar roles.

Physical Selection Standards for Recruits

The United Kingdom implemented the PSS(R) in April 1998. It introduced a “gender-free” (i.e., gender-neutral) job-related physical selection system for recruits joining the Army. It used a battery of nine physiological tests with representative tasks to predict performance and was conducted at the end of recruit training. The tasks were derived from a scientific study of 64 physically demanding role-related tasks extracted from 132 role-related tasks identified by Army arms directors [41].

The same physical tests were applied to both men and women, and women were expected to reach the same fitness levels as men. This policy quickly came under fire when it increased the number of recruit injuries. One study showed that female recruits were twice as

likely to suffer injuries under the gender-neutral policy than when they were not expected to complete the same training program as men [54]. A researcher looked at medical discharges among recruits trained under the old policy (1997–1998) and the new policy (1998–1999). He found that the proportion of medical discharges from overuse injuries (e.g., stress fractures, tendinitis, and back pain) remained low at 1.5 percent for men, but for women it increased from 4.6 percent to 11.1 percent under the new training policy. Researchers cited various possible reasons for the injury rate increase, including differences in women's bone size and muscle mass (meaning training causes 33 to 39 percent more stress on the female than the male skeleton) and women's tendency to march at men's longer stride in mixed gender units, putting their bones and muscles under even more stress. The research also suggested that women's muscles can “mimic” men's muscles, but over a longer training period—6 months rather than the standard 12 weeks [54].

Rather than abandon the use of gender-neutral PSS(R), the Army looked to adopt strategies to address the increase in injury rates and medical discharges, especially among women. In April 2006, the Army Training Regiment (Pirbright) (ATR(P)) introduced the process known as “gender streaming,” which has men and women following largely the same regimen, but in single-sex platoons. The idea behind the concept was that streaming by sex would allow female recruits to train at an intensity that would reduce the incidence of overuse injuries and increase retention throughout training while still achieving the common physical output standards after 14 weeks. In the year following the implementation of gender streaming, there was a 47-percent decrease in discharges from overuse injuries in female recruits [55].

Combat Effectiveness Gender study

In 2000, Defence Secretary Geoff Hoon commissioned an inquiry that resulted in the United Kingdom beginning a series of tests over nine months that teamed up women with men to establish how women fared in military occupations that were directly engaged in fighting. These tests were hailed as a major step toward British women joining the frontlines of the British Army.

A panel of subject matter experts conducted the study. They issued a report, *A Study of Combat Effectiveness and Gender*, to British ministers in 2001.²⁴ The study's tests were designed to examine the feasibility of mixed-gender tank crews, all-women crews, mixed infantry units, and all-women infantry units. They also were designed to examine how men would react to the presence of women on the battlefield and how each gender coped with the physical demands of combat.

According to news articles, some reports maintain that the exercises found that women were as capable as men for service in combat units, but the results were mired in controversy [56]. Senior military officers, including Brig Seymour Monro (the Army's director of the infantry), stated that the Army field tests were so diluted that they "amounted to little more than aggressive camping." Brig Monro also said that tasks that women were not physically capable of doing were simply dropped from the trials [56]. According to the final Ministry of Defence report, the study showed that fewer than 2 percent of female soldiers were as fit as the average male soldier [57]. Specifically, news reports stated that the trials stalled early on when women were not able to complete a number of tasks under battlefield conditions [56]:

- When asked to carry 90 pounds of artillery shells over measured distances, women failed 70 percent of the time (compared with a male failure rate of 20 percent).
- When asked to march 12.5 miles carrying 60 pounds of equipment followed by target practice in simulated wartime conditions, women failed 48 percent of the time (compared with a male failure rate of 17 percent).
- Women were generally incapable of digging themselves into hard ground under fire.
- Women were generally slower in simulated combat exercises involving "fire and move" drills.
- Women suffered much higher injury rates in close-quarter battle tests, such as hand-to-hand combat.

24. We were unable to obtain a copy of this report.

In the end, the policy did not change; women were not allowed to enter military occupations directly engaged in fighting.

Women in the Armed Forces review

In the early 2000s, the Women in the Armed Forces review examined differences in the physical abilities of men and women that were deemed to be relevant for military performance. The review determined that there were some physiological and psychological differences between the genders, but that combat effectiveness and cohesion were the primary reasons to restrict women from ground close combat [41].

The study was conducted in two parts. In the first part, researchers conducted two formal literature reviews. One review focused on physiological and psychological differences between the genders and their effect on performance; the other focused on the impact of gender on group task performance. Both literature reviews examined the experiences of other nations and the United Kingdom's recent experience in the employment of women (specifically the Army's experience in opening an additional 23 percent of posts to women). The second part of the study focused on research to gain a better understanding of the effect of employing women in the most demanding combat roles. It included a survey as well as a field experiment.

The literature reviews showed significant differences between men's and women's physical capabilities. Researchers concluded that the sexes had significant differences in their capacities to develop muscle strength and aerobic fitness, to the extent that only 1 percent of women could achieve the performance of the average man [41]. The review also showed that women would have to work 50 to 80 percent harder to achieve the same results, which put them at greater risk of injury. It further found that women experienced higher injury rates as the carry load weight increased. Overall, the study concluded that about 0.1 percent of all women and only 1 percent of trained women could reach the standards required for ground combat roles [41]. It further concluded that women had a lower capacity for aggression, which required that they experience greater provocation, and that they were more likely to fear the consequences of aggressive behavior.

Finally, the team concluded that there was no evidence to suggest that mixed-gender teams performed worse than single-sex teams in non-combat settings. The researchers stopped short of concluding that the same would hold in combat.

The study fielded a survey, using focus groups and interviews to ascertain the key issues and range of attitudes about women's military roles. There were several focus groups of 10 to 12 participants and interviews with ten commanders. This information was used to design a questionnaire that aimed to quantify attitudes that might affect combat effectiveness [41]. The questionnaire was sent to 10,500 people (servicemembers and spouses). Response rates exceeded 50 percent for all groups except spouses. The general findings follow [41]:

- Men were less in favor of women serving in all areas of the Army than were women.
 - The greatest discrepancies were for trained servicemembers in the Royal Engineers and Royal Artillery.
- More than 50 percent of women supported employment of women in the Household Cavalry and the Royal Armoured Corps.
- Twenty percent of men thought that women should be employed in the Household Cavalry, the Royal Armoured Corps, and the Infantry.
- The general consensus was that the recruitment of women into the Household Cavalry, the Royal Armoured Corps, and the Infantry would not affect the recruitment of men or increase the number of women interested in joining the Army.

The researchers also conducted a field experiment to measure small-group cohesion. It included 53 soldiers (mostly from the Royal Artillery). Mixed-gender sections and one all-male section trained for two weeks in basic infantry and then tested for 12 days. The section members completed questionnaires to evaluate cohesion. The results showed that leadership and teamwork were more important than gender mix in explaining performance, but that it was not possible to

determine if leadership qualities were related to gender. The team concluded that “there is nothing to suggest that the presence of females either harmed or enhanced cohesion” [58]. Although the two consistently highest rated sections (in terms of cohesion and performance) were mixed-gender groups, performance varied among sections, and the study’s sample size was limited. The researchers also noted that they could not determine whether the results would be applicable to actual ground combat situations.

The review’s overall conclusion was that the presence of women could be detrimental to creating “the necessary degree of cohesion” and that “it might be easier to achieve and maintain cohesion in a single-sex team” [41]. Based on these findings and citing the importance of combat effectiveness and unit cohesion, the Secretary of State for Defence concluded that, although some women were capable of meeting the physical standards required to effectively perform close combat roles and that psychological differences between the sexes did not indicate overall that women would perform less well in combat, the combat exclusion policy should remain in place [41]. With little evidence from the field exercises or other countries' experiences, he relied on the military judgment of senior officers, who deemed the risk of degrading cohesion and performance to be too high [41].

Review of the Exclusion of Women from Ground Close-Combat Roles

In 2008, the Defence Department's legal advisors determined that the armed forces could not continue to exclude women from ground close-combat indefinitely on the basis of the 2002 assessment [59]. Therefore, as directed by the courts in *Sirdar versus the Army Board and the Secretary of State*, the British government undertook its periodic review of the combat exclusion policy beginning in May 2009. Specifically, Defence Secretary John Hutton ordered senior defence chiefs to study the rules in light of experiences in Iraq and Afghanistan.

The 2009–2010 review had three components [59]:

1. A literature review on the effectiveness of mixed-gender teams in combat environments

2. An assessment of women's roles in recent operations
3. Consideration of the experience of other nations in employing women in ground close combat

It further examined whether the physiological issues identified in the previous review remained valid.

The Defence Science and Technology Laboratory conducted the first and third components, and Berkshire Consultancy Limited (BCL) conducted the second. The BCL work included a literature review as well as interviews, focus groups, and questionnaires.

Overall, the research showed that women had been effective in ground close-combat situations (occasional events), but it was unable to address their effectiveness in ground close-combat roles (engaging in these activities on a daily basis). Questionnaires and interviews showed that gender did not significantly contribute to a lack of cohesion in mixed-gender units experiencing a combat incident. Specifically, results showed the following [59, 60, 61]:

- Both men and women involved in combat incidents reported higher cohesion than those in noncombat situations.
- Cohesion was higher in smaller teams.
- Men did not rate cohesion lower when women were present.
- Women reported lower overall cohesion than men in the ground close-combat incidents (particularly in terms of leadership and application and understanding of the rules).
- Cohesion was reported as lower when more women were present (specifically when there were three or more women in a section).²⁵

The Minister of Defence Personnel, Welfare, and Veterans and the Service Chiefs judged that, overall, “the research's conclusions were

25. Researchers posited that this could have been the result of (a) women generally rating cohesion lower, (b) women knowing others in the unit less well, (c) women having previously operated with the section fewer times, or (d) women being generally less senior.

mixed and did not provide the basis for a clear recommendation as to whether the policy excluding women from ground close-combat roles should be retained or rescinded” [59]. The Service Chiefs maintained that, although women were fundamental to the operational effectiveness of the British Armed Forces, their contributions were not those typical of the small tactical teams in combat arms and ground close-combat [59]. Finally, the minister concluded that “the consequences of opening up these small tactical teams in close combat roles to women were unknown” [59]. The report states that “other nations have very mixed experiences” [59]. Consequently, in November 2010, the minister decided to maintain the policy excluding women from ground close-combat roles. This view was endorsed by the Secretary of State for Defence.

Current situation

Because the United Kingdom has only recently completed its review of the exclusion of women from ground close-combat roles, it is unlikely that the matter will be reexamined in the immediate future. It will, however, be reexamined sometime within the next eight years, as required by European law.

Over the past few years, the Ministry of Defence has been reconsidering its ban on women serving on submarines. The justification for the ban had been that women's service on submarines would put them at greater risk of medical complications than men. Recent medical evidence has shown that women do not face any more health risks than men. Specifically, a study by the Institute of Naval Medicine found that levels of carbon dioxide in the recycled air on submarines did not damage female reproductive organs or fertility [62]. Given this finding, legal counsel advised the Ministry that the Royal Navy is unable to justify a ban on female submariners. Starting in 2013, women will no longer be excluded from serving on submarines in the Royal Navy. According to [36], the first female submarine officer has been appointed, and additional billets (including those for sailors) will be created as submarines are refitted to accommodate women.

Canada

Like the U.S. military, the Canadian Forces (CF) are an all-volunteer force. In terms of personnel, the CF are much smaller than the U.S. military—less than one-third the size of the U.S. Marine Corps. Unlike the U.S. military, the CF do not restrict women from serving in certain military roles, such as combat arms. The CF opened all but submarine military occupational careers (MOCs) and environments to servicewomen in 1989 as part of the country's human rights mission; submarine roles were opened to women in 2001. The CF conducted a number of studies (mostly during the 1990s) on gender integration and women's combat roles. In general, the studies found that, although most people believed that women were capable of serving in nontraditional roles, the degree of women's acceptance within the CF depended on the military environment (air, land, or sea).²⁶

Composition of the CF

The CF comprise three military environmental commands (i.e., branches)—the Royal Canadian Air Force, the Canadian Army, and the Royal Canadian Navy—with roughly 66,000 active-duty personnel in the Regular Force and 30,000 reservists in the Primary Reserve [63, 64]. Around three-quarters of CF personnel are noncommissioned members (NCMs), and the rest are commissioned officers.

The Royal Canadian Navy is the smallest branch of the CF with approximately 11,000 active-duty and 4,000 reserve personnel [65]. The Royal Canadian Air Force is the next largest with 20,000 in its Regular Force and 2,300 in its reserves [66]. The largest environment, the Canadian Army, consists of about 35,000 active-duty personnel and 23,000 reservists [67].

Women in the CF

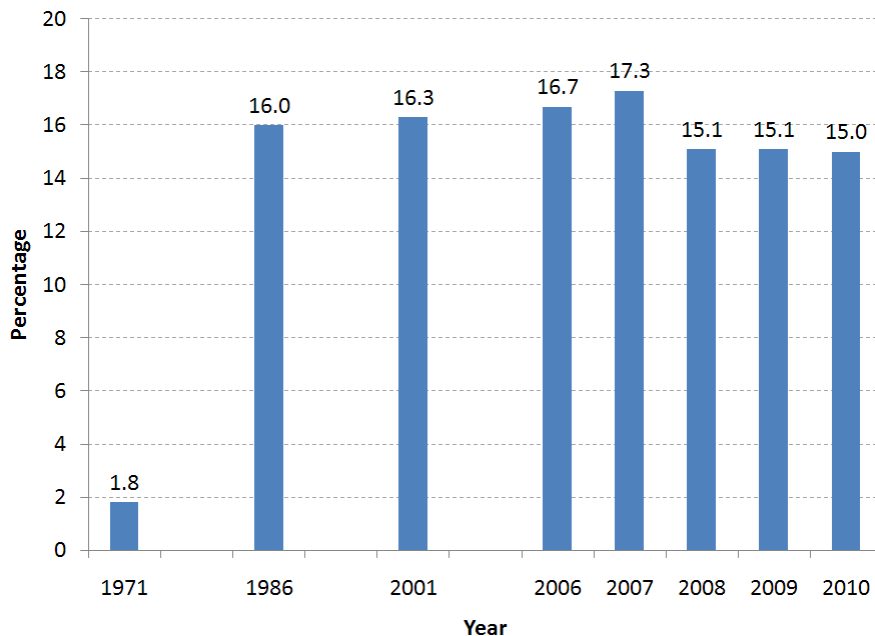
In 2010, women made up roughly 15 percent of CF members [68, 69]. As of July 2010, there were roughly 9,300 women in the Regular

26. The CF use the term *environments* to distinguish between their Air Force, Army, and Navy forces.

Forces and more than 6,000 women in the Primary Reserves. Of the personnel deployed, about 10 percent were women [68, 69].²⁷

Figure 1 shows the percentage of women in the CF for various years between 1971 and 2010.²⁸ In 1971, only 1.8 percent of the CF was female; however, since 1986, the percentage has been between 15 and 16 percent. In 2010, women had the strongest presence in the Navy, making up 19.2 percent of Navy personnel [68].

Figure 1. Percentage of women in the CF, various years between 1971 and 2010^a



a. Source: [69 through 75].

The Canadian Forces National Reports to the NATO Committee on Gender Perspectives (formerly the NATO Committee for Women in NATO

27. The CF do not discriminate according to gender when selecting personnel for deployment operations [70, 71].

28. The data presented in the figure are from a variety of sources [69 through 75]. We were unable to find a source with more than three consecutive years of female personnel data.

Forces) document changes over time in female representation in the CF [70, 71, 74]. In 1989, a little over 9 percent of officers and 9.7 percent of NCMs were women. By 2007, 15.4 percent of officers and 12.6 percent of NCMs were women. The medical/dental and support MOCs tend to have the highest percentage of women: between 2001 and 2007, women made up about 43 percent of medical and dental officers, 38 percent of medical NCMs, 75 percent of dental NCMs, and 20 to 25 percent of officers and NCMs in support MOCs. Historically, combat arms has had the lowest percentage of women: in 2007, women made up 3.8 percent of officers and 1.3 percent of NCMs.

Promotion rates

During the 1990s, women were promoted at lower rates than their male contemporaries [76]. During the 2000s, however, men and women exhibited similar career progression rates and trends [75]. In fact, over 67 percent of respondents in the *2005 Your-Say Survey* disagreed or strongly disagreed that merit boards favored men over women in the CF [77].²⁹

Attrition and retention

During the 1990s, women left the CF at higher rates than men did. The average 1989–1997 attrition rate—the number of releases during the year divided by total strength at the beginning of year—was 8.9 percent for women and 8.2 percent for men [76]. The female attrition rate was 10.1 percent for officers and 8.6 percent for NCMs, while the male attrition rate was 8.2 percent for both officers and NCMs. The difference between male and female attrition rates was greatest in MOC groups that were untraditional for women, such as combat arms [76].

Between 2001 and 2005, male and female attrition rates averaged 6.2 percent and, in 2006, women had a lower attrition rate (6 percent) than men (7 percent) [75]. In the *2005 Your-Say Survey*, 27.7 percent

29. The *2005 Your-Say Survey* had a special focus on understanding CF personnel's attitudes about diversity and employment equality in the CF. The *Your-Say Survey* is administered by the Directorate of Personnel Applied Research to determine CF personnel's attitudes about human resource issues [77].

of men and 28.4 percent of women said that they planned to reenlist. Also, women were more likely to say that they planned to stay in the CF for the remainder of their careers [77].

Although not necessarily applicable to women currently in the CF, a 1994 qualitative investigation showed that women left because of the organizational environment [76]. Specific reasons included a lack of support from supervisors and administrative support, which was exacerbated by supervisor discrimination and harassment; cumulative stresses that resulted from combinations of discrimination based on gender, maternity, family status, and language; and lack of control over, and perceptions of commitment to, career. The women who were interviewed referred to the nature of leadership as a significant influence on the quality of their CF experiences.

Women in combat roles

In 2010, women made up roughly 2 percent of combat personnel (250 women served in combat occupations out of a total of 13,000 combat personnel) [69]. Figure 2 presents the percentage of active-duty combat arms servicemembers, who were women, by officer and non-commissioned member (NCM) designation, for various years between 1989 and 2007.

As of 2009, women had not served in the “assaulter” roles in Canada's elite antiterrorist unit, Joint Task Force (JTF) 2 [1]. According to [1]:

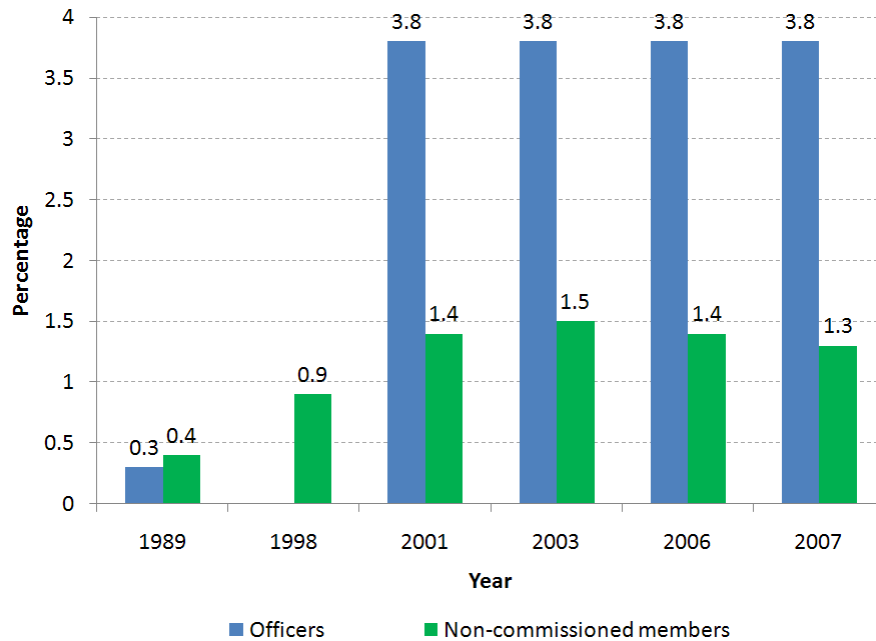
Although women are not formally excluded from [JTF 2] roles, the physical standards have been set so high that very few women are expected to meet them and, if they do, to subsequently complete the training process that functions to “weed out” candidates.³⁰

Roughly 8.3 percent of women serving in combat arms positions were deployed to Afghanistan between October 2001 and July 2011—almost double the proportion deployed during the 1990s (4.6 per-

30. A later subsection provides the physical fitness standards in the CF, including those for the JTF 2 unit.

cent) [78].³¹ These women have deployed in the infantry, field artillery, combat engineers, air defence, and armour [78].

Figure 2. Percentage of active-duty combat arms personnel who are women, both officer and NCMs, various years between 1989 and 2007^a



a. Source: [73 through 76].

Law and policy

Since the late 1800s, women have served as nurses in the Royal Canadian Army Medical Corps during times of war. More than 2,800 women served in this capacity during WWI [76]. At that time, each CF environment established a women's division, enrolling female volunteers for full-time military service in trades other than nursing to release medically fit men for combat duty [1, 76].³² Single women

31. This includes 6.4 percent of women in the regular (or active-duty) combat arms and 21.7 percent of reserve women in combat arms [73].

32. CF enrollments are the equivalent of U.S. military accessions.

without children, age 18 to 45, with a minimum of a grade 8 education were able to volunteer to serve as clerks, cooks, drivers, and telephone operators (more traditional roles), as well as mechanics, parachute riggers, heavy mobile equipment drivers, and pilots. Almost 50,000 women served in the women's divisions before their disbandment at the war's end [72].

By 1951, the Canadian government approved the enrollment of women into the Air Force component of the Regular Forces as well as into the female components of the Army and Navy Primary Reserves [72]. Women served full-time and usually on 3-year contracts. By 1955, over 5,000 women had served in the CF [76]. At the end of the Korean War, the number of women allowed to serve in the different environments of the Regular Forces was limited to 2,500 in the Air Force, 400 in the Army, and 90 in the Navy. In 1963, the Air Force stopped recruiting women, and the number of women serving in the Air Force dropped to 500 [76]. Beginning in 1965, women could join any branch of the Regular Forces, but only in limited numbers and occupations. Across the three services, a fixed ceiling of 1,500 women could serve in such roles as clerks, medical or dental assistants, radio operators, radio plotters, and supply technicians [72].

The 1970 Royal Commission on the Status of Women and the passage of the Canadian Human Rights Act in 1978 were the impetus to opening the Canadian Military Colleges and two-thirds of all MOCs to servicewomen [76]. Also, the passage of the Canadian Human Rights Act was the catalyst for the Servicewomen in Non-Traditional Environments and Roles (SWINTER) trials. During these trials, women were temporarily assigned to “near combat” environments and jobs to assess the effect of gender integration on operational effectiveness and unit cohesion. Between 1979 and 1985, approximately 280 women served tours at an isolated station in the Arctic, at sea aboard a diving tender, in the field with two combat service support units, and as aircrew on five different transport or transport-and-rescue squadrons [72]. The SWINTER trials indicated that the integration of women into near-combat roles was possible, although the degree of acceptance of female integration depended on the environment; gender integration was least successful in the sea and land trials [72, 76].

The development of national human rights initiatives continued to push the CF to formulate new policies regarding female employment. In 1985, the *Equity for All* report by the Parliamentary Committee on Equal Rights recommended that all trades and occupations in the CF be open to women [72]. In response to the *Equity for All* report, the CF established a Charter Task Force on Equality to review the potential impact of the Canadian Charter of Rights and Freedoms on several CF polices, including the employment of women. The CF Charter Task Force recommended opening 14 additional MOCs to women, and concluded that there was insufficient evidence to preclude *consideration* of further expansion of women's employment in combat occupations and environments that remained closed to women. It was further recommended that trials be established to evaluate the impact of including women in the areas that remained closed—that is, to determine if inclusion would have an adverse effect on operational effectiveness [76].

To investigate the impact of opening combat occupations to women, the CF began the Combat Related Employment of Women (CREW) trials in 1987. For the length of the trials, the CF allowed women to serve in select infantry, artillery, armored, signals, and field engineering units in the Army and Navy [76].³³ The CREW trials were set up so that female integration occurred during the first year, followed by a two-year evaluation period during which mixed-gender units would be compared with all-male units. Two years into the trial, only 1 out of 60 women recruited for infantry had successfully completed the 16-week infantry training program [78]. The lack of female volunteers and the few who completed training caused some Canadian officials to question the cost of opening and training women in combat MOCs [79]. In 1989, the CF ended the CREW trials—without evaluating them—after the Canadian Human Rights Tribunal decided that it was discriminatory to exclude women from serving in combat roles [76].

Four complaints against the CF's policy regarding women serving in combat roles went to the Canadian Human Rights Tribunal in the mid-1980s. Three women claimed that they were denied training or

33. At the time, all occupations in the Air Force, including fighter pilot, were open to women.

entry into combat-related occupations because of their gender, and one man complained that rules excluding women from combat discriminated against men because men were required to take more risks [72]. After several hearings between 1986 and 1988, the tribunal decided that the CF do not have a “bona fide occupational requirement” to keep women out of combat roles, and it ruled that the designation of all-male occupations and units was discriminatory.³⁴ In February 1989, the tribunal ordered that all occupations and units—except the submarine service—be opened to women in February 1989, and that the CREW trials be considered preparation or lead-up to full integration [68, 72, 76]. The tribunal also required internal and external monitoring so that complete integration of women occurred by 1999 [72, 76].

Today, women may enroll in training for any military occupation, including combat-related roles in infantry, armored corps, field artillery, air-defense artillery, signals, field engineers, and naval operations [68, 80]. According to the Department of National Defence (Canada) [80], “Men and women undergo the same integrated training, meet the same academic standards, and enjoy the same career opportunities.” In addition to opening all MOCs to women, the CF have made all equipment suitable for a mixed-gender force, including combat helmets and boots, rucksacks, and flak jackets [68].

Under the 1995 Employment Equity Act, the CF are required to track the number of women serving. The act requires the CF to analyze their workforce and determine if there is underrepresentation among women, Aboriginals, or visible minorities.³⁵ The CF set their representation goal for each military occupation based on the propensity to join and the availability of women in the Canadian labor market [73, 75]. In 2007, the CF goal was to reach a female representation rate of 19.5 percent (Regular Forces and Primary Reserves);

34. The Canadian Human Rights Act in 1978 allowed a company to restrict a group from employment if there was a “bona fide occupational requirement.”

35. Section 3 of the 1995 Employment Equity Act defines “visible minorities” as persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in color.

however, as of 2010, the CF have yet to achieve this goal, with women making up only 15 percent of CF personnel [75].

Attitudes

Shirley Robinson, who served 30 years in the Canadian military and was a consultant to human rights lawyers in the 1980s, claimed that it was more difficult to convince the lower ranks than the generals that gender integration was necessary [69]. Studies commissioned in 2004 to support the Canadian Army Campaign Plan found similar sentiments. Although overall attitudes about gender integration were positive, the Canadian Army Campaign Plan studies found that acceptance of women was lowest in occupational combat units—“rating their [women's] presence as unacceptable in combat and the integration process as only marginally successful” [1]. Both men and women did not fully support women serving in combat roles, but women were more likely to favor it.

The 1997 Mixed Gender Opinion Questionnaire measured the level of acceptance of gender integration within the CF as the military approached its 1999 complete gender integration deadline. Survey results indicated that, overall, CF members supported the employment of women in all environments and roles, as well as the CF policies and training put in place to support gender integration [76]. The fact that the survey found that the Air Force was more likely than the Navy and Army to express support for complete gender integration reflected the ongoing challenge the CF were experiencing trying to integrate women into operational and deployable units.

The *2005 Your-Say Survey* found that men were more likely than women to express interest in serving in operational occupations. When asked if they would be interested in an operational occupation (i.e., combat arms), 29.2 percent of men and 12.6 percent of women strongly agreed, while 48.2 percent of men and 72.0 percent of women strongly disagreed [77]. Overall, the results showed that personnel did not believe that women were treated less fairly during training (70.7 percent of the respondents either disagreed or strongly disagreed that women were treated less fairly than men during training, whereas 12.3 percent either agreed or strongly agreed). Women,

however, were more likely than men to believe that women were treated less fairly than men during training (27 percent of women either agreed or strongly agreed with that statement, compared with only 10 percent of men) [77].³⁶

Physical fitness standards

The CF employs three types of physical fitness standards: selection standards, maintenance standards, and course standards. We summarize these in table 11.

Table 11. Canadian Forces' physical assessments^a

	Selection standards	Maintenance standards	Course standards
Purpose	To ensure that personnel applying for certain occupations are physically capable	To ensure that personnel maintain fitness required for common military tasking or occupation-specific tasking	To determine suitability for certifications that require physical capacities beyond those required by the regular maintenance standards
Description	Four occupations—anti-terrorist (JTF 2), special operations (CSOR), national defence fire-fighters, and search and rescue	Uses general physical tests to measure strength and endurance required of the five common military tasks; includes the CF ExPRES and the LFCPFS (land force Army test)	Certain certifications, such as parachutist
Application	General fitness with some occupation-specific task assessments	All personnel	Only those applying for certifications
Gender neutral	Yes	CF ExPRES is “gender-fair”; LFCPFS is gender neutral	Yes

a. Sources: [81, 82, 83].

Selection standards

CF selection standards are designed to ensure that personnel applying for the most physically demanding military occupations are not

36. Results were similar when men and women were asked about the fairness of merit boards [77].

only physically capable of completing selection and training, but also capable of being employed in those occupations on a regular basis. Four occupations have selection standards—Joint Task Force Two (JTF 2), Canadian Special Operations Regiment (CSOR), the CF Department of National Defence (DND) Fire Fighters, and Search and Rescue Technicians.

JTF 2. The JTF 2 is Canada's elite antiterrorist unit, but its personnel also can be employed in other types of military operations, such as Surveillance, Security Advice, and Close Personal Protection [81]. JTF 2 specialists are required to pass only the Canadian Forces Exercise Prescription Program (CF ExPRES) [81].³⁷ Those interested in serving as JTF 2 special operations assaulters (SOA), support personnel (SP), or special operations coxswains (SO Cox'n) must meet additional standards. The minimum standards for JTF 2 SOA, SP, and SO Cox'n are as follows:

- 1.5-mi run in less than 9 min, 45 seconds for SOAs or 11 min for SPs and SO Cox'ns
- 40 push-ups with no rests
- 40 sit-ups in 1 minute
- Five over-hand, straight-arm pull-ups
- Bench press 65 kg from chest to full arm extension (one time)
- CF Swim Test (SOA and SO Cox'n)

If an applicant meets all of the minimum standards, he or she is awarded 55 points; however, it takes a total of 75 points to pass the test. Therefore, an applicant must achieve more than the minimum standard in at least some test categories [81]. Note that support personnel are not required to meet these standards; they must meet the CF ExPRES standards.

The Canadian Special Operations Regiment (CSOR). Individuals must have a minimum of two years of service to qualify for employment as a CSOR special operator [81, 82]. In addition to being medically fit

37. The CF ExPRES will be discussed in detail later in this report.

and possessing a security clearance, an individual must meet the minimum fitness standards “without difficulty” [81]:

- Stage 9 on the CF 20-meter shuttle run
- 40 continuous push-ups
- 40 continuous sit-ups
- Five pull-ups (overhand grip)
- Combat swim test (25-meter swim in combat gear with boots, rifle, and no floatation device)
- 13-km rucksack march (in under 2 hours, 26 min, carrying a 35-kg rucksack)
- 25-meter casualty drag

DND Fire Fighters. The CF relied on researchers at the University of Alberta to develop physical fitness selection standards for CF/DND Fire Fighters. In addition to measuring aerobic performance, applicants are required to complete job-related task evaluations. There are six evaluations with a three-minute rest between each [81]:

1. Charged hose advance: Applicant drags a charged hose 45 meters.
2. High-volume hose pull: Applicant pulls 56 kg a distance of 15 meters; evaluation is repeated three times.
3. Forcible entry simulation: Applicant moves a weighted truck tire (102 kg) a distance of 30.5 cm using a 3.6-kg sledgehammer.
4. Victim drag: Applicant drags a mannequin weighing 68.2 kg a distance of just over 30 meters then lifts the mannequin and walks backwards for 15 meters.
5. Ladder climb: Applicant climbs a 7.3-meter ladder and returns to the floor as quickly as possible.
6. Equipment carry/vehicle extrication: Applicant carries 54-kg extrication tools a distance of 30 meters, then lifts and holds 18 kg in specific positions to simulate removing a vehicle door.

Search and Rescue Technicians. The Air Force’s Canadian Forces Personnel and Family Support Services (CFPFSS) Directorate of Fitness developed the SAR Tech applicant physical fitness selection test. It includes the following [81]:

- Treadmill test
- Equipment carry
- 750-meter pool swim with fins

Maintenance standards

Maintenance physical fitness standards are to ensure that CF personnel attain and maintain the necessary level of physical fitness to perform common military tasks or occupation-specific tasks. There are three levels of maintenance standards: general, environmental, and trade/occupation.

General maintenance standards. Between 1983 and 1988, the CF developed the Minimum Physical Fitness Standards (MPFS) based on the Universality of Service (U of S) principle. The U of S principle, also known as the “soldier first” principle, requires that all CF personnel be able to perform general military duties in addition to their military occupation or occupational specifications. There are five common military tasks. The criteria for each task are presented in table 12 [81, 83].

Table 12. Common military tasks fitness evaluation standards^a

Task	Aim	Standard for men and women	
		Under age 35	Age 35 and over
Sea evacuation	Simulate casualty evacuation during a fire on board a ship	3 minutes and 30 seconds	4 minutes and 37 seconds
Land stretcher evacuation	Simulate a land evacuation of a casualty on a stretcher over a distance of 750 meters	15 minutes	19 minutes and 48 seconds
Low-high crawl	Simulate conditions of self-protection when moving in front of enemy fire	2 minutes and 20 seconds	3 minutes and 5 seconds
Entrenchment dig	Simulate self-protection in face of enemy fire by digging an entrenchment	8 minutes and 30 seconds	11 minutes and 13 seconds
Sandbag carry	Simulate self protection or protection of others from natural elements	12 sandbags in 10 minutes	9 sandbags in 10 minutes

a. Source: [81, 83].

Annual testing of the five common tasks is time-consuming, logistically difficult, and not cost-effective; therefore, the CF developed a physical fitness battery—the CF ExPRES—to predict successful completion of the five common military tasks. Instead of creating a new fitness battery, the CF adopted an existing test battery called the Canadian Standardization Test of Fitness (CSTF), 3rd edition [81]. An empirical model then was developed to link the CSTF (the predictor) to the five common military tasks. In 1988, gender-fair MPFS were established (see table 13). Standards are different for men and women as well as for those under and over the age of 35 for each gender. The differences result from different restrictions during the research process: (1) CF members over 35 were restricted to 90 percent of their maximum heart rates (which was in accordance with the American College of Sports Medicine Guidelines for Exercise Testing and Prescription, 1986), and (2) women used different techniques than men used in the performance of the common tasks [81].

Table 13. CF Minimum Physical Fitness Standards (CF ExPRES Program)^a

Test item	Men		Women	
	Under age 35	35 and older	Under age 35	35 and older
Predicted VO ₂ max. ^b (ml*kg ⁻¹ *min ⁻¹)	39	35	32	30
Sit-ups (number in one minute)	19	17	15	12
Push-ups (number continuous)	19	14	9	7
Handgrip (combined left and right hands (kg))	75	73	50	48

a. Source: [81].

b. VO₂ max. now is estimated from the last stage completed of the 20-meter shuttle run.

Currently, one common physical fitness standard for all military personnel is being researched—“Project Force” Fitness Operational Requirements of CF Employees. The reexamination of the CF MPFS will determine if the five common military tasks of 1988 reflect today’s military job demands, and upgrade or revalidate the “inferential model” underlying the MPFS 1988, which related performance on common military tasks to fitness [81, 82].

Environmental Standards—Land Force Command Physical Fitness Standard (LFCPFS). The CF ExPRES Program may fail to meet the needs of

particular military groups, such as the Army. The Army-specific LFCPFS is a scientifically valid task-related fitness standard separate from the CF MPFS, which recognizes the physical demands of personnel in LFC field units [81]. The LFCPFS has four components (see table 14) and applies to all soldiers—regardless of age or gender.

Table 14. Land Force Command Physical Fitness Standard^a

Task	Standard ^b
Weight load march	13.2 km in 2 hours and 26 minutes
Casualty evacuation	25-meter drag on even grassed ground of a fellow soldier of similar weight, but weighing no less than 70 kg
Maximal trench dig	0.486 cubic meters in under 6 minutes
Ammunition box lift ^c	48 in less than 5 minutes

a. Source: [81].

b. A 10-minute rest is provided between each component.

c. The LCF uses the first three tasks listed above. For logistical reasons, the ammunition box lift is not being evaluated.

The LFCPFS has been under review since 2008; the review resulted in the current drag replacing a fireman’s carry as the casualty evacuation test because it was considered to be more operationally relevant [81]. Future research includes revalidating the distance and weight of the weighted load march and the addition of an urban combat situation component to the test.

Trade/Occupation Standards. In some occupations (i.e., those that demand a higher level of physical fitness), successfully meeting the MPFS does not necessarily imply that a CF member is fit to perform specific occupational tasks. For these unique CF occupations, specific physical fitness standards are required:

- The Fire Fighter Physical Fitness Maintenance Program (FF PFMP) has three components [81]. The first is a 10-item task-based circuit (see table 15). Based on circuit performance, the second component is an exercise program detailing the frequency, intensity, time, and type of activities that a fire fighter should do to maintain the necessary fitness level. The third component consists of information on healthy living (active

living and physical fitness, stress management, nutrition, healthy weight, and suicide prevention) [81].

- Individuals in the search and rescue technician (SAR Tech) occupation have to be extremely fit because their missions may include parachuting, diving, helicopter hoisting, mountaineering, and ground operations [81]. A SAR Tech needs to be conditioned to cope with the stress of sustained operations and be physically ready to be subjected to the impact forces associated with their penetration methods. The SAR Tech Physical Fitness Maintenance Program is based on a compensatory model and a lifting task [81]:
 - Compensatory model
 - 20-meter shuttle run stage 8 or score 44.6 ml/kg/min on the step test
 - Score a minimum of 30 points on the compensatory model (handgrip, push-ups, and sit-ups)
 - Lifting task (extraction kit): Lift 40 kg to a table 1.5 meters high.

Table 15. 10-item circuit for FF PFMP^{a,b}

Item	Task	Standard
1	One-arm hose carry	Carry a 50-ft section of 2.5-in. hose a total distance of 100 ft
2	Ladder raise	Carry a 12-ft ladder a distance of 50 ft and raise it against a wall
3	Charged hose drag	Drag a charged 1.5-in. hose a distance of 100 ft
4	First ladder climb	Climb a 24-ft ladder three times
5	High-volume hose pull	Pull a 100-ft length of 4-in. hose and a 50-ft length of 2.5-in. hose tied together a distance of 100 ft
6	Forcible entry	Move a tire weighing 225.5 lb a distance of 12 in. using a 10-lb sledgehammer
7	Victim drag	Drag a mannequin weighing 150 lb a distance of 100 ft
8	Second ladder climb	Climb a 24-ft ladder twice
9	Ladder lower	Lower and carry a 12-ft ladder a distance of 50 ft
10	Spreader tool carry	Carry an 80-lb spreader tool a distance of 100 ft

a. Source: [81].

b. Rest intervals are provided between each task: 50-ft walks between tasks 1, 2, and 3 and tasks 8, 9, and 10; and 100-ft walks between tasks 4, 5, 6, and 7.

Course standards

Course standards are designed to ensure that personnel applying for additional certifications (for example, an analogue to becoming Airborne- or Ranger-qualified in the U.S. Army) have the requisite physical abilities for the certification. Parachuting is one training opportunity available and has operational requirements that have physical demands beyond the MPFS [81]. Unlike the previous fitness standards, the Canadian Forces Parachutist Physical Fitness Test has not gone through rigorous research but has been developed from earlier generations of military screening. The screening standards for parachutist training include the following [81]:

- 7 pull-ups
- 31 sit-ups
- 1-mile run in 7.5 minutes or less³⁸

Studies and reviews

Apart from the 1994 attrition and retention investigation already discussed, the only study that examines the combat arms experience and women is a qualitative analysis from 15 years ago. The 1997 study of female retention in combat arms showed that, although men and women entering combat arms training had similar test scores, educational attainment, and military potential ratings, women successfully completed combat arms training at a lower rate than men [84]. Along with differences in physical strength and endurance, focus group discussions revealed additional areas of concern:

- There was a perception that instructors had a negative attitude toward women. Because few women pass training or remain in the combat arms environment, it was felt that women were not capable or motivated enough to be in combat arms.
- Male junior combat arms officers in training expressed a view that women could not be effective leaders because they did not have a commanding presence.

38. In the case of bad weather, a 600-meter shuttle run over a 50-meter indoor course is done.

- High physical standards were problematic for both genders, but particularly for women. It was felt that there was inconsistent enforcement of the standards, and some felt that double standards were applied. Examples included the retention rather than the release of women who did not pass standards, the (informal) lowering of battle school standards for women, instructors treating women differently (i.e., being more lenient or afraid to discipline), and favoritism toward women (i.e., women were asked if they need a bathroom break more frequently than men).

The 1997 retention study also interviewed 31 women who had served in combat arms roles between 1989 and 1996. The women claimed that they had faced social and psychological barriers that affected their ability to meet physical standards and their perceived suitability for combat arms. The women felt that their ability and motivation were measured against cultural, and typically male, assumptions regarding accepted gender roles and behaviors [85]. Because of this, some women felt that they were in a difficult and sometimes impossible situation: If a woman did not meet the standard, it was because women were not suitable for combat arms, but if she did, it was believed that she would not be able to sustain the physical fitness needed for the position [85].

Current situation

The CF strive to meet their goal of proportional representation of women in their ranks. According to the *Canadian Forces 2008 National Report to the NATO Committee for Gender Perspectives*, the CF have shifted their focus from developing and introducing new gender integration policies to becoming more flexible in their application of existing policies [70]. The CF aim to provide employment opportunities that are appealing to women and beneficial to the CF recruiting and retention efforts.

As discussed, Canada is also reexamining its minimum physical fitness requirements. Project Force Fitness for Operational Requirements of CF Employment, mandated by Chief Military Personnel (CMP), seeks to validate the CF Bona Fide Occupational Requirements (BFOR) with the aim “to develop scientifically valid and legally defensible

physical fitness tests and standards that meet current domestic and deployment operational requirements for CF members” [82]. It is expected to be completed in 2013.

This multiyear project, led by Director of Fitness (DFIT) Human Performance Research and Development, is reviewing the CF Minimum Physical Fitness Standards to ensure that all CF personnel are operationally fit and meet the U of S principle. The project also hopes to confirm that the common tasks and the yearly evaluation components reflect current CF employment and deployment. First, researchers analyzed what tasks any CF member might be reasonably expected to perform in various situations [82]. Researchers are using operational reports, surveys, focus groups, and interviews to determine the most physically demanding common tasks. Second, they measured the physical demands of these tasks, which ultimately will be used to develop a new minimum standards test. They are now in phase 3, or the development of the actual fitness test components to assess the demands identified in phase 2. According to Michael Spivock, a CF research manager,

just because this test must be based on tasks which could be expected of all CF personnel regardless of occupation or environment (for Human Rights reasons), it may not specifically reflect the demands of the combat arms. [82]

For this reason, Canada also has been working to revalidate the LFCPFS.³⁹ According to Spivock, the team revalidating the LFCPFS has conducted trainability studies showing that women are capable of attaining the new standard established in a matter of weeks [82].

In addition, Canada is conducting the Occupational Fitness Standards project, which is sponsored by the Director of Personnel Generation Requirements. The project’s goal is to establish specific physical and psychological requirements for each of the CF’s 102 occupations [82]. To date, it has examined approximately 20 occupations but has not yet reviewed the combat arms occupations [82].

39. This revalidation led to the replacement of the fireman's carry with a casualty drag in recent years.

Israel

The Israeli Defense Force (IDF) is a conscript force that is about half the size of the U.S. military. The IDF drafts both men and women at age 18 into military service. Women can serve in the majority of roles within the IDF, including several combat positions.

Composition of the IDF

The IDF is composed of General Staff Directorates, Regional Commands, Home Front Command, and three branches (Ground Forces, Navy and Air Force) [86]. The IDF also partly oversees the Border Police with the Israeli Police. The IDF has approximately 156,000 active-duty personnel, 560,000 reservists, and 3,000 Border Police. The Israeli Army is the largest of the paramilitary branches with over 39,000 members on active duty and 231,000 members on reserve duty. The Air Force has 34,000 active-duty and 55,000 reserve soldiers. The smallest branch, the Israeli Navy, has about 20,000 personnel on active or reserve duty.

Women in the IDF

Women have served in the IDF since the establishment of Israel in 1948. Historically, women did not serve in battle but in technical or administrative support roles. Although not a current sentiment, as women are integrated into high-risk positions, the initial reason for keeping women out of combat was a fear of capture:

It was fair and equitable, it was argued, to demand from women equal sacrifice and risk; but the risk for women prisoners of rape and sexual molestation was infinitely greater than the same risk for men. [87]

During the Yom Kippur War in the early 1970s, women were called to serve in ground forces because of a shortage of men [1, 88]. Women served in the Women's Corps during the 1980s and 1990s, until it was disbanded in 2001 [1]. In 2001, the position of Advisor to the Chief of General Staff on Women's Issues and Women's Affairs was created to promote conditions that allow the IDF to take full advantage of the capabilities of its female soldiers [88]. It is also responsible for establishing women's policies in the IDF [86].

In 2010 and 2011, women made up about one-third of IDF personnel [88, 89]. The smaller proportion (i.e., smaller than what is representative in the total population) is because of the shorter service requirement and the more lenient discharge and service exemption policies for women. Women can leave military service for religious reasons, marriage, pregnancy, and motherhood [1, 90].⁴⁰

In 2006, 88 percent of military positions were open to women, and 2.5 percent of women served in 14 combat positions [1]. According to the Israel Ministry of Foreign Affairs [91], in 2009, women could be deployed in 90 percent of IDF positions.⁴¹ In 2011, women made up the following percentages [86]:

- 16 percent of the Air Defense Division
- 11 percent of the Artillery Corps
- 10 percent of Search and Rescue units
- 6.5 percent of Border Police
- 57 percent of the Caracal combat battalion
- Up to 2 percent of each Air Force squadron

In August 2010, the IDF published the *60 Years of Women's Service in the IDF* report, which provides a snapshot of the gender composition of IDF soldiers [92]. In table 16, we highlight the percentage of women in open-combat occupations.

Table 16. Women in open-combat occupations, Aug. 2010 (from [92])

Corps	Percentage of women
Artillery	16%
Field Intelligence	15%
NBC	21%
Commando K9 Oketz unit	14%
Light Infantry	68%

40. Exceptions are made for students, whose mobilizations may be deferred for as long as their studies continue. Student deferments account for approximately 6 percent of the 18-year-old Israeli population [87].

41. According to the law, all positions are open to women [86].

Law and policy

Beginning in 1995, women were allowed to enter certain combat roles in response to a Supreme Court ruling. Alice Miller, a licensed civilian pilot, appealed to the Israeli Supreme Court after she was automatically rejected from the Air Force's pilot course because of her gender [1]. The Supreme Court ruled in Miller's favor and an amendment was added to military law stating that women have the same right as men to serve in every position, except those with demands that preclude women [1].

Today, women may serve in “non-close” combat roles voluntarily [1]. For example, women may volunteer to serve in such positions as light infantry, air defense, search and rescue, shallow water diving, combat at the K-9 unit, artillery, pilot, border control, and nuclear, biological, and chemical (NBC) [1]. Women serving in combat roles have a three-year mandatory service requirement—the same as men—and operate alongside men during deployments [86 and 89]. Although women can volunteer for combat assignment, [1] cites evidence suggesting that the IDF does not accept all eligible women.

IDF draft process⁴²

The IDF is one of the only militaries to draft women. The mandatory service requirement for men is three years, whereas women have to serve a minimum of two years [1].⁴³

Draftees go through a personal interview and a medical exam on the day of recruitment. Those with a medical profile score above 80 may be placed in a combat unit. The IQ test, personal interview, and medical exam are combined into a single numerical score, called a *Kaba* score. The *Kaba* score determines a draftee's classification, job assignment, and potentially his or her mobility through the Army ranks.

42. Information in this section is from [93] unless otherwise noted.

43. The age exemption for men and women from reserve duty changes according to different criteria and positions. Pregnancy and parenthood are valid exemptions for women filling involuntary positions. Women serving in voluntary positions will be exempt at the exemption age (i.e., female doctors at age 49 and female pilots at age 45) [86].

Later, draftees select their position of choice from the Preference Questionnaire—a listing of available potential job options based on the draftee’s *Kaba* score.

Male and female draftees with high physical profiles and high personal skills levels may be invited to a one-day tryout (*gibush*) for the Army called *Yom Sayerot* [86], at which time draftees also try out for the IDF’s combat units. During the tryout, participants must crawl, carry stretchers, and run long distances without stopping. In addition to the physical tests, the day is a chance for commanders to examine the participants’ abilities to work in group settings [94]. At the end of the day, participants fill out a deployment questionnaire in which they rank their choice of placement among different combat units.⁴⁴ Participants who pass the one-day trial are usually placed in their first or second choice of units [94].

Studies and reviews

Gender differences in physical fitness

We found two publicly available studies that examine gender differences in physical performance. Both studies compare men and women in basic training for the IDF Caracal combat unit.

The first study examined gender differences in physical fitness while in gender-integrated Army basic training [95]. The study followed 129 women and 47 men through a 4-month basic training program, which consisted of an average of 4 hours of running, 4 hours of combat marching, and 5 hours of continuous standing per week [95]. The study included an IDF physical test (IDF-PT) that consisted of a timed 2-km run as well as the number of push-ups and sit-ups performed until the recruits stopped for more than two seconds. It also measured soldiers’ aerobic fitness, anaerobic fitness, and lower extremity force and power [95].

44. After *Yom Sayerot*, individuals may be asked to additional tryouts for one of the IDF’s three specialized units: *Mathal* (IDF’s Delta Force), *Sheyetet* (Navy Seals), and *Hovlim* (Navy).

The study found that, before basic training, men performed better than women across all fitness measures. After basic training, the female-male gap narrowed by up to 4 percent in all categories except push-up performance, where the gap increased by almost 17 percent, and abdominal performance, where no gender difference existed [95].

The second study looked at the effect of basic training on stress fractures for men and women in the Caracal combat unit during basic training. The study found that 12 percent of women and 0 percent of men suffered stress fractures, even when the physical demands of female combat soldiers were reduced [96]. The study concluded that, for women to successfully complete combat training, the physical demands for women should be reduced by 30 percent compared with men (particularly in endurance training). The study also recommended that women should carry no more than 30 percent of their weight and men no more than 40 percent during loaded carries [96].

Gender differences in psychological fitness [97]

A 2010 study examined the psychological factors that may affect women's integration into combat units. The study compared 235 women and 90 men in the mixed-gender basic training program for the Caracal combat battalion with 135 women in a medical-assistance, noncombat training course. Metrics of wellness were measured before, during, and at the end of training and included perceived stress levels, burnout levels, self-efficacy (i.e., one's belief in one's own competence), commitment, and the number of doctor visits.

The study found that female soldiers (in combat and noncombat training) had higher stress levels than men, but that—in the middle of basic training—women in noncombat training were more stressed than women in combat training. The study did not find significant differences among the groups or across time in soldiers' burnout levels. Female soldiers training in combat experienced a decrease in self-efficacy between the start and end of basic training, while women in noncombat training experienced an increase in self-efficacy. Both women and men in combat training showed higher levels of commitment than women in noncombat training. In terms of medical visits, 18.3 percent of women in combat training saw a doctor compared

with 10.0 percent of men in combat training and 7.4 percent of women in noncombat training.

Beliefs about women in combat roles

The majority of women in combat roles are in the Caracal combat unit or in the Border Patrol [1, 92]. According to an IDF report on studies of female combatants between 2002 and 2005, commanders have found that women often are better than men in the following areas [1]:

- Discipline and motivation
- Maintaining alertness
- Shooting
- Managing tasks and organization
- Displaying knowledge and professionalism in weapon use

The successful integration of women into combat units depends, in part, on the beliefs of the commanders. If the commanders believe that women can be successful soldiers and are just as capable as men, the unit may be more accepting of its female soldiers [1].

Current situation

The IDF continues to struggle with integrating women into combat units. In August 2011, four female soldiers were removed from the Artillery Corps' 55th Battalion because religious, *Hesder*, male soldiers were joining the battalion [98]. This example of the tension between religious soldiers who refuse to serve alongside women and female combat soldiers represents the competing cultural mindsets that exist within Israel and limit the IDF's ability to integrate women throughout its military.

Wrap-up

Studies done by Australia, the United Kingdom, Canada, and Israel show that a small percentage of women are capable of meeting gender-neutral physical standards required for service in ground

combat units, but there are some challenges to gender-integrating such units.

Australia recently announced the upcoming repeal of its policies excluding women from certain ground combat positions. It will rely on gender-neutral PESs to determine who is eligible to serve in each of its trades, including ground combat. To date, women have not been participating in testing of the CA PES or the ground combat trades PESs, so it is unclear how many women can meet the physical standards of these professions.

The United Kingdom recently upheld its policies excluding women from ground close-combat occupations. It did so despite finding that a small percentage of women (no more than 1 percent of trained women and 0.1 percent of women in general) would meet its requirements for service in ground combat. The United Kingdom maintains that gender-integrating such units could have potentially harmful effects on cohesion, which could in turn affect combat effectiveness. Despite these concerns, however, the United Kingdom allows women to serve in the attached arms (as supporting personnel, such as medics, clerks, and logisticians) in units that engage in ground close combat in the British Army and Royal Marines at the battalion level and below.

In Canada, which allows women to serve in all military occupations and units, women make up only 2 percent of the combat arms occupations, and no woman has served in the elite JTF 2. Women have successfully led units in combat in Afghanistan. Studies showed that, in the early years of gender-integrated combat units, recruiting and attrition were both problematic. According to a 1997 study, some reasons for this were women's lower physical strength/endurance, negative attitudes of instructors toward women, and social and psychological barriers. According to the CF, recruiting women into combat arms is still challenging [99].

Israel allows women to serve in non-close-combat roles voluntarily. These women, however, are sometimes removed from these units based on the objections of religious male soldiers in the unit or if the unit is deployed.

Other physically demanding professions

Much of the current debate about whether women should be allowed into closed positions or restricted combat arms military occupational specialties relies on the assertion that direct ground combat is physically demanding and that women do not have the strength or endurance to fulfill the demands of the job. Therefore, it makes sense to review the policies and practices of the most physically demanding professions. According to a study based on CareerCast.com's 2009 Jobs Rated Report, fire fighters, roustabouts,⁴⁵ civilian sailors, and police officers have the most physically demanding jobs [100].

CareerCast.com used data from the U.S. Department of Labor (DOL) to arrive at its ranking of the physical demands of a job [101]. It began with DOL's five categories for the amount of weight a person normally has to lift at work [102]:

1. Sedentary work: occasional lifting of 10 pounds or less
2. Light work: lifting a maximum of 20 pounds
3. Medium work: lifting a maximum of 50 pounds, with frequent lifting of objects weighing up to 25 pounds
4. Heavy work: lifting a maximum of 100 pounds
5. Very heavy work: lifting in excess of 100 pounds, with frequent carrying of objects weighing 5 pounds or more

CareerCast.com also adheres to DOL's consideration of “whether a job is indoors or outdoors and whether or not it involves stooping, kneeling, climbing, or balancing” [101].

To arrive at a final score and ranking, CareerCast.com incorporates several additional factors into its calculation [101]:

45. In this context, roustabouts refer to natural gas and oil rig workers.

- One point for each category of lifting, with 1 point for sedentary work and a maximum of 5 points for very heavy work
- One point for each physical component: lifting, pulling, pushing, standing, walking, stooping, kneeling, crawling, climbing, crouching, or reaching
- An unspecified number of points for hazards, weather exposure, work environment, and "the need for stamina"
- One point for each full or fractional hour by the average worker in excess of 40 hours per week

According to CareerCast.com's methodology, fire fighters score 43.23 for physical demands; roustabouts, 36.89; civilian sailors, 30.77; and police officers, 22.63 [100]. Because of the similarities in terms of physical demands, in this section, we examine women's roles in two of these professions. First, we discuss women in the fire-fighting profession, outlining physical requirements and test results as well as legal issues surrounding women in the profession. We include a short discussion of female smokejumpers because smokejumping is arguably one of the most demanding fire-fighting specialties. Second, we discuss women in the police profession, focusing on Special Weapons and Tactics (SWAT) teams because their roles are more closely related to what might be experienced in ground combat units.

Fire fighters

Fire fighting requires intensive physical conditioning and training to ensure personal safety and successful job completion [103]. Fire fighters work in complex, dangerous environments and perform a range of duties and responsibilities during an emergency event. While fighting fires, they work in teams; their organization is similar to the military's, with a well-defined chain of command. Because of the hazardous conditions and physical demands, fire fighters have a high risk of injury or death.⁴⁶

46. Annually, 40 percent of professional fire fighters are injured [104]. Each year from 2001 to 2009, about 80,000 fire fighters were injured; of those, an average of 39,000 were fireground injuries [105]. Death and injury statistics by gender are not available.

In 2009, 71 percent of fire fighters were volunteer; the other 29 percent of fire fighters were paid (see table 17) [106].⁴⁷ In what follows, we focus on paid fire fighters and the fire departments they staff.

Table 17. 2009 figures for U.S. fire departments and fire fighters^a

	Number
Fire departments	
100% volunteer fire-fighting staff	20,857
1-50% paid fire-fighting staff	5,099
51-99% paid fire-fighting staff	1,752
100% paid fire-fighting staff	2,457
Total	30,165
Fire fighters	
Volunteer fire fighters	812,150
Paid fire fighters	335,950
Total	1,148,100

a. Source: References [106] and [107].

Women in fire fighting

Women compose 47 percent of the civilian labor force. From 2005 through 2009, they made up less than 4 percent of professional fire fighters [103, 108].

Fire-fighting duties

As first responders, fire fighters perform search and rescue, emergency medical services, hazardous material response, disaster response, and fire suppression duties. Their duties may change several times at the emergency scene. Their specific fire suppression tasks, however, include the following [104]:

- Connecting hose lines to hydrants
- Operating pumps

47. *Volunteer, on-call, and part-time* are terms used for fire fighters who are not compensated for performing fire-fighting duties; *paid, professional, and career* are terms used to describe fire fighters who are compensated.

- Applying extinguishing agents through hose lines and nozzles
- Positioning ladders
- Rescuing victims and administering emergency medical care
- Ventilating smoke-filled areas
- Operating heavy equipment
- Salvaging building contents

Fire-fighting tools and equipment may weigh over 70 pounds, with the self-contained breathing apparatus (SCBA) alone weighs 40 pounds [109].

Becoming a fire fighter

The employer determines the examination and hiring process. Local government employs 91 percent of paid fire fighters [110, 111]. Most municipalities require applicants to pass written, physical fitness, and drug screening tests, and a medical examination, in addition to being at least 18 years old and having the equivalent of a high school diploma. A fire fighter certification or civil service exam often is required as a prerequisite for the interview process.

Once applicants are hired, they attend the department's training center or academy for several weeks of specialized training. The training includes instruction and practicums on a range of topics, such as fire suppression and prevention, emergency medical procedures, and building codes [110]. Recruits must participate in physical fitness sessions as part of academy training. On academy graduation, new fire fighters are assigned to a fire company for a probationary period; they continue to attend training and are evaluated regularly.

Although municipalities typically establish the standards for professional fire fighter certification, some states levy additional mandatory fire-fighting training and certification requirements. The U.S. National Fire Academy and some states provide additional training.

To further illustrate the process, we discuss the application and recruitment process for the City of Phoenix—chosen because comprehensive information was available.

The City of Phoenix requires applicants to take a 100-question, multiple-choice test containing basic math and reading comprehension questions. Most of the questions are contained within a pretest study guide. The City of Phoenix Personnel Department places all applicants who pass the exam on the Fire Fighter Recruit eligibility list and provides it to the Fire Department.

The Fire Department invites applicants from the Fire Fighter Recruit eligibility list to come in for job interviews. The interview format is the same for the first and second round of interviews: in the 30 minutes before the scheduled interview time, candidates are allowed 15 minutes to review the interview questions; 20 minutes are allotted for the interview. Those candidates invited for the second round of oral interviews must provide the following:

- Proof of successful completion of a Candidate Physical Ability Test (CPAT) from a licensed agency within 12 months
- Proof of a valid emergency medical technician certification

After completing the second interview, candidates are placed on a hiring list. The Fire Department Personnel Officer or Deputy Chief notifies candidates from the hiring list who are selected to continue. To be hired and start the Phoenix Fire Department Training Academy, candidates must pass a comprehensive background investigation, a medical examination, and a pre-employment drug screening test that specifically tests for anabolic steroids.⁴⁸

The Candidate Physical Ability Test

The CPAT, created by the International Association of Fire Fighters (IAFF) and the International Association of Fire Chiefs (IAFC), is the minimum standardized requirement for a fire fighter.⁴⁹ Currently, 1,005 professional fire departments—about 40 percent of all professional fire departments—require the CPAT [104].

48. The Phoenix Fire Department screens all of its professional fire fighters annually. Fire fighters may be screened up to three times a year.

49. The Candidate Physical Ability Test is not the same as the Consolidated Physical Ability Test, which is also known as the Biddle Test [103].

According to [112], the CPAT is a “legally defensible and legitimate tool for assessing eligibility for employment” because it “meets validity criteria established by the U.S. Equal Employment Opportunity Commission (EEOC), the U.S. Department of Justice, and the U.S. Department of Labor.”

The CPAT is administered during the fire fighter candidate recruitment process to ensure that candidates are physically capable of performing essential job tasks.⁵⁰ Depending on the municipality, the CPAT may be required before the written test or before the interview process; a few states (e.g., Mississippi) allow multiple opportunities at the academy to pass the test before state certification [113]. However, all IAFF-licensed professional fire departments require candidates to pass the CPAT—regardless of where in the recruitment or training process it is administered—before working as a fire fighter.

The CPAT evaluates a candidate's ability to perform eight critical job tasks [104]:

1. Stair climb: climbing stairs while carrying an additional 25-pound simulated hose pack
2. Ladder raise and extension: placing a ground ladder at the fire scene and extending the ladder to the roof or a window
3. Hose drag: stretching uncharged hoselines, advancing lines
4. Equipment carry: removing and carrying equipment from fire apparatus to fireground
5. Forcible entry: penetrating a locked door, breaching a wall
6. Search: crawling through dark unpredictable areas to search for victims
7. Rescue drag: removing victim or partner from a fire building
8. Ceiling pull: locating fire and checking for fire extension

50. The CPAT was validated for use during the recruitment process as being representative of the physical fitness level required for training, not for the job of fire fighting [113]. IAFF does not release the validation process and information for the CPAT [113].

The candidate must perform the eight tasks in sequence; the sequence mimics the logical sequence of events at a fire scene [114]. Each task station is separated by 85 feet; the candidate must walk (running is prohibited) between each station, allowing for approximately 20 seconds of recovery time between events [114].

The CPAT must be completed within 10 minutes and 20 seconds, and it is evaluated on a pass/fail basis. The candidate wears long pants, a hard hat with chin strap, gloves, and a 50-pound vest to simulate the weight of an SCBA and fire fighter protective clothing. Twenty-five pounds is added to the shoulders during the stair climb to simulate a hose pack. Successful completion of the CPAT requires a high level of cardiopulmonary endurance, muscular strength, and muscular endurance [103].

Because the test simulates the essential physical tasks that a fire fighter must be able to perform, it is seen as a reliable indicator of a candidate's physical ability to function at a fire scene [103, 104]. A *National Report Card on Women in Firefighting* points out that, although the CPAT underwent content-based validation (i.e., test tasks parallel job duties), it was not subjected to criterion-based validation (i.e., test tasks statistically predict job performance) [108].

In compliance with the EEOC, professional fire departments that mandate CPAT for employment and are IAFF licensees must provide an orientation and mentoring process beginning eight weeks before a candidate takes the CPAT, in which the candidate [104]

- must attend at least two mandatory orientation sessions and receive "hands on" familiarity with the actual CPAT apparatus; and
- will perform at least two timed practice runs (although the candidate is given time to complete the entire course), using actual CPAT apparatus, within 30 days of the CPAT test date.

These two orientation sessions and two practice runs are minimum IAFF-defined requirements. Departments may offer more comprehensive orientation programs in addition to meeting the minimum requirements.

Certified peer fitness trainers, fitness professionals, and/or CPAT-trained fire fighters are present during this process to familiarize candidates with the gear and specific CPAT tasks, and to provide guidance for improving their physical performance [114]. A candidate can bypass this pre-CPAT process by signing a waiver.

The CPAT orientation guide, which explains each of the eight test events, and the CPAT preparation guide, which provides a workout regimen and schedule to help prepare recruits for the CPAT, are available on IAFF and some fire department websites.

Physical fitness at the academy and fire departments

As previously noted, municipalities typically establish the standards for professional fire fighter training and certification. Some states, however, mandate additional fire-fighting training and certification requirements.

The Los Angeles Fire Department (LAFD) publishes a Fitness Log, which details a recommended pre-training-academy workout and the required training academy physical fitness program [115]. The preliminary workout covers flexibility, cardio-respiratory, and strength training; provides a picture and written instructions for each of the flexibility and strength training exercises; and details weekly workouts. Its goal is to prepare candidates physically for the 18-week training academy.

The LAFD training academy's physical fitness program focuses on building "job-specific strength and stamina" through "simulated fire-fighting movements and actual job tasks" [115]. The program commences with a 30-minute drill tower warm-up consisting of push-ups, pull-ups, leg-lift scissor kicks, and dips. Table 18 presents the warm-up regimen and the fitness level breakdown. Although the lowest value in the bronze fitness level is the minimum number of repetitions for the exercise in the warm-up, recruits are advised to go for the gold because maintaining the gold fitness level is "a good indicator of sufficient strength and stamina to meet the rigors of the Training Academy" [115].

Table 18. Exercises and fitness levels for the drill tower warm-up portion of the LAFD training academy physical fitness program^a

Sequence	Exercise	Gold	Silver	Bronze
1	Push-ups	25+	20-24	15-19
2	Leg-lift scissor kicks	20+	15-19	10-14
3	Push-ups	25+	20-24	15-19
4	Leg-lift scissor kicks	20+	15-19	10-14
5	Push-ups	25+	20-24	15-19
6	Leg-lift scissor kicks	20+	15-19	10-14
7	Pull-ups	10+	7-9	5-6
8	Dips	10+	7-9	5-6
9	Pull-ups	10+	7-9	5-6
10	Dips	10+	7-9	5-6

a. Source: Reference [115].

After completing the warm-up, recruits move to the Complete Physical Training portion, which takes about 2 hours to complete and is broken into two circuits: yard and field. For the yard circuit, recruits wear full personal protective equipment, axe, and SCBA. The recruits may start at any of nine stations (listed below), but they must progress at a pace appropriate for fireground operations and within the allotted 1.5 hours:

1. Axe manipulation (average time = 2 minutes)
2. 2.5-inch hose drag (average time = 4 minutes)
3. 35-foot extension ladder (average time = 25 seconds)
4. Climbing ground ladder (average time = 40 seconds)
5. Civilian rescue (average time = 40 seconds)
6. Above-ground hose lay (average time = 3.5 minutes)
7. Tower climb (average time = 3.5 minutes)
8. 1.75-inch hose line advance (average time = 20 seconds)
9. Hand lay 4-inch supply line (average time = 14 seconds)

Recruits then rehydrate and change into exercise gear for the field circuit: a 0.5-mile run from the drill tower, two sets of wind-sprints (distance unspecified), and a 0.5-mile run back to the drill tower.

The Phoenix Fire Training Academy considers the CPAT to be the minimum fitness requirement. Physical fitness is one of the subjects covered in the 12-week Phoenix Fire Training program [112]. One Recruit Training Officer (RTO), who holds the rank of captain, is responsible for five to six recruits for the duration of the academy.

To complete the academy, recruits must meet performance requirements, such as the ability to perform required fire fighter skills and to function while wearing personal protective equipment (PPE) and SCBA. Recruits also must demonstrate each skill taught at the academy to standard during their final evaluations. They are given three attempts.

After graduating from the Phoenix Fire Department Training Academy, the fire fighters enter the field as probationary fire fighters. For nine months, they continue to participate in a structured training program and to receive monthly evaluations. Fitness level is one of the 11 evaluation categories. They also attend advanced training at the training academy. The fire fighters then must complete 200 shifts of emergency medical transportation duty before being assigned to fire companies.

Physical fitness test results

As previously noted, IAFF [113] will not have CPAT data until later this year, based on a 2006 agreement between the EEOC and IAFF to provide data, such as pass/fail percentages and performance breakouts by gender, in 2012.

The authors of *A National Report Card on Women in Firefighting* [108] surveyed 675 male and female fire fighters in 48 states, collected data from 114 fire departments with paid fire fighters in 39 states, interviewed 175 female fire fighters, and conducted case studies for five metropolitan fire departments for their 2008 report. Tables 19 and 20 summarize the survey results that pertain to physical fitness.

Table 19. Summary of survey results for physical fitness tests during hiring^a

Survey question	Yes or agree (percentage)	
	Women	Men
Statistics based on fire fighter responses		
Men and women are not treated the same during applicants' physical fitness screening	13.3	10.5
My department's selection process included a physical fitness test	91.0	89.3
Of those taking a physical fitness test, percentage who specifically trained to prepare	78.4	55.2
Of those taking the test, percentage who passed the first time	85.8	97.9
My department's physical fitness test accurately measured my ability to perform the job	42.8	52.9
Statistics based on fire department responses		
Average pass rates on physical fitness test during hiring	47.3	83.9

a. Source: Reference [108], with minor modifications.

Table 20. Fire department survey results for physical fitness testing during hiring^a

Survey topic	Response (%)
Physical fitness test required during hiring:	92.9
- "Home-grown" tests	54.2
- Test developed by testing professionals, or state's civil service commission	24.3
- CPAT	21.5
Average CPAT pass rate for women	68.0
Average pass rate for women on other two categories of physical fitness tests	49.0
Ratio of female-to-male CPAT pass rates	77.4
Ratio of female-to-male pass rates for other two categories of physical fitness tests	61.7
Physical training provided prior to test	45.9
Pass rates for women at departments with pretraining ^b	52.6
Pass rates for women at departments without pretraining	34.6

a. Source: Reference [108].

b. Average duration of pretraining programs was 5.1 weeks [108].

Although the report takes issue with the CPAT validation process and test administration, it notes that the CPAT requires “high levels of physical fitness” and that the 77.4-percent ratio of women to men passing the CPAT contradicts “the assumption that the only way to increase the proportion of women passing physical abilities tests is to lower standards” [108].

Female recruits who participated in a 14-week pretest physical fitness training program in Milwaukee improved their strength by an average of 21 percent and their fitness by 29 percent, bringing their combined size, strength, and fitness to an average of 96 percent of their male peers [108]. Women reported inequities in training, access to classes, equipment, work assignments, and drilling that curtailed their promotion opportunities [108]. Each of these areas may have an imbedded physical fitness and abilities component. In those instances, if women have less time to train and practice, they are likely to underperform when tested on those skills and abilities.

Legal action involving physical fitness tests

In spite of hiring a personal trainer and preparing for the Chicago Fire Department's Physical Abilities Test (PAT), Samantha Vasich failed the physical abilities test in 2010, causing the Chicago Fire Department to reject her employment application [116]. She filed a civil rights lawsuit against the city of Chicago, alleging that the test is discriminatory, and is seeking class action status.

The Chicago Fire Department does not use the IAFF-developed CPAT. Instead, it hired a private company to develop and administer the PAT [117] and has been using the current test since 1996 [116]. The PAT is a four-part “gym-style” physical test [117, 118, 119]:

1. Arm lifts
2. An arm endurance test using a hand cycle
3. Leg lifts performed by stepping on and off a platform while carrying 18-pound weights
4. Hose drag (2.5-inch hose 70-feet) and high-rise pack carry

Women fail the PAT at a disproportionate rate to men [117]: 80 percent of women fail compared with 8 percent of men.⁵¹ Although IAFF

51. Chicago administers the PAT infrequently. In 1995 and 2006, 19 percent of women passed in each year (64 of 345 in 1995; 44 of 227 in 2006), compared with 92 percent of men who passed in 1995 (3,300 of 3,583) and 93 percent in 2006 (1,404 of 1,512) [117].

lacks official statistics, [118] asserts that fewer women pass the PAT than the CPAT. Several key points resonate throughout the media coverage of this lawsuit:

- The PAT is not representative of on-the-job tasks and does not correlate with successful performance at the academy or on the job [116 through 120].
- The PAT emphasizes strength rather than fire-fighting skills [117].
- Testing administration, methodology, and evaluation are neither transparent nor reasonably justifiable [117, 119].
- Standards and requirements are not provided [117, 119].
- Chicago does not provide practice runs or tests for applicants [119].
- Applicants do not know how they are doing on the PAT while performing it, nor are they told which part(s) they failed.

In several articles [117, 119, 120], the CPAT is heralded as being a fairer and more transparent test that should be used in place of the PAT. Currently, only 2 percent, or 116 out of 5,000, of Chicago's fire fighters are women [117, 119].

Despite the CPAT program's widespread use since it began in 1999, it has not come under legal scrutiny because of the conciliation agreement between IAFF and the EEOC. In 2006, IAFF and EEOC entered into an agreement that, in 2012, IAFF would provide data, such as pass/fail rates by gender, for the CPAT [113]. Until the EEOC received these data, it would not look into any CPAT-related lawsuits [113]. IAFF-licensed professional departments are required to forward testing data to IAFF.

According to the terms and conditions of the CPAT license [120]:

The CPAT license is granted only upon the express conditions that the licensee must use the CPAT in whole and only for the purpose of candidate testing; it explicitly prohibits use of the CPAT to test incumbent members of a fire department.

Full implementation of the CPAT includes providing “recruiting and mentoring programs, providing recruits with fitness guidance to help prepare them for the CPAT, and setting up and administering the test” [120]. Anecdotally, departments report that those who participate fully in the orientation process have higher pass rates than those who have partial or no participation [113]. Supporting data will not be available until late 2012. To date, IAFF has received two challenges to CPAT, both initiated by women; nothing came of either one [113].

Smokejumpers

Overview

Most wildland, or forest, fire fighting occurs on federal land. Wildland fire fighters typically work for the U.S. Forest Service (USFS), the Bureau of Land Management (BLM), the National Park Service (NPS), the Bureau of Indian Affairs, and the U.S. Fish and Wildlife Service (FWS) for national wildlife refuges.⁵² Smokejumpers are an elite subset of wildland fire fighters. Their methods and equipment differ from those of other fire fighters [110].

Smokejumpers parachute or rappel into access-constrained areas, and their tools, fire-fighting chemicals, and enough food and water to be self-sufficient for 48 hours are air-dropped to them [122]. Smokejumpers stay with the fire until it is extinguished and are often called on to work 14 to 16 hours a day constructing a fireline [121]. Smokejumping is not an entry-level fire-fighting position [121]; applicants are experienced wildland fire fighters [122, 121]. Physical fitness is part of the screening criteria because the job requires strength and stamina.

Qualifications

Following an application screening and interview, smokejumper candidates attend rookie training. Both BLM and USFS smokejumping recruits must pass the same Office of Personnel Management (OPM) Physical Fitness Standards for smokejumping [123, 124]:

52. There are approximately 150 BLM and 280 USFS smokejumpers [121].

- 25 push-ups
- 45 sit-ups
- 7 pull-ups
- 1.5-mile run in 11 minutes or less

For BLM recruits, this test is administered on the first day of training, and candidates must pass it to continue in the program [121, 123]. The exercises must be performed within “one time period with a 5-minute break between exercises” [123].⁵³

USFS recruits must pass the test during the first week of training before participating in further training [124]. The exercises must be performed “during one established time period with a break of not less than 5 minutes, nor more than 7 minutes between events” [124].

BLM and USFS recruits must pass two additional tests as conditions of employment [123, 124]:

- Pack-Off Test: 3-mile hike over level ground carrying a 110-pound pack in 90 minutes or less
- Work Capacity Test at the arduous level: 3-mile hike over level ground carrying a 45-pound pack in 45 minutes or less

They also must pass medical exams. Height and weight requirements apply. Candidates must be between 60 and 77 inches tall and weigh between 120 and 200 pounds [123]. The weight range (120 to 200 pounds) set for smokejumpers is based on the rate of descent using a standard-issue parachute [125]; it is not based on gender.

After passing the three physical fitness tests, candidates complete “an intensive training program in parachute jumping and fire suppression methods and techniques” and “must demonstrate a high level of

53. The OPM test is considered a minimum requirement. BLM smokejumpers have their own standard that they feel better predicts a person’s “potential for successful completion of rookie training” [121]: 35 push-ups, 60 sit-ups, 10 pull-ups, run 1.5 miles in 9:30 or 3 miles in 22:30, and pack 110 pounds on level terrain for 3 miles in 90 minutes or less.

proficiency in the various aspects of parachute jumping and smokejumper related duties” [123]. USFS smokejumping employees and recruits must pass all three test annually before making the first training or refresher jump and working on the fireline [122, 124].

Women smokejumpers

Smokejumping was an all-male profession until 1981 when Deanne Shulman became the first woman smokejumper. In 1979, she washed out of rookie training not because she failed the physical fitness test but because she didn’t meet the height and weight requirements in place at the time. She was later admitted after filing an EEOC complaint.

Smokejumping is still primarily a male profession and women smokejumpers are rare. As of 2003, there were 27 women among the nation’s 400-plus smokejumpers (i.e., less than 7 percent) [125]. The training program is the same for both genders. Teams are set at the beginning of the season through random selection, and they are assigned to fires based on the rotation schedule [125].

Special Weapons and Tactics (SWAT) teams

Overview and qualifications

The first SWAT teams were formed within the L.A. Police Department in 1969. Volunteers from within the police department made up the 15 four-man teams; all were men who had specialized experience and prior military service [126].

Today, each police department sets its own standards for SWAT team selection and training. After serving a minimum tenure with a department, police officers may apply to the SWAT section. They undergo a psychological evaluation and must pass written, oral, and physical tests.

Because SWAT teams conduct tactical operations, they must maintain their physical fitness and weapon proficiency. Physical fitness is typically part of the daily regimen of SWAT team members, and they must continue to pass the physical fitness test on a routine basis. The phys-

ical fitness component often includes running, push-ups, pull-ups, weight lifting, and agility exercises [127].

For example, for Nashville SWAT, applicants must complete the following exercises [128]:⁵⁴

- 2-mile run in 17 minutes and 45 seconds
- 4 deadhang pull-ups
- 35 push-ups in 2 minutes
- 50 sit-ups in 2 minutes

SWAT members must pass these requirements on a quarterly basis. Women have passed the Nashville SWAT physical fitness test in the past, although there are currently no female SWAT members [128]. The Nashville Police Department is considering going to the Cooper Fitness standard [128]; an attractive feature of this standard is that it has been defended legally in court. The Texas Tactical Police Officers Association has endorsed this standard. The Cooper “Single Cut-Point” standard involves a 1.5-mile run in 16 minutes and 28 seconds, a 300-meter run in 1 minute and 11 seconds, 25 push-ups in 1 minute, and 29 sit-ups in 1 minute [130].

Women in SWAT

Although the SWAT concept began in Los Angeles, only five women have ever volunteered for the LAPD's SWAT [131], and only one has ever completed training. Jennifer Grasso made national news in 2008 when she was permitted to enter its 12-week training program [131].⁵⁵ The physical fitness test included a three-mile run, sit-ups, push-ups, pull-ups, and an obstacle course [132]. She passed the training program and was selected to join LAPD's SWAT unit.

54. The SWAT requirements are more stringent than the pre-employment physical ability test [129] that applicants to the Nashville Police Department must pass: 15 or more sit-ups in 1 minute.

55. Acceptance into and successful completion of the training program do not guarantee acceptance into the SWAT unit. Successful applicants vie for a handful of slots.

In 2010, the first woman joined the Unified Police Department/Salt Lake County Sheriff Office's SWAT team [133]. Of the 21 people who tried out for SWAT in 2010, two were women; only five people were selected [133]. An average of 15 to 20 people try out for Unified Police Department/Salt Lake County Sheriff Office's SWAT team each year; typically, one or two are women [133]. One-third of the applicants attrite during the training process [133].

Wrap-up

The tests to become a fire fighter or SWAT professional are very physically intensive. In the case of fire fighting, the CPAT requires completing many tasks while carrying 75 pounds; smokejumpers must carry a 100-pound pack during a 3-mile hike. Although most SWAT units do not appear to require physical testing carrying excess weight, they do have intense physical standards that are difficult to achieve. Women's low pass rates on the physical tests required to become a fire fighter or SWAT officer may well be a contributing factor to their lack of interest or representation in these professions.

Glossary

AACC	All Arms Commando Course
ACS	All-Corps Soldier (Australian Army)
ADA	Australian Defence Association
ADF	Australian Defence Force
AFT	Annual Fitness Test
AIB	Admiralty Interview Board
AIRN	Army Individual Readiness Notice
ARTC	Army Recruit Training Centre
ATR(P)	Army Training Regiment (Pirbright)
BCC	Basic Close Combat
BCD	Break Contact Drill (Australian Defence Force)
BCL	Berkshire Consultancy Limited
BFA	Basic Fitness Assessment (Australian Army)
BFOR	Bona Fide Occupational Requirements (Canadian Forces)
BLM	Bureau of Land Management
BLP	Box Lift and Place (Australian Defence Force)
CF	Canadian Forces
CFA	Combat Fitness Assessment (Australian Army)
CFPFSS	Canadian Forces Personnel and Family Support Services (Air Force)
CMP	Chief of Military Personnel (Canadian Forces)
CPAT	Candidate Physical Ability Test
CREW	Combat Related Employment of Women
CREWET	Combat Related Employment of Women Evaluation Team
CSOR	Canadian Special Operations Regiment
CSTF	Canadian Standardization Test of Fitness
DCC	Dismounted Close Combat

DFIT	Director of Fitness (Canadian Forces)
DND	Department of National Defence (Canada)
DOL	U.S. Department of Labor
DSTO	Defence Science and Technology Organisation
EEOC	U.S. Equal Employment Opportunity Commission
FM	Forced March
FWS	U.S. Fish and Wildlife Service
GBAD	Ground-Based Air Defence (Australian Defence Force)
GPS	Global Positioning System
IAFC	International Association of Fire Chiefs
IAFF	International Association of Fire Fighters
IDF-PT	Israeli Defense Force Physical Test
JTF 2	Joint Task Force 2
LAFD	Los Angeles Fire Department
LC	Lift and Carry (Australian Defence Force)
LFCPFS	Land Force Command Physical Fitness Standard (Canadian Forces)
MFA	Ministry of Foreign Affairs (Israeli Defence Force)
MOC	Military Occupational Career (Canadian Forces)
MOS	Military Occupational Specialty
MPFS	Minimum Physical Fitness Standards (Canadian Forces)
NBC	Nuclear, Biological, and Chemical
NCM	Non-Commissioned Member (Canadian Forces)
NCO	Non-Commissioned Officer
NPS	National Park Service
PAT	Physical Abilities Test (Chicago Fire Department)
PES	Physical Employment Standard

PFA	Pre-joining Physical Fitness Assessment (Australian Army)
PJFT	Pre-Joining Fitness Test (Royal Marines)
PLCE	Personal Load Carrying Equipment (Royal Marines)
POC	Potential Officers Course
POW	Prisoner of War
PPE	Personal Protective Equipment
PSS(R)	Physical Selection Standards for Recruits
RA	Royal Artillery (British Army)
RAAF	Royal Australian Air Force
RAF	Royal Air Force
RAN	Royal Australian Navy
RDJ	Run Dodge Jump
RE	Royal Engineers (British Army)
REME	Royal Electrical and Mechanical Engineers (British Army)
RMC	Royal Military College (United Kingdom)
RTO	Recruit Training Officer (Phoenix Fire Dept.)
SAR	Search and Rescue
SCBA	Self-Contained Breathing Apparatus
SOA	Special Operations Assaulters (Canadian Forces)
SO Cox'n	Special Operations Coxswains (Canadian Forces)
SP	Support Personnel (Canadian Forces)
SWAT	Special Weapons and Tactics
SWINTER	Servicewomen in Non-Traditional Environments and Roles (Canadian Forces)
U.K.	United Kingdom
USFS	U.S. Forest Service

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List of figures

Figure 1. Percentage of women in the CF, various years between 1971 and 2010	40
Figure 2. Percentage of active-duty combat arms personnel who are women, both officer and NCMs, various years between 1989 and 2007	43

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List of tables

Table 1.	Australian Army’s physical assessments.	9
Table 3.	Basic Fitness Assessment standards.	10
Table 2.	Physical Fitness Assessment standards for enlistment and appointment	10
Table 4.	Combat Fitness Assessment standards’	11
Table 5.	Trade-specific PES schedule	14
Table 6.	All-Corps Soldier and Combat Arms PES	17
Table 7.	PESs for combat arms employment categories . . .	17
Table 8.	Royal Marines and British Army physical standards	25
Table 9.	British Army officer candidate physical fitness standards.	29
Table 10.	British Army soldier recruit physical fitness standards.	29
Table 11.	Canadian Forces’ physical assessments.	48
Table 12.	Common military tasks fitness evaluation standards.	51
Table 13.	CF Minimum Physical Fitness Standards (CF ExPRES Program)	52
Table 14.	Land Force Command Physical Fitness Standard.	53
Table 15.	10-item circuit for FF PFMP	54

Table 16.	Women in open-combat occupations, Aug. 2010 (from [92])	59
Table 17.	2009 figures for U.S. fire departments and fire fighters	67
Table 18.	Exercises and fitness levels for the drill tower warm-up portion of the LAFD training academy physical fitness program	73
Table 19.	Summary of survey results for physical fitness tests during hiring	75
Table 20.	Fire department survey results for physical fitness testing during hiring	75

