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A Force to be Reckoned with:
How a Focus on A Fitter Sailor Will Benefit the Royal Canadian Navy

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JCSP 48
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My time at the Canadian Forces College has been a rejuvenating force for my career. I would like to extend my sincere thanks and gratitude to my thesis advisor Dr. Louis-Philippe Rouillard. In addition, Lieutenant-Colonel Anthony Robb who has been an informal advisor and friend throughout my time on the Joint Command and Staff Programme. My father Geoff Hill, who is a skilled editor and academic in his own right, also regularly challenged my assumptions and propositions.

Physical fitness has become a personal interest throughout my career. Similar to General Matthew Ridgway, who I reference in this paper several times, I consider it an important aspect of my personal leadership ethos. I have benefited both personally and professionally from unit physical training and group sports over my 20 years in the Canadian Armed Forces.

Leaders in the force who exemplify the use of physical fitness to great success, and influenced my thinking on the topic include Colonel Dany Boivin, Rear-Admiral (retired) Simon Page, and Rear Admiral Chris Sutherland. I feel it is now up to a new generation of Flag Officers, Senior Officers, and Senior Non-Commissioned Members to get the Royal Canadian Navy on a path towards better health and fitness. My hope is that this project can be a starting point for a larger discussion and an impetus for change.

ABSTRACT

The Canadian naval fleet is unique in its ability to provide diplomatic, industrial, economic and informational benefits to the state through the use of soft and hard power alongside and on the open seas. Threatening these whole of government contributions is the fact that the Royal Canadian Navy has low health related fitness compared to other elements. This paper argues that changes to the navy's approach to physical training should be undertaken to benefit the force in terms of health, lower attrition and ultimately Naval Readiness. To achieve this, recommendations will be proposed that are built upon the latest research into the health profile of the force, how best to motivate change, and which types of changes have and should prove most effective. Ultimately, a greater informal and institutional focus on this issue, rooted in a culture of fitness will be shown to be a critical component in evolving the business of our business.

LIST OF ABBREVIATIONS

Active Living and Injury Prevention	ALIP
Armed Forces Council	AFC
Army Fitness Standard	AFS
Attack Team	AT
Behavioural Change Techniques	BCT
Bona Fide Occupational Requirement	BFOR
Canadian Armed Forces	CAF
Canadian Army	CA
Canadian Army Integrated Performance Standard	CAIPS
Canadian Forces Base	CFB
Canadian Forces College	CFC
Canadian Forces General Message	CANFORGEN
CF Exercise Prescription	EXPRES
Character Based Leadership	CBL
Chief of Defence Staff	CDS
Chief of Military Personnel	CMP
Commanding Officer	CO
Conseil International du Sport Militaire	CISM
Defence Research and Development Canada	DRDC
Department of National Defence	DND
Director General Military Personnel Research and Analysis	DGMPRA
Director of Fitness	DFIT
Engine Room	ER
FORCE Combat	FC
Fleet Diving Unit Atlantic	FDU(A)
Health and Lifestyle Information Survey	HLIS
High intensity functional training	HIFT
Lieutenant-Commander	LCdr
Machinery Control Room	MCR
Maritime Forces Atlantic	MARLANT
Maritime Forces Pacific	MARPAC
Minimum Physical Fitness Standard	MPFS
Naval Combat Information Operators	NCIOP
Naval Communicators	NAVCOMM
Naval Electronic Sensor Operators	NESOP
Navy, Sea, Air, and Land	SEAL
Performance 4	P4
Personnel Support Programs	PSP
Physical Training	PT
Royal Canadian Air Force	RCAF
Royal Canadian Navy	RCN
Self-contained Breathing Apparatus	SCBA
World Health Organization	WHO

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A FORCE TO BE RECKONED WITH: HOW A FOCUS ON A FITTER SAILOR WILL BENEFIT THE ROYAL CANADIAN NAVY

> *"This [physical fitness] is leadership business, and I expect the support of leaders at all levels to ensure the Canadian Forces is fit to fight."*
>
> - General Rick Hillier, *in 2006 during the height of the Canada's War in Afghanistan*

CHAPTER 1 - INTRODUCTION

During the height of Canada's mission in Afghanistan, then Chief of Defence Staff (CDS) General Rick Hillier issued new orders and policies to the Canadian Forces regarding health and physical fitness.[1] These directives were in response to an expansive 2004 Health and Lifestyle Information Survey (HLIS). The survey was conducted between September 2005 and December 2006, on both reserve and regular force members.[2] The survey found that members of the Canadian Armed Forces (CAF) were exercising less and gaining weight.[3] It also found that despite the lowering of fitness standards over the proceeding 20 years, up to 15% of CAF members were failing their annual fitness test. To energize the institution into reversing these negative trends, General Hillier put the CF Health and Physical Fitness Strategy into action on 31 March 2008. The strategy's purpose was to ensure that military personnel continued to be healthier and fitter than the general population. Additionally, to make certain that the

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[1]Department of National Defence, "Defence Administrative Orders and Directives 5023 – Table of Contents," last accessed 1 February 2022, https://www.canada.ca/en/department-national-defence/corporate/policies-standards/defence-administrative-orders-directives/5000-series/5023.html.

[2]The first HLIS was conducted in 2000 and has been conducted every four to five years up until 2019. Results from the latest survey in 2019, titled the Canadian Armed Forces Health Survey are narrower in focus compared to previous HLIS.

[3]Canadian Broadcasting Corporation, "Forces exercising less, failing fitness tests," last accessed 1 February 2022, https://www.cbc.ca/news/canada/nova-scotia/forces-exercising-less-failing-fitness-tests-1.592828.

strength and endurance of CAF members could make the difference between success and failure in complex and demanding operational environments.[4]

Since the release of the strategy, subsequent HLIS have shown that health related trends for the CAF have continued to worsen. Approximately one third of CAF members remain inactive, and 25% self report as being obese.[5] Policies which halted promotions and could eventually release individuals for failing to pass their annual fitness test have been put aside in the face of lower recruitment, and increasing attrition amongst what is termed the "missing middle".[6] While the 2008 strategy's goal of placing a newfound emphasis on physical fitness and wellness across ranks was not entirely achieved, it was accompanied by an increase in resources. These resources allowed Personnel Support Programs (PSP) to begin the integration of health promotion programming with new physical fitness standards into what now is called the FORCE program.[7] The new associated fitness test, called the FORCE Evaluation, has proven itself particularly innovative in that the data it collects can be analyzed and correlated on a yearly basis. This means that CAF leadership no longer has to wait half a decade to receive the results of the HLIS and a specific Command report, and that more granular data points on groups and even units down to Level Three organizations are available. With this data,

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[4]Department of National Defence, *Canadian Forces Health and Physical Fitness Strategy* (Ottawa, ON: Canadian Forces Morale and Welfare Services, 2008), 4.

[5]Department of National Defence, "Health and Lifestyle Information Survey of Canadian Armed Forces Personnel," last accessed 1 February 2022, https://www.cafconnection.ca/getmedia/cf673d7e-0006-4204-9b67-8fc108605f61/HealthLifestyleSurvey_SocialMedia_Rev10.aspx.

[6]Canadian Armed Forces, *CDS Planning Directive For Canadian Armed Forces Reconstitution* (Chief of Defence Staff, 9 July 2021), 5.

[7]Canadian Forces Morale and Welfare Services, "Ground breaking CAF fitness program introduced," last accessed 1 February 2022, https://www.cfmws.com/en/AboutUs/CFPFSS/CFMWS_20th_Anniversary/Pages/Ground_breaking_CAF_fitness_program_introduced.aspx#:~:text=The%20FORCE%20program%20officially%20launched.

leadership can act on highlighted areas which can be improved annually. A successive document to the CAF's 2008 Fitness Strategy has also been released, named BALANCE – the CAF Physical Performance Strategy.[8] With a culture of fitness as its core, it looks to encapsulate other elements necessary for members to achieve a high level of physical performance, such as nutrition, rest, and injury prevention.

The term physical fitness is often used interchangeably with physical activity, and physical exercise. It is important to distinguish between the three concepts. As found in a still widely quoted 1985 paper developed for the US National Institutes of Health, physical activity is defined as "any bodily movement produced by skeletal muscles that results in energy expenditure."[9] There are different categories of physical activity, some of which include sports, conditioning, occupational, and household. By extension, physical exercise or physical training (PT) is the repetitive, planned and structured nature of specific physical activities, with the goal of improving one's health. Physical fitness in contrast to physical activity / exercise, is a set of attributes that people have or seek to achieve. The general attributes of health related physical fitness are (a) cardiorespiratory endurance, (b) muscular endurance, (c) muscular strength, (d) body composition, and (e) flexibility. Elements of physical fitness, including skills such as agility, balance, coordination, speed, power, and reaction time are all measurable, and should be of interest to the leadership of the CAF to determine if military members are physically fit.

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[8]Canadian Forces Morale and Welfare Services, "Balance Strategy," last accessed 1 February 2022, https://www.cafconnection.ca/National/Programs-Services/For-Military-Personnel/Military-Fitness/BALANCE-Strategy.aspx.

[9]Carl J. Caspersen, Kenneth E. Powell, and Gregory M. Christenson, "Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research," *Public Health Reports* 100, no. 2 (March – April 1985), 126.

The US President's Council on Physical Fitness and Sports defines being physically fit as "the ability to carry out tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure time pursuits and to meet unforeseen emergencies."[10]

As the CAF uses elements of physical fitness, assessed during a FORCE evaluation, to establish the fitness profile of its personnel, it is worth briefly expanding on the external battle being fought with the Canadian population as a whole. As CAF members are drawn from the general population, and often spend a majority of one's time outside of the workplace, its health related trends directly impact our personnel. In a 2017 report published by the Public Health Agency of Canada, it noted that nearly two thirds of Canadian adults over the age of 18 are either overweight or obese.[11] This is an increase from 49% in 1979, and 59% in 2004. Labelling the problem an epidemic, a similar report for the Canadian Senate Standing Committee on Social Affairs, Science, and Technology found that due to excess weight, 48000 – 66000 die from directly related medical conditions each year.[12] Another research article for Statistics Canada commissioned in 2020, found that the majority of Canadians (82.5%) do not meet Health Canada guidelines of greater than 150 minutes per week of moderate-to-vigorous physical activity. In addition to this, 65% of adults spend the majority of their total day being

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[10]President's Council on Physical Fitness and Sports, Physical Fitness Research Digest 1, no. 1, (Washington, DC: 1971).

[11]Public Health Agency of Canada, "Tackling Obesity in Canada: Obesity and Excess Weight Rates in Canadian Adults," last accessed 1 February 2022, https://www.canada.ca/en/public-health/services/publications/healthy-living/obesity-excess-weight-rates-canadian-adults.html. As of 2017, 64% of adults over the age of 18 are overweight or obese.

[12]Standing Committee on Social Affairs, Science and Technology, *Obesity in Canada* (Ottawa, ON: Senate of Canada, 2016), 7.

sedentary. As society's unhealthy behaviour and sedentary preferences continue to worsen, the CAF's mission to have a strong, healthy, and fit military will continue to be challenged. This seems to be particularly germane to the Royal Canadian Navy (RCN).

As of late 2021, the RCN's military and civilian workforce is just over 75% staffed, including approximately 1000 regular force positions out of 7,539 left vacant.[13] Overall CAF attrition, pre-COVID (2017-2019) averaged over 5420 personnel per year, of which 32% of those were medically released.[14] These numbers are important for two critical reasons. Firstly, that attrition is a more controllable factor by managers and leaders across the entire CAF and Department of National Defence (DND), when compared to recruitment.[15] Secondly, medical research shows irrefutable evidence that fitter individuals are less prone to injury and chronic disease, and are mentally more resilient and happier.

Recognizing these assertions, the current FORCE fitness profile of the RCN is particularly worrying. In a 2018 presentation to the Naval Strategic Management Board, the RCN Command Surgeon and PSP Director of Fitness (DFIT) concluded, "The RCN is the lowest performing environment on the FORCE Fitness Profile, and has a higher rate of obesity and other risk factors for cardiovascular disease compared to the CAF [as a whole]."[16] Contrasted directly against both the Canadian Army (CA), and the Royal

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[13]Royal Canadian Navy, *RCN Managed Workforce Health – Current TES vs. Positions*, (Ottawa, ON: Directorate of Naval Personnel, 1 November 2021).

[14]Lee Pothier (Naval Technical Officer Occupation Manager), "Attrition vs. Medical Release Data," email with Graham Hill, 16 November 2021.

[15]The Chief of Military Personnel is responsible for the CAF recruitment of Regular Force Personnel under the Canadian Forces Recruiting Group (CFRG). Force Generators such as the RCN may only assist and augment this group in limited ways and means.

[16]Ramona Burke *et al,* "RCN Force Fitness – Health and Wellness Profile" (presentation, Naval Strategic Management Board, Ottawa, ON, 6 April 2018).

Canadian Air Force (RCAF), the RCN is both 5% more obese, and achieving only marginal health related fitness objectives.

It is therefore incumbent on the Navy to consider its force posture and readiness, and enhance the physical fitness of its sailors through both a greater informal, and institutional focus. Fitter sailors will not only be more productive, but less likely to seek voluntary release, or be subjected to a compulsory medical release. The necessary changes that must be undertaken are not exclusively programmatic in nature, but rather rooted in a culture of fitness, that must become a part of the RCN's core mission and exercised daily.

The first chapter of this paper will explore the history of fitness in the military, the importance of fitness related strategies to the CAF, and how the institution measures the total health profile of its members. The chapter will also compare its current health related trends, and provide specific information related to RCN attrition rates. The next chapter will present relevant medical research regarding the positive connections between PT and health related outcomes. It will also include motivational change methods that best encourage and motivate individuals to be more physically fit. Several practical case studies will also explore the continued need for fitness in the RCN, and how the CA has managed to better inculcate a culture of fitness in its ranks. Finally, the last chapter will examine how Naval Readiness will benefit from solutions which focus the RCN onto strengthening the fitness profile of its members. Connecting the information presented in chapters two and three, it will describe current initiatives and recommend new ones, while arguing that clear and consistent leadership practices are the most critical element

needed to change actual behaviours, and ultimately encourage proper physical fitness and lifestyle choices.

CHAPTER 2 - DEFINING THE PROBLEM

Historical Context

Physical fitness has and will continue to be a key factor in ensuring the CAF is operationally effective, and ready to ensure the future defence interests of Canada. In a 1999 version of Dispatches, a publication from the CA Lessons Learned Centre, a corporal was quoted as saying "In operational theatres, people who are physically unable to do their jobs are a hazard not only to themselves but others!"[17] While such sentiment should be clear and unambiguous to those who serve in Armed Forces, recent health trends in the CAF suggest otherwise. Historically, there are many examples of how militaries and their leaders have embraced a regimented approach to physical fitness, and greatly benefited from doing so.

The Roman Empire maintained a highly trained and large standing professional army and navy. Their PT was outlined in *Epitoma rei militaris* or Concerning Military Matters by the Roman historian Vegetius.[18] To survive 20 years in the legion, recruits were first taught to march at speed; the standard being the ability to march 20 miles in step over a five-hour period. Soldiers were also trained to jump over ditches and climb any height to move around obstacles. Swimming, necessary to cross rivers to both engage and even retreat from the enemy, was also taught in the summer months. Recruits were also required to frequently carry up to 60 pounds on the march, as some campaigns necessitated the carrying of provisions as well as weapons as a prelude to conflict. All the associated PT associated with these tasks was conducted to ensure legions would not fall

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[17]The Army Lessons Learned Centre, "Physical Fitness Training," *Dispatches* 6, no. 1 (April 1999): 3.

[18]Pablius Flavius Vegetius, *Epitoma reit militaris,* (Liverpool: Liverpool University Press, 1996), Retrieved http://www.imperium-romana.org/uploads/5/9/3/3/5933147/vegetius-roman-army.pdf

victim to being disorganized or split-up. The Romans believed that skill and training, vice numbers and untaught bravery, were the keys to producing victory.[19]

Over the course of his 50 years in the British Army, Field Marshall Montgomery considered high levels of physical fitness to be essential to both officers and the junior ranks. In a 1960s interview at the Memorial University of Newfoundland, he credits his experiences during World War One as convincing him that "… war is a highly professional business, and that there is no room in war for the amateur."[20] It was at this point that he famously cast aside all vices other than the study of war, with mental and physical fitness becoming one of his highest priorities. According to historian Alastair Horne, he often quoted a famous line from Kipling which read "Nations have passed away and left no trace, And History gives the naked case of it – One single, simple reason in all cases; They fell because their peoples were not fit."[21] Leading from the front on this issue, he made his command staff during World War Two do a five mile run once per week, and would be ruthless in sacking officers he considered would be physically unfit for command in action.[22] Field Marshall Montgomery was also Colonel Commandant (Honourary Colonel) of the Army Physical Training Corps from 1946 – 1960.

Another General from World War Two, Matthew B. Ridgway, who commanded the 82nd Airborne Division credited physical fitness as playing a huge part of his

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[19]*Ibid,* 3.

[20]"Field Marshall Montgomery Lord Taylor Interviewing," YouTube video, 7:05, posted by "NFLD Archive," 23 October 2015, https://www.youtube.com/watch?v=H1dz3pqbRaw&t=1228s.

[21]Armchair General, "Monty: World War II's Most Misunderstood General, Part 1," last modified 11 July 2005, http://armchairgeneral.com/monty-world-war-iis-most-misunderstood-general.htm

[22]Richard Mead, *Churchill's Lions: A biographical guide to the key British generals of World War II*, (Stroud, UK: Spellmount, 2007), 306.

leadership ethos, and more specifically one of his three basic ingredients of leadership.[23] In an address to the U.S. Army Command and General Staff College in 1966, he credited his earlier physical fitness training as something that greatly "… paid off in battle – first as a division, then as a corps, and finally as an army commander."[24] He also stressed that no one can predict when one can be placed into combat, and when that happens, you will have no time to get in shape, and therefore "You must be in shape all the time."[25]

In more modern campaigns, the Falklands War demonstrated the need for troops to be physically fit for combat as per the Ridgway ethos. As UK Forces did not achieve complete air superiority during the conflict, and the very difficult terrain of the islands precluded the use of mechanized transport, soldiers of 3 Commando Brigade marched up to 60 km per day on foot. In addition, each soldier carried up to 60 kg. In an article for *Strategic Survey*, one of the lessons learned that had an immediate impact on post conflict British Defence planning was that "Under extreme climatic and terrain conditions, physical fitness and small unit morale are critically important."[26]

In similarly challenging physical conditions in southern Afghanistan during Operation *Athena*, the value of fitness was proven time and again by members of the CA. Despite the number of vehicles or helicopters made available for the transport of troops in Kandahar, infantry was always dismounting with heavy loads, often in extreme

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[23]General Matthew B. Ridgway, "Leadership," *Military Review* (October 1966): 48, https://nrotc.arizona.edu/sites/default/files/Gen%20Ridgeway%20%28Leadership%29%20-%20reduced%20size.pdf.

[24]*Ibid.*

[25]*Ibid,* 49.

[26]"Military Lessons of the Falklands Campaign," *Strategic Survey* 83, no. 1 (January 1, 1982): 121–23, https://doi.org/10.1080/04597238208460594.

temperatures.[27] Equipped with up to 120 pounds of gear, soldiers could find themselves in mountainous terrain for days at a time. In a collaborative study between the University of New Brunswick Gregg Centre for the Study of War and Society, and the DND, most interviewed soldiers who participated in Operation *Athena* commented on the primacy of fitness training pre-deployment, as the best prevention of field casualties due to injury and strain.[28]

At the 2009 Conseil International du Sport Militaire (CISM) Swimming and Lifesaving Championship, then CDS General Walter Natyczyk discussed the important role physical fitness has on the state of the CAF. Drawing upon his own personal command experience, he stated that "Maintaining a high state of personal physical fitness is fundamental for the CF" and that it also fosters teamwork, leadership, and promotes a strong work life balance.[29] This advice very much aligns with the current CDS' guidance to Commanding Officers (CO) and their Leadership Teams, which affirms that the promotion of daily physical fitness (preferably in a group setting), improves work performance, reduces stress, and increases morale.[30]

Many other Canadian General and Flag Officers, especially those whom are patrons of CISM sports, also espouse the critical nature that fitness has had on their careers. Major-General Lise Bourgon, current Acting Chief of Military Personnel (CMP) and sport patron, expressed in her biography that "I am a big proponent of physical

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[27]The Army Lessons Learned Centre, "The Royal Canadian Infantry Corps in Afghanistan," *Dispatches* 17, no. 1 (December 2013): 25.

[28]*Ibid.*

[29]Government of Canada, "Canadian Forces Members Compete with International Military Swimmers in Montreal," last modified 6 August 2009, https://www.canada.ca/en/news/archive/2009/08/canadian-forces-members-compete-international-military-swimmers-montreal.html.

[30]Department of National Defence, *Chief of Defence Staff Guidance to Commanding Officers and their Leadership Team*s (Ottawa: DND Canada, 15 October 2020), 12-53.

activity and sport and try to incorporate them into my life as much as possible."[31] She also believes that physical fitness and mental fortitude go hand and hand, both being essential to life as a member of the CAF. In a 2018 report for the Centre for Disease Control and Prevention, brain health is listed as one of the main benefits of moderate to vigorous physical activity.[32] In terms of both acute and long-term effects, reduced anxiety, improved sleep and enhanced cognitive functions were all observed from the latest medical research. Sustained and organized physical fitness programs for CAF personnel will therefore increase member's abilities to plan and organize, as well as initiate tasks and control emotions.

The need for battle ready physical fitness is not restricted to the land domain. Naval operations are more or less continuous after a warship leaves port, with the ship routinely spending weeks at sea without reprieve. Sailors work irregular hours in sea conditions that can range from calm to severe, often in small spaces which present challenges to physical fitness programs that are more easily delivered while alongside. In the RCN's annex to BALANCE, the Commander RCN acknowledges these limitations, while more importantly noting that "…we [RCN] serve in a physically and mentally demanding environment where optimal work performance is paramount to conducting our business safely and effectively."[33] As such, maintaining ship's fitness while deployed is an important enough requirement that PSP staff are included in a unit's Table of

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[31]Canadian Armed Forces Sports Facebook page, 24 October 2018, accessed 21 February 2022, https://www.facebook.com/photo/?fbid=2151750781544464&set=a.2151750311544511.

[32]U.S. Department of Health and Human Services, *Physical Activity Guidelines for Americans, 2nd edition*, (Washington, DC: U.S. Department of Health and Human Services; 2018), 29.

[33]Canadian Forces Morale and Welfare Services, "Balance Strategy," last accessed 1 February, https://www.cafconnection.ca/National/Programs-Services/For-Military-Personnel/Military-Fitness/BALANCE-Strategy.aspx.

Organization and Equipment (personnel), alongside other mission specialists such as a Chaplain, Legal Advisor, and Public Affairs Officer.[34]

CAF Fitness Strategies

Over the last 20 years there have been two overarching strategies released by the CAF to ensure high levels of fitness and readiness are maintained by its members. The first was the CF Health and Physical Fitness Strategy promulgated in 2008. The second is BALANCE – The CAF Physical Performance Strategy that is in place now. Both strategies maintain that healthy and fit military members are essential to operational readiness. The different objectives and tone of each document are worth outlining, as they demonstrate an evolution in philosophy behind the support and motivations provided to those in uniform.

The 2008 strategy's strategic goal was to facilitate the "adoption of a healthy lifestyle" for the CAF.[35] The lead author for the strategy was CMP, however it was not developed in isolation but rather with a diverse team of stakeholders from the CA, RCAF, RCN, PSP Health Promotion, and the PSP DFIT. From a practical perspective, the CDS through this strategy wanted to better examine each element, establish new occupational fitness standards, and ultimately develop and sustain a healthier and fitter CAF. To accomplish this, the strategy outlined four guiding principles that the entirety of the institution would need to endorse, including:

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[34]A unit's Table of Organization and Equipment (personnel) is first generated at the strategic level, and then approved by a Force Employer, such as CJOC. It outlines all personnel (position / rank / occupation / source) required for a given deployment to accomplish a mission.

[35]Department of National Defence, *Canadian Forces Health and Physical Fitness Strategy* (Ottawa, ON: Canadian Forces Morale and Welfare Services, 2008), 30.

1. Accountability and responsibility for leaders and CAF members;
2. Operational focus by establishing standards in line with operational demands;
3. Measurable performance standards that are science based; and
4. Integrated force (regular and reserves) culture of health and physical fitness.

In addition to these four principles, motivation, awareness, support, and accountability were to be applied centrally, but executed decentrally by the chain of command (CoC). It therefore called upon local CoCs to produce their own directives in support of seven lines of operation, which ranged from defining responsibilities, facilitating time and access to regular physical activity, and education on healthy lifestyles.[36] Another important concept introduced was the application of a Health Domain model, to facilitate what would be termed a CF Culture of Fitness (Figure 1). The model recognized that the required outcome of the proposed schema must be CAF personnel who are healthy and fit to be deployable at all times. Additionally, such an outcome can only be achieved with a solid foundation (green layer in Figure 1), which looks beyond the individual and includes a social environment influencing physical activity participation.

[36]The complete seven lines of operation in the 2008 strategy are: Shared Ownership, Lifelong Lifestyle Commitment, Regular Physical Fitness Activity, Healthy Nutrition, Healthy Weight, Addiction Free Lifestyle, and Effective Governance Framework.

Figure 1 - Creating a CF Culture of Health Model

The Chief of Review Services conducted an audit of the strategy which was published in February 2014. While the aims of the strategy were found to be clear and necessary given the evolving health profile of the CAF, they concluded that the lack of a centralized accountability framework ultimately hampered its success.[37] The decentralized approach to action, meant funding for education, infrastructure, and physical fitness programming were inconsistent. It found that CAF base, wing, and station commanders, while supportive, could often push aside the goals of the strategy when confronted with short term operational priorities. Due to these flaws, it recommended that a new version of the strategy be drafted. This recommendation was accepted by CMP, and a target date of December 2014 was set to plan and generate an initiating directive to produce what would eventually be BALANCE.

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[37]Department of National Defence, *Audit of the CF Health and Physical Fitness Strategy and CF Fitness Program Delivery* (Ottawa, ON: Chief of Review Services, February 2014), 5.

BALANCE was released to the CAF/DND via Canadian Forces General Message (CANFORGEN) in February 2019.[38] While not specifically billed as a revision to the proceeding strategy, the tone and focus of BALANCE was changed, while the main goal of enhancing the culture of fitness and operational effectiveness of the CAF remained more or less the same.[39] One of the most noticeable terminology changes in the document was the removal of the term physical fitness. Physical fitness by its definition focuses on desirable traits, as opposed to its replacement term *Physical performance* which is behaviorally based in BALANCE. The four key behaviours supporting the new physical performance strategy, also called the performance 4 (P4) are: (a) Injury Prevention, (b) Sleep/rest, (c) Physical Activity, and (d) Performance Nutrition (Figure 2). By viewing these behaviours more holistically, and including a more robust accountability framework, the strategy hoped to achieve results of not just optimizing the physical fitness of soldiers, but also their cognitive performance.

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[38]Chief of Military Personnel, *Balance, The CAF Physical Performance Strategy,* Canadian Armed Forces: CANFORGEN, 031/19, 071319Z FEB 19.

[39]Canadian Forces Morale and Welfare Services (CFMWS), "Balance Strategy," last accessed 1 February 2022, https://www.cafconnection.ca/National/Programs-Services/For-Military-Personnel/Military-Fitness/BALANCE-Strategy.aspx.

Figure 2 - P4 Behaviours affecting Physical Performance

Implementation of the strategy was once again categorized as having a centralized intent, and decentralized execution. Unlike the previous strategy however, clear performance indicators were included as part of commander's intent. These included process, behaviour and performance indicators (Annex A). The data being gathered as part of annual FORCE tests would provide the bulk of the information to assess performance indicators, while surveys such as the HLIS, or locally conducted culture of fitness surveys would measure process and behavioural indicators. Various governance boards were also stood up as part of the CDS' strategic initiating directive 01/2016, including a strategic BALANCE steering committee made up of Senior Officers from each operational L1, and Base/Wing steering committees with representatives from major units and Health services. With a coordinated approach across the institution, leaders from unit command teams to individuals themselves, would not only be called upon to

promote P4 behaviours through education and awareness, but be evaluated on defined outcomes.

In a conversation with the CAF DFIT, he noted that BALANCE is an evolution in how the CAF/DND not only views the health and wellness of its service people, but how it can best influence their health related trends.[40] Whereas the 2008 strategy was supported and developed by expertise and knowledge in PSP which centred around physical fitness and injury prevention, the organization since that time had come to better understand the interplay between these factors, as well as those of nutrition and rest. New specialists, both within the Human Performance Research and Development sections of PSP, and the Directorate of Force Health Protection were able to provide scientifically backed advice to the programming implementation bodies of sports, fitness, and health promotion. Ultimately however, he noted that if negatively trending health outcomes are to be reversed, and the behaviour benchmarks achieved as set in BALANCE, individuals must be ready and motivated for change. PSP and Health Services have a large role to play in this mission, but are not sufficiently resourced to complete all the necessary elements of the change process, which includes education, risk awareness, understanding the benefits of an active lifestyle, and increasing access. He notes that the most influential role in this change is expected to be individual CoC.

With the onset of COVID-19, any judgment on the success of BALANCE will not be known for several more years. The ability to gather reliable and complete FORCE statistics for fiscal years 20-21 is not possible or at best skewed.[41] Additionally, the next

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[40]Daryl Allard, Microsoft Teams conversation, 18 November 2021.

[41]The ability to conduct an annual FORCE evaluation from March 2020 through March 2022 was greatly inhibited by the Government of Canada / DND work from home posture. Only those members with

CAF Health Survey is not expected to begin until at least 2022.[42] One clear deficiency with BALANCE, is a lack of any increase to centralized baseline funding which would be necessary to ensure the success of the program evenly, across all bases. This central funding, delivered from CMP to bases, in accordance with Service Level Agreements, is used for core/standard fitness programming, fitness facilities, and health promotion services. From the audit of the previous 2008 strategy, Chief of Review Services noted that "… associated baseline funding, should be determined and clearly articulated to all stakeholders."[43] It also noted that central funding for core/standard programming is often augmented by local funds, either from their parent Level One or non-public funds to achieve CAF programming needs. As local funding is not stable year to year, the measurable aspects of BALANCE could be inconsistent across the CAF. Resource instability affects staffing, and the possible delivery of fitness programs.

Evaluating Fitness

The use of a fitness standard in the CAF, is based on the organization's need to establish what is referred to in law as a bona fide (legitimate) occupational requirement (BFOR).[44] A BFOR is a reasonable, but potentially discriminatory requirement necessary for employment in an organization. Both the Canadian Human Rights Act, and rulings

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an operational requirement to conduct a test were given access. As a result, only 17128 evaluations were conducted in FY 2020 / 2021.

[42]Department of National Defence, "Health and Lifestyle Information Survey of Canadian Armed Forces Personnel of Canadian Armed Forces Personnel 2013/2014," last accessed 22 February 2022, https://www.canada.ca/content/dam/dnd-mdn/documents/health/health-and-lifestyle-survey-2013-2014.pdf. Page 5 mentions the frequency in which the survey is conducted (quadrennial).

[43]Department of National Defence, *Audit of the CF Health and Physical Fitness Strategy and CF Fitness Program Delivery* (Ottawa, ON: Chief of Review Services, February 2014), 8.

[44]Ontario Human Rights Commission, "Reasonable bona fide requirements," last accessed 22 February 2022, https://www.ohrc.on.ca/en/policy-preventing-discrimination-because-gender-identity-and-gender-expression/9-reasonable-bona-fide-requirements.

from the Supreme Court of Canada have established legal tests for when such a requirement can be designated a BFOR.[45] An employer must also be ready to defend the designation, namely that the function being performed fulfills a necessary purpose or goal, and that accommodation would not be possible due to undue hardship. Meeting the minimum operational standards as found in the Defence Administrative Orders and Directives 5023 series are BFORs, and they include the need to be deployable, employable, and physically fit. As such, each are based on military tasks that all CAF members must be able to perform. These tasks are developed based on objective and expert opinion, as well as scientific evidence when available.[46] The current six common military tasks related to the physical fit BFOR are: (a) escape to cover, (b) vehicle extrication, (c) picking and digging, (d) stretcher carry, (e) sandbag fortification, and (f) pickets and wire carry. All CAF members could be called upon regardless of gender, occupation, age, rank or environment to complete these tasks.

Establishing an evaluation for physical fitness, that effectively replicates these common military tasks in a cost-effective manner, is the origin for such tests in the CAF. Current evaluations are therefore more accurately described as tests of Universality of Service (UoS), with the added potential of monitoring the physical fitness levels of the force. The CF exercise prescription (EXPRES) program was used between 1983 and 2012, with a revalidation and testing scheme update in 1996.[47] In a 2014 Canadian Forces College (CFC) paper by Lehoux on military fitness evaluations, the history, procedures,

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[45]*Ibid.*

[46]Department of National Defence, *Project Force Phase 1 Report Identification of Common, Essential, and Physically Demanding Tasks in the CF* (Ottawa, ON: Director General Personnel and Family Support Services, 20 October 2011), 25.

[47]*Ibid.*

and impacts of not passing the EXPRES program / Minimum Physical Fitness Standard (MPFS) are explained in detail and will not be repeated in this paper.[48] However, it is worth expanding on additional points related to the MPFS, which relate directly to the FORCE fitness evaluation currently in use by the CAF today. Firstly, the four components tested, namely sit-ups, push-ups, handgrip dynamomter and 20-metre shuttle run (MSR), did scientifically predict overall body muscular strength, endurance, and aerobic fitness respectfully.[49] A measurement of body mass index (BMI) or waist circumference, which is a widely used international standard for examining indicators of health risk, was not part of the test.[50] Aerobic fitness however was approximated by the maximum oxygen uptake (VO2 maximum) predicted by the stage you achieved on the MSR. Despite the potential of this data to predict the health of the force, it was never used in this fashion by DND/CAF. Score results were recorded on paper records and never tabulated on an institutional level, with only pass/fail being recorded in the CAF's Human Resources Management System. Complicating this was the fact that the test was not administered universally to all CAF personnel, as some trade specific physical fitness evaluations were deemed to exceed the MPFS.[51]

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[48]M.C.G. Lehoux, "Fit Soldiers – Aiming Above the Force: Physical Evaluation in the CAF Today," (Joint Command and Staff Programme Paper, Canadian Forces College, 2014-2015), 12.

[49]Department of National Defence, *Project Force Phase 1 Report Identification of Common, Essential, and Physically Demanding Tasks in the CF* (Ottawa, ON: Director General Personnel and Family Support Services, 20 October 2011), 19.

[50]Health Canada, "Canadian Guidelines for Body Weight Classification in Adults – Quick Reference Tool for Professionals," last accessed 22 February 2022, https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/fn-an/alt_formats/hpfb-dgpsa/pdf/nutrition/cg_quick_ref-ldc_rapide_ref-eng.pdf.

[51]Canadian Forces Morale and Welfare Services, "History of Fitness," last accessed 22 February 2022, https://www.cfmws.com/en/AboutUs/PSP/DFIT/Fitness/Pages/History-of-Fitness.aspx.

As previously discussed, BFORs must be defendable. As new scientific studies were released over the life of the EXPRES program, and the essential jobs and roles of CAF members evolved out of the cold war paradigm, it became apparent that the MPFS needed to be re-validated. As an output of the 2008 Physical Fitness strategy, strategic initiating directive (SID) 4/10 was signed by CMP on 30 June 2010 to "Develop one common physical fitness standard for all military personnel … and be scientifically and legally defensible as a CF BFOR."[52] The current evaluation which was developed from this SID is the Fitness for Operational Requirements of CAF employment (FORCE).[53]

As described in the FORCE Evaluation Operation Manual, the FORCE evaluation is designed to "… capture the movement patterns, energy systems, and muscle group recruited in the performance of common military duties."[54] It approaches fitness testing by focusing on functional and operational tasks, establishing one common performance standard regardless of element, occupation, rank, gender, and age. It was developed by a Project Management Team, chaired by DFIT, and comprised of key operational stakeholders from across the CAF and supported by a research committee of subject matter experts. After a three-phase development and validation of task specific fitness tests and standard, the new FORCE program became operationalized starting in 2013/2014.[55] This program not only developed the FORCE evaluation, but also the six common military tasks fitness evaluation, known as CMTFE. The four components of the

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[52]Chief of Military Personnel, *Minimal Physical Fitness Standard Research (Project Force),* Canadian Armed Forces: Strategic Initiating Directive, 04/10, 30 June 2010.

[53]Canadian Forces Morale and Welfare Services, *FORCE Evaluation Operations Manual 3rd Edition* (Ottawa, ON: Personnel Support Programs, 2021), 3.

[54]*Ibid,* 4.

[55]Chief of Defence Staff, *Launch of New CAF Fitness Evaluation,* Canadian Armed Forces: CANFORGEN, 038/13, 071319Z MAR 13.

FORCE evaluation, including: (a) 20 m rushes, (b) sandbag lift, (c) intermittent loaded shuttles, and (d) sandbag drag, predict one's performance of the CMTFE, and must each be completed by a cutoff time. It is simply not feasible, from a time and effort perspective to administer the CFTFE to each member of the CAF annually. With the use of sandbags in a gym, the test can effectively be performed for large groups of individuals on a daily basis as required.[56]

Although the primary purpose of the FORCE evaluation is to ensure members meet the physically fit BFOR found in UoS principles, it also provides the CAF the ability to measure the physical fitness of its members. By conducting the test, every member is provided a FORCE Fitness Profile (Figure 3). As seen on the diagram, the overall assessment of the evaluation is plotted on a graph. The x axis is comprised of your health related fitness, measured as a combination of your waist circumference and estimated aerobic capacity. A waste circumference measurement is taken before the FORCE test commences. Aerobic capacity, or an estimate of your VO2 max, is a function of your completion times for each of the completed components. The y axis, or operational fitness, predicts one's ability to meet or exceed the minimum physical rigors of military services as measured by the completion times of the four components of the test. All members of the CAF must score above the red quadrant – operationally unfit section on the graph as determined by your operational fitness. If you exceed the time standards for the FORCE test to a large enough degree, normalized against your age and sex, you can also achieve a bronze, silver, gold, or platinum incentive. The data needed to

[56]A complete list of the required equipment can be found on page 9 of the FORCE Operations Evaluation Manual.

calculate these incentives was collected from the CAF general population during 2015 FORCE test trials, across five different bases and implemented by CANFORGEN in 2018.[57] Bronze, silver, gold, or platinum rewards are based on a normal distribution of results, meaning you fall into the 34, 14, 2, or 0.1% compared to your peers of the same age bracket and sex.

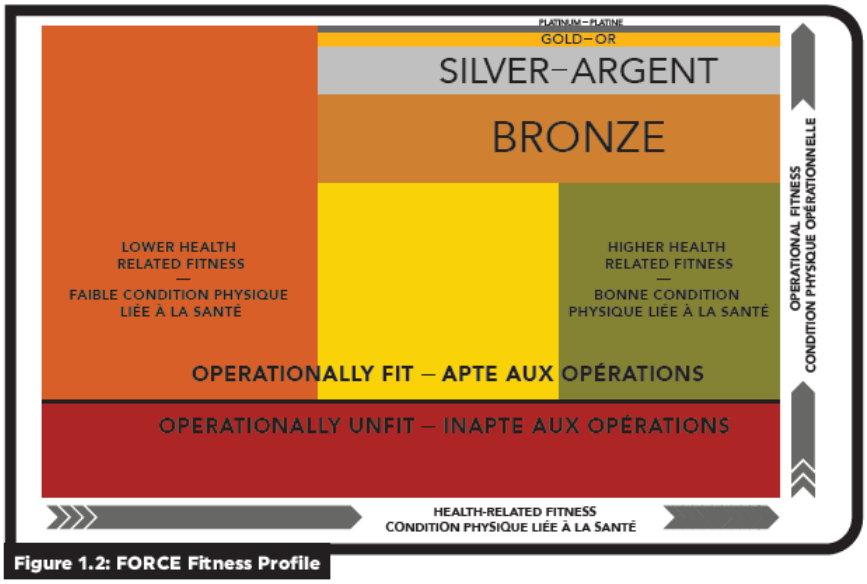

Figure 3 – FORCE Fitness Profile

When first launched, FORCE results were recorded in a similar fashion to the CF EXPRES test using paper records only. Since the launch of the FORCE Fitness Profile in 2018 however, the FORMeFIT electronic data collection system accurately captures member's results as per the FORCE Operational Manual. Using tablets which upload verified results post evaluation, PSP Fitness staff now have a way to measure both the health related fitness, and operational fitness of all CAF members, without any trade

[57]Chief of Military Personnel, *Canadian Armed Forces FORCE Rewards Program,* Canadian Armed Forces: CANFORGEN, 216/18, 142017Z DEC 18.

exceptions which were previously allowed under the CF EXPRES program. The FORMeFIT Reporting System, developed as a secure information portal, allows for digital tracking and reporting of the physical levels amongst CAF personnel.[58] In addition to displaying the performance of specific groups, it can also determine what percentage of the CAF completed the test, display average FORCE component completion times by gender, and also compare health related fitness parameters (aerobic capacity and waist circumference) against the Canadian population. Most critically, the year over year data reporting can aid in guiding CAF leadership, in consultation with PSP and health practitioners, on both programming and policy decisions.

Current Force Health and Attrition Rates

To determine an accurate picture of the physical fitness and activity levels of the CAF today, and more specifically the RCN, the most relevant and current sources of data must be examined. These data sources include the HLIS of CAF personnel conducted in 2013/2014, FORMeFIT reports generated before the COVID-19 pandemic, and various qualitative and quantitative research studies conducted by Defence Research and Development Canada (DRDC).

The last comprehensive HLIS of CAF personnel was conducted in 2013/2014 and published in 2016. The Epidemiology Section of the Directorate Force Health Protection within the Canadian Forces Health Services Group was the conducting agency, with

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[58]Canadian Forces Morale and Welfare Services, "FORMeFIT Reports FAQ," last accessed 23 February 2022, https://www.cafconnection.ca/National/Programs-Services/For-Military-Personnel/Military-Fitness/FORCE-Program/Frequently-Asked-Questions/FORMeFit-Reports-FAQ.aspx.

Statistics Canada providing support.[59] Over 4,312 regular force personnel were randomly selected to participate, resulting in a +/- 3% margin of error by sex and rank at a 95% level of confidence. Body weight and health, as well as physical activity levels of the force featured prominently in the survey.[60] Overall health related trends could also be observed using previous data from the 2008/2009, and 2004 HLIS. The mean self-reported BMI of the CAF was 27.6 (kg/m^2), an increase by 0.5 from 2004 levels. Additionally, 74% of all regular force personnel have a BMI in excess of 25 (overweight), with 25% being classified as obese. The study notes that although BMI on an individual level can have limitations, upward trendlines for groups correlate with higher body fat percentages, all-cause mortality rates, and severity of chronic conditions.[61] Looking specifically within RCN lines, the prevalence of measured obesity ($BMI \geq 30$) within the regular force was 35%, higher than both the CAF regular force at 30.4%, and the Canadian adult population (26.7%) as seen in Figure 4 below.[62] The largest Formation within the RCN, Maritime Forces Atlantic (MARLANT), had an even larger percentage of obese personnel (36%), making it the second most obese formation amongst the 22 largest such formations in the CAF.

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[59]Department of National Defence, "Health and Lifestyle Information Survey of Canadian Armed Forces Personnel of Canadian Armed Forces Personnel 2013/2014," last accessed 23 February 2022, https://www.canada.ca/content/dam/dnd-mdn/documents/health/health-and-lifestyle-survey-2013-2014.pdf.

[60]Chapter 1-8 of the survey were as follows: Health Status, Mental and Social Wellness, Injuries, Health Promotion, Women's Health, Health Care Utilization, Physical Activity, and Healthy Weight, Diet and Nutrition.

[61]E.E. Calle *et al*, "Body-mass index and mortality in a prospective cohort of US adults," *New England Journal of Medicine* 341, no. 15 (1999): 1097.

[62]Capt(N) Bruce Creighton, Cdr Charles Cross, Cdr Cynthia Smith, and Robert Hawes, "RCN Medical Analytics: Health Evidence and Operational Support," (presentation, Commander Royal Canadian Navy, Ottawa, ON, 16 May 2019).

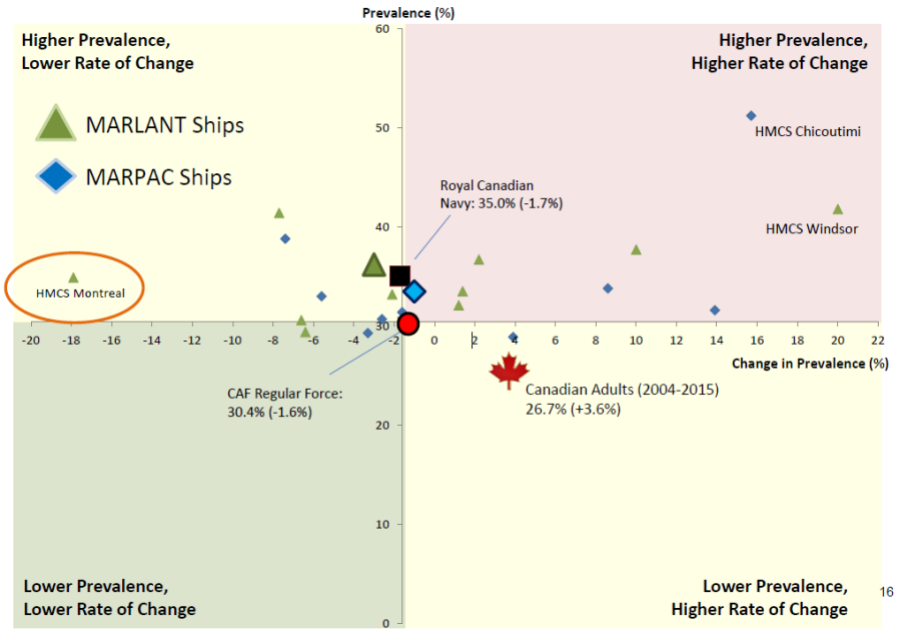

Figure 4 - Prevalence of Measured Obesity (BMI ≥ 30), RCN Regular Force, 2014-2016

Contrasting with these negative BMI indicators are physical activity levels. 85.2% of personnel were physically active in 2013/2014, as opposed to 78.7% in 2008/2009. Over 98% also reported participating in at least one physical activity over the last four months, and 52.1% of participants indicated that they participated in group PT at least once per week, while on base/wing. Naval personnel had the lowest percentage of personnel participating in a weekly group PT session, at 33.8%. The sedentary nature of regular force personnel worsened. Overall, 30.5 hours per week were spent being non-active, an increase of 6.35 hours per week since 2004. An increase in sedentary activity is attributed to personnel more engaged on the internet, playing video games, and watching TV; although the study has a caveat that surfing the internet could simply be representative of past sedentary activities that were difficult to capture, such as waiting for appointments or sitting on public transit.

The FORCE Fitness profile of the RCN in fiscal year 2019/2020, indicates that it is both the lowest performing environment in terms of health related, and operational fitness (Figure 5). During fiscal year 2019, over 43155 FORCE tests were conducted representing 66% of the total force.[63] Of those, the RCN conducted 5225 tests. Looking specifically at the performance breakdown for operational fitness, the percentage of RCN personnel with orange – low health related fitness was 11.2%, with only the Information Management Group having a lower percentage (11.6%) in that one category. In all other categories, as explained in Figure 3 above and ranging from yellow to green (above the minimum standard), to bronze to platinum (achieved incentive), the RCN had the worst outcome. Its health related fitness followed a similar pattern as seen in Figure 6 below. While predicted VO2 max is higher than the Canadian population, waist circumference measurements are nearly the same for males, and 1.2 cm smaller for females. It is also worth comparing the performance of the CA and the RCAF, to the RCN. For both VO2 max and waist circumference, the results of those services saw an improvement of 6.5% and 2.2% respectfully.

[63]Daryl Allard, "Royal Canadian Navy Fitness Profile 19/20 Reporting," (presentation, Deputy Commander Royal Canadian Navy, Ottawa, ON, September 2020).

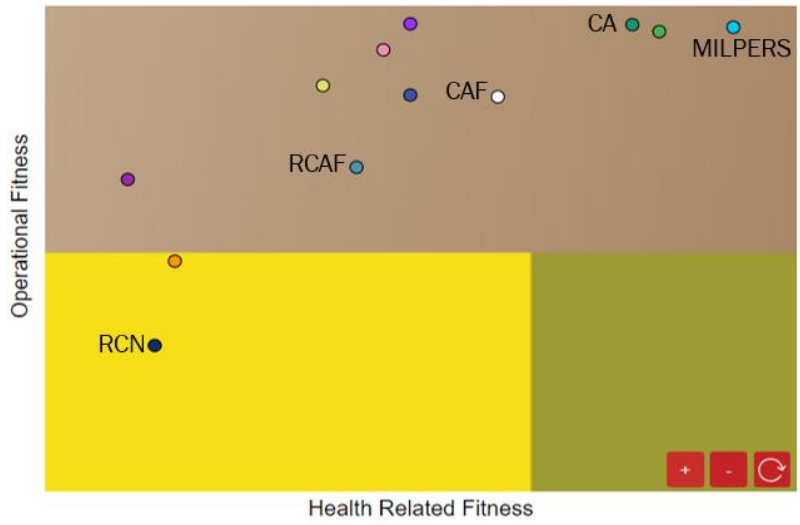

Figure 5 - FORMeFIT Reporting Data for fiscal year 2019/2020

	Male	Female
RCN Predicted VO_2	42.9 mL/kg/min	38.2 mL/kg/min
Canadian Predicted VO_2	38.8 mL/kg/min	33.4 mL/kg/min
RCN Waist Circ	96.4 cm	86.3 cm
Canadian Waist Circ.	96.0 cm	87.5 cm

Figure 6 - Comparison of Health Related Fitness with Canadian Population: RCN Average

Over the last ten years, the attrition rate of the CAF has remained stable at 7-8%.[64] Over the last four fiscal years, 20686 individuals were released from the CAF.[65] There are five categories of release, including (a) misconduct, (b) unsatisfactory service, (c) medical, (d) voluntary, and (e) service completed. Medical releases accounted for 33.3% of those released, while 56.2% voluntarily released from service. In a 2018

[64]Government of Canada, "Department of National Defence Personnel," last accessed 23 February 2022, https://www.canada.ca/en/department-national-defence/corporate/reports-publications/proactive-disclosure/supp-estimates-a-2020-21/other-issues/personnel.html.

[65]Lee Pothier (Naval Technical Officer Occupation Manager), "Attrition vs. Medical Release Data," email with Graham Hill, 16 November 2021.

descriptive analysis of regular force medical releases by DRDC, it found that the medical attrition rate for both men and women, reaching 3% and 4% respectfully in fiscal year 2016/2017, were the highest rates observed in the last 20 years.[66] In a further breakdown of those medically released, normalized between women and men, 45% were due to mental health, 41% musculoskeletal, and 14% other (Figure 7).

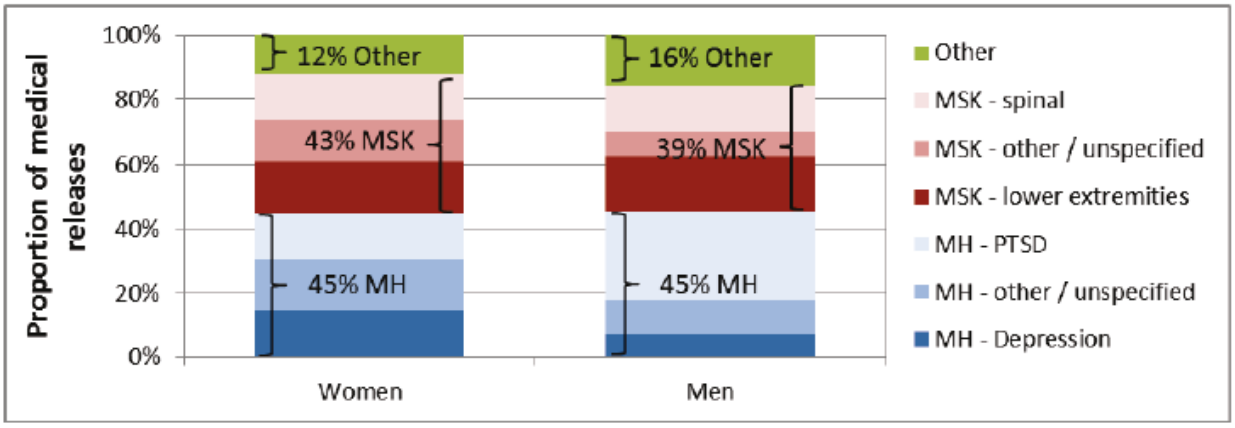

Figure 7 - Distribution of Medical Releases by Primary Diagnosis and Sex

The examination of the reasons behind voluntary release are more nuanced and qualitative in nature. In a 2019 contracted report performed by Human Resource Systems Group on behalf of Director General Military Personnel Research and Analysis (DGMPRA), 1732 regular force personnel between February and May 2019 were surveyed regarding their intentions on remaining in the CAF over the next three years.[67] The result of the survey estimated that 23.5% intend to leave the CAF, which was an

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[66]Department of National Defence, DRDC-RDDC-2018-L037, *Descriptive analysis of Regular Force medical releases from FY 14/15 to FY 16/17 by type or illness and sex* (Ottawa: Defence Research and Development Canada, 2018), 2.

[67]Department of National Defence, DRDC-RDDC-2020-C016, *The 2019 CAF Regular Force Retention Survey* (Ottawa: Defence Research and Development Canada, 2019), 7.

increase from 18.6% in 2016. The most common internal reasons for intending to leave include the impact of military life on spouse or partner (25.4%), job dissatisfaction (21.5%), lack of meaningful, satisfying, or challenging work (20.6%), lack of geographic stability (19.1%), and occupational dissatisfaction (18.5%). The most common external reasons for intending to leave are a lack of energy or motivation and/or the need for a break or change (20.5%), eligibility for pension benefits (16.9%), and personal health reasons (7.4%).

In a similar survey for the RCN, conducted by DGMPRA in 2018 albeit with a smaller sample size, the top five reasons for a sailor to leave a hard sea occupation included: impact on family/spouse (49.2%), too much time away (46.2%), direction of senior leadership steering the CAF (20%), lack of meaningful/satisfying/challenging work (18.5%), and long work hours (16.9%).[68]

[68]Department of National Defence, DRDC-RDDC-2018-R307, *Retention and Attrition in Hard Sea Occupations* (Ottawa: Defence Research and Development Canada, 2018), 71. Note that three choices could be made from 10 available options. Hard Sea Occupation groups include Combat Operations, Technicians, MARS Officers, Naval Technical Officers and Other (Boatswain, Steward, and Clearance Diver).

CHAPTER 3 – RELEVANT RESEARCH AND CASE STUDIES

The Relationship Between BMI, Abdominal Health and Disease

The use of BMI as a tool to categorize the anthropometric height and weight characteristics of individuals has existed since the 1970s.[69] It was further standardized and operationalized throughout the 1990s by both the World Health Organization (WHO), and the National Institute of Health. The currently accepted categories of BMI were developed by the International Obesity Task Force of the WHO in 1997 (table 1). Since this time, BMI has found wide acceptance in its use as a risk indicator for the development of health issues, especially across large populations.[70] In a review of data collected by multiple longitudinal health studies conducted by Statistics Canada between 1994 and 2009, population life expectancy was lowest in the underweight, and class II+ obesity categories. Life expectancy was found to be highest in the overweight category, when compared to those who were deemed normal weight. When factoring in health related quality of life, those spent in non-optimal health were those in categories above normal weight. Put in another way, adults in the overweight category might live longer, but will spend those additional years in poorer health. Other large scale, population-based studies in the United States and the UK, have produced similar results.[71]

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[69]Ancel Keys et al., "Indices of Relative Weight and Obesity," *Journal of Chronic Diseases* 25, no. 6 (July 1, 1972): 329–43, https://doi.org/10.1016/0021-9681(72)90027-6.

[70]Frank Q. Nuttall, "Body Mass Index: Obesity, BMI, and Health: A Critical Review," *Nutrition Today* 50, no. 3 (May 2015): 117–28, https://doi.org/10.1097/NT.0000000000000092.

[71]Anthony Jerant and Peter Franks, "Body Mass Index, Diabetes, Hypertension, and Short-Term Mortality: A Population-Based Observational Study, 2000–2006," *The Journal of the American Board of Family Medicine* 25, no. 4 (July 1, 2012): 422–31, https://doi.org/10.3122/jabfm.2012.04.110289.

Underweight	15–19.9
Normal weight	20–24.9
Overweight	25–29.9
Preobesity	
Class I obesity	30–34.9
Class II obesity	35–39.9
Class III obesity	≥40

Table 1 - Categories of BMI

The direct association of BMI to the development of comorbidities, or diseases such as cardiovascular disease, diabetes, hypertension, or malignancies which will negatively impact health must be done more cautiously. In a critical review of Obesity, BMI, and Health as found in *Nutrition Research* by Dr. Frank Nuttall who is an award winning US endocrinologist, he states that BMI has been somewhat co-opted as a "measure of fatness" because it is a readily obtained metric.[72] While he acknowledges that population studies are correlating risks of disease and mortality to BMI categories, he also argues that often those studies do not take into consideration family history of diabetes, hypertension, coronary heart disease, etc., or a patient's current history of smoking and alcohol use, or even their duration of obesity. He recommends that other means of estimating percent of body fat, such as waist circumference to height ratios be used. In a more current 2021 article in *Military Medicine*, an examination of BMI measurements of US active-duty personnel, found that BMI actually underestimates body

[72]Nuttall, "Body Mass Index: Obesity …, https://doi.org/10.1097/NT.0000000000000092.

fat mass when compared to the use of laboratory grade measurements.[73] They also recommend that given the rising obesity epidemic in western countries, new scalable approaches for screening, as well as programs for overweight and obese military members would improve service readiness.

The Harvard T.H. Chan School of Public Health recommends both the measurement of waist circumference or waist-to-hip ratio, as predictors of health risk related to abdominal fat.[74] Informally they refer to the apple and/or pear shape body types as those that have accumulated excessive fat around the hips and thighs areas. The school also cites multiple, long-term studies which have concluded that "abdominal obesity" is strongly associated with type 2 diabetes, cardiovascular disease and death, even if BMI is within the normal or overweight range. In one particular Nurses' Health Study, 44000 volunteers were tracked over 16 years to examine the relationship between waist size and death from disease. Those women with the highest waist sizes (35 inches or higher), had nearly double the risk of dying from heart disease and cancer. As a result of the study, abdominal obesity measurement guidelines were produced by both the American Heart Association, National Heart, Lung and Blood Institute as found in table 2 below.[75]

A systemic review found in the *Journal of Public Health Research* which examined 13 peer reviewed studies done between 2009 and 2018 came to similar

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[73]Philip G Clerc, Stéphanie B Mayer, and Sky Graybill, "Overweight BMI (25–29) in Active Duty Military: Excess Fat or More Lean Mass? A Look at the Evidence," *Military Medicine*, October 22, 2021, usab447, https://doi.org/10.1093/milmed/usab447.

[74]Harvard T.H. Chan School of Public Health, "Waist Size Matters," Obesity Prevention Source, October 21, 2012, https://www.hsph.harvard.edu/obesity-prevention-source/obesity-definition/abdominal-obesity/.

[75]Scott M. Grundy et al., "Diagnosis and Management of the Metabolic Syndrome," *Circulation* 112, no. 17 (October 25, 2005): 2735–52, https://doi.org/10.1161/CIRCULATIONAHA.105.169404.

conclusions.[76] Findings included that waist circumference increased the risk of developing hypertension, hyperuricemia (acidic levels in blood), muscular skeletal pain, type 2 diabetes, and hypercholesterolemia. With regards to joint and back pain in particular, excess body weight leads to the traction of soft tissues and associated skeletal support structures (vertebrae), mostly related to the projection of one's centre of gravity forward. As a result, the spine, hips, and other joints can be more easily damaged, which is dangerous to overall integrity of one's entire muscular skeletal system.

Organization	Measurement used	Definition of abdominal obesity
American Heart Association, National Heart, Lung and Blood Institute (10)	Waist circumference	Women: > 88 cm (35 inches), Men: > 102 cm (40 inches)

Table 2 - Abdominal Obesity Measurement Guidelines

The Health Benefits of Exercise for Military Personnel

The latest scientific evidence is clear and unequivocal; physical activity is linked to many positive health outcomes, both physically and mentally.[77] In the physical realm, even small amounts of physical activity can have accumulating benefits. New research published in the *British Journal of Sports Medicine*, found that those who perform just 30-60 minutes of strength training per week had a 10-20% lower risk of all-cause

[76]Darsini Darsini et al., "Health Risks Associated with High Waist Circumference: A Systematic Review," *Journal of Public Health Research* 9, no. 2 (July 2, 2020): 1811, https://doi.org/10.4081/jphr.2020.1811.

[77]U.S. Department of Health and Human Services, *Physical Activity Guidelines for Americans 2nd Edition*, (Washington, DC: U.S. Department of Health and Human Services, 2018), 6.

mortality, lung cancer, diabetes, and cardiovascular disease.[78] More interestingly, combining strength training with any aerobic activity significantly enhanced the benefit. The benefit included a 28% lower chance of dying from cancer, 40% lower risk of premature death, and a 46% lower incidence of heart disease. Remarkably, this study included a meta-analysis of over 16 additional studies, drawing on a pool of data of 480000 participants between the ages of 18 and 98 years old.

We know from the information presented in Chapter 2 of this paper that both the CAF and the Canadian population at large are becoming more sedentary. In a 2006 peer reviewed article for the *Canadian Medical Association Journal* and Health Canada, researched concluded that "… the greatest improvement in health status are seen when people who are the least fit become physically active."[79] Additionally, the improvement in health outcomes outlined and described in the article due to increased physical activity and fitness levels included: reduced abdominal adiposity (fat), improved weight control, enhanced lipid lipoprotein profile (cardiovascular health), reduced blood pressure, improved insulin sensitivity, improved autonomic tone (nervous system functionality), and an overall decrease in chronic inflammation that has "…been shown to be strongly associated with most of the chronic diseases whose prevention has benefited from exercise."[80]

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[78]Haruki Momma et al., "Muscle-Strengthening Activities Are Associated with Lower Risk and Mortality in Major Non-Communicable Diseases: A Systematic Review and Meta-Analysis of Cohort Studies," *British Journal of Sports Medicine*, February 28, 2022, bjsports-2021-105061, https://doi.org/10.1136/bjsports-2021-105061.

[79]Darren E.R. Warburton, Crystal Whitney Nicol, and Shannon S.D. Bredin, "Health Benefits of Physical Activity: The Evidence," *CMAJ: Canadian Medical Association Journal* 174, no. 6 (March 14, 2006): 801–9, https://doi.org/10.1503/cmaj.051351.

[80]*Ibid.*

Recent studies have confirmed what had only been previously assumed, that military members on average exert more energy and perform more physical activity daily than the civilian population.[81] Despite this, the health profile of the CAF continues to trend negatively. Concentrating on the right type of physical activity could therefore prove most beneficial for military personnel. In terms of overuse injuries and stress fractures, a study of military recruits in *Military Medicine* concluded that resistance training, vice aerobic training improved bone strength and bone mineral density.[82] Those members with weaker lower body strength not only were at "… significantly higher risk for stress fractures than the stronger recruits" but spent more days on lighter duties due to injury, than those who were more physically active before their enrollment.

High intensity functional training (HIFT) fitness programs, such as CrossFit also present unique benefits for military personnel.[83] HIFT training sessions are shorter in length, can incorporate functional movements such as combat tasks, and need less equipment/space. The constant variation in exercises and movement keep participants engaged from across all levels of fitness, and are associated with fewer problems i.e., injuries associated with high volume endurance training. A non-randomized program evaluation by the Royal Canadian Infantry School in 2005 found that CrossFit versus the standardized course fitness program resulted in greater improvements in core and leg

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[81]Christin Schilz and Stefan Sammito, "Soldiers' Physical Activity of Daily Life: A Systematic Literature Review," *Journal of Public Health*, May 18, 2021, https://doi.org/10.1007/s10389-021-01586-y.

[82]J. R. Hoffman et al., "The Effect of Leg Strength on the Incidence of Lower Extremity Overuse Injuries during Military Training," *Military Medicine* 164, no. 2 (February 1999): 153–56.

[83]Christopher K. Haddock et al., "The Benefits of High-Intensity Functional Training Fitness Programs for Military Personnel," *Military Medicine* 181, no. 11 (November 2016): e1508–14, https://doi.org/10.7205/MILMED-D-15-00503.

strength, and equal cardiovascular endurance despite needing less than half the scheduling requirements.[84]

In another article written for the Canadian Institute for Military and Veteran Health Research and published by the Canadian Defence Academy Press, the authors came to similar conclusions regarding the advantages of moderate intensity interval training (2-4 minute intervals at 80-95%), maximal aerobic capacity (VO2 max), and sprint interval training (20-30 seconds maximal intensities).[85] While noting that the time considerations of conducting PT can be a barrier for some, interval training not only alleviated that barrier, but displayed exercise performance gains and health improvements which "… appear to match, or even exceed those observed following endurance training."[86]

The mental health benefits of physical exercise are another area of study in which more evidence is being documented. In his 2013 JCSP paper on the role physical exercise has on operational stress injuries, O'Neill explores the research accumulated on the impact of physical exercise on psychological wellbeing.[87] And while a full review of the material is beyond the scope of this paper, the positive impact that physical exercise has on depression, PTSD, anxiety, stress levels, and feelings of self-esteem are becoming clearer.

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[84]*Ibid.* The Army Fitness Manual "12-week Army Fitness Program" was utilized which included 50 minutes of exercise, comprised of aerobic intervals, strength and power training, and an optional activity day of weight loaded marching or team sports.

[85]Department of National Defence, *Shaping the Future: Military and Veteran Health Research* (Kingston, ON: Canadian Defence Academy Press, 2011), 52-67, https://cimvhr.ca/documents/Shaping-the-Future.pdf.

[86]*Ibid.*

[87]O'Neil, G., "The Impact of Physical Exercise on Operational Stress Injuries (OSIS)," JCSP 39 Master of Defence Studies Paper, Canadian Forces College, 2013.

In particular, findings from peer reviewed scientific journals shows that "a growing body of epidemiologic research on adults suggests that people who are more active have lower levels of anxiety and depression symptoms."[88] However, a lack of randomized control trials limit conclusive findings. As noted by O'Neill, most of the current studies lack large sample sizes, and as such can only be deemed co-relational, meaning the direct links of causation cannot fully be determined. One such study funded by the Office of Naval Research "demonstrated that aerobic fitness was inversely associated with the impact of stressful events, and that this relationship may be mediated via fitness related attenuations in trait anxiety."[89] In other words, it concludes that physical fitness may buffer stress symptoms related to military activity. More research is therefore needed before we can finally codify the links between physical fitness and enhancing the mental fortitude of the warfighter.

Motivating Change

One of the main goals of BALANCE is to increase the physical activity levels of CAF members. This increase in physical activity is to be accomplished in conjunction with ensuring proper rest, nutrition, and injury prevention. As these are behaviours that we can infer must change, the techniques associated with changes in self-efficacy for physical activity need to be explored. The transtheoretical model of health behaviour change, or the "Stages of Change" model has long been touted by physicians as an

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[88]Patricia M. Dubbert, "Physical Activity and Exercise: Recent Advances and Current Challenges," *Journal of Consulting and Clinical Psychology* 70, no. 3 (June 2002): 526–36.

[89]Marc Taylor et al., "Physical Fitness Influences Stress Reactions To Extreme Military Training," *Military Medicine* 173 (September 1, 2008): 738–42, https://doi.org/10.1249/01.mss.0000321522.42150.fa.

important tool in lifestyle modification for disease prevention, long-term disease management and addictions.[90] Much of the research into the model has been derived from the examination of smoking cessation and alcohol abuse programs. The model shows that changes in behaviour occur gradually, with an individual moving between four distinct phases which are: (a) precontemplation, (b) contemplation, (c) preparation, and finally (d) action. A patient of the model therefore cognitively moves "… from being uninterested, unaware or unwilling to make a change (precontemplation), to considering a change (contemplation), to deciding and preparing to make a change."[91] The issue with this model, as well as several other similar behavioural change techniques (BCTs) is that although self-efficacy or the belief in one's ability to accomplish a goal can be increased, this does not always translate to an increase in physical activity levels. In fact, a majority of studies have found that cognitive processing is not an important mediator of change in physical activity behaviour.[92] It cannot however discount the possibility that knowing where an individual is in the Stages of Change process, will not play an important role in preparing them for a required intervention. An article in the *Annals of Behaviour Medicine* found that individualized, motivationally tailored intervention did increase physical activity more than self-help materials alone, and that self-help materials

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[90]Gretchen L. Zimmerman, Cynthia G. Olsen, and Michael F. Bosworth, "A 'Stages of Change' Approach to Helping Patients Change Behavior," *American Family Physician* 61, no. 5 (March 1, 2000): 1409–16.

[91]*Ibid.*

[92]Beth A. Lewis et al., "Healthy for Life: A Randomized Trial Examining Physical Activity Outcomes and Psychosocial Mediators," *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine* 45, no. 2 (April 2013): 203–12, https://doi.org/10.1007/s12160-012-9439-5.

"… matched to individuals' stage of motivational readiness are an effective approach to increasing physical fitness participation."[93]

A 2013 review in the *International Journal of Behavioural Nutrition and Physical Activity* examines the interplay between BCTs, self-efficacy, and the frequency of physical activity.[94] It reminds readers that "Social cognitive theory does not propose that increasing self-efficacy will inevitably result in behaviour change."[95] Therefore, although populations can be assured that an intervention will increase physical activity, if they are not conceived that such an action will result in a tangible benefit e.g. weight loss or health outcomes, the outcome will not necessarily result in increased physical activity.

Out of an examination of forty different studies related to BCTs, four were found to be effective in increasing physical activity behaviour in both obese and non-obese adults. These included: (a) provide information on consequences of behaviour in general, (b) prompt rewards contingent on effort or progress towards behaviour, (c) provide instructions on how to perform the behaviour, and (d) facilitate social comparison. An additional meta-analysis of BCTs also found that combining self-monitoring with these techniques was significantly more effective than the intervention alone.[96] Given the diversity of thought and motivations behind each CAF member, tailoring physical

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[93]B. H. Marcus et al., "Efficacy of an Individualized, Motivationally-Tailored Physical Activity Intervention," *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine* 20, no. 3 (1998): 174–80, https://doi.org/10.1007/BF02884958.

[94]Ellinor K Olander et al., "What Are the Most Effective Techniques in Changing Obese Individuals' Physical Activity Self-Efficacy and Behaviour: A Systematic Review and Meta-Analysis," *International Journal of Behavioral Nutrition and Physical Activity* 10, no. 1 (2013): 29, https://doi.org/10.1186/1479-5868-10-29.

[95]*Ibid.*

[96]Susan Michie et al., "Effective Techniques in Healthy Eating and Physical Activity Interventions: A Meta-Regression," *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association* 28, no. 6 (November 2009): 690–701, https://doi.org/10.1037/a0016136.

activity intervention techniques around those proven to be most effective is a logical way forward. The CAF is currently conducting, or has the capacity to change/modify the application of many of these techniques, which will be explored in the next chapter of this paper. Succinctly, providing information on consequences and how to perform a behaviour are best tailored and directed at an individual, either through current PSP programming or via one's own CoC. Rewards and facilitating social comparisons are best accomplished on a macro level, both through the modification of the current FORCE rewards program, and the continuation of group PT or sports at the unit level.

Case Study 1 – Canadian Army

The CA had the highest level of operational fitness as compared to both the RCAF and the RCN, observed between both fiscal years 2018/2019 and 2019/2020. A FORMeFIT report of fitness profiles can be seen in Figure 8 below. Exploring the holistic approach to fitness exhibited by the CA could therefore yield valuable lessons learned which could be applied to the RCN in the future.

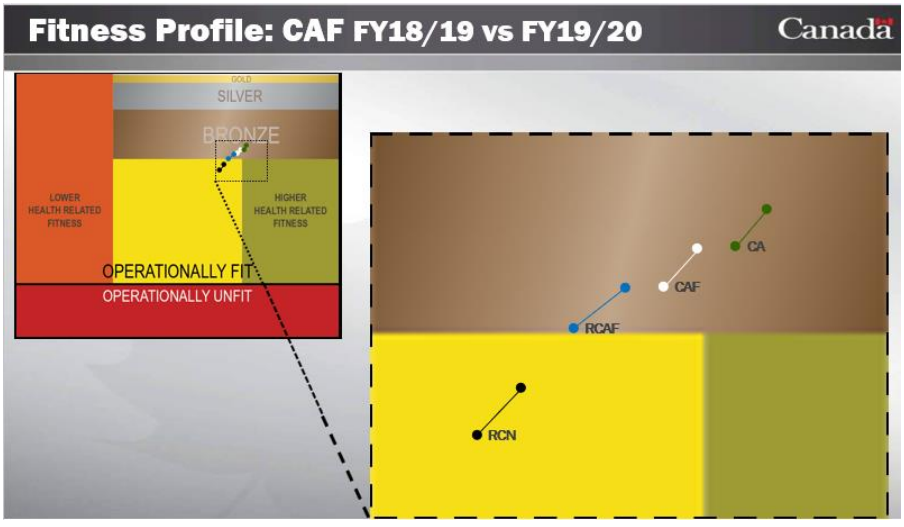

Figure 8 - Fitness profiles of the CAF, CA, RCAF, and RCN FY 18/19 vs. FY 19/20

To begin, the physical demands of CA occupations and roles are unique, particularly those operating in combat environments. To recognize these unique BFORs, and until the release of the FORCE program in 2013/2014, members of the CA were assessed annually against the Land Forces Command Army Fitness Standard (AFS).[97] The AFS consisted of a weight loaded march, casualty evacuation, and trench dig. As a precursor to the current FORCE evaluation, there was one standard, and "Every soldier – young or old, male or female, small or large – must be able to meet the AFS to be fit to fight."[98] With the release of the FORCE program, the CA adopted both the FORCE evaluation to assess its members against UoS principles, and the FORCE Combat (FC).

The FC is a modified version of the FORCE evaluation, to replicate and assess the physical requirements specific to combat roles within the CA. It became effective as of 1 October 2017. The components of FC are a 5 km – 35 kg load carriage march, followed by a FORCE evaluation performed as a circuit wearing 25 kg of standard CA fighting order.[99] Canadian Army Order 24-02 outlines who the FC is applicable to annually. In the broadest sense, any CAF member collecting Land Duty Allowance, or deployed as part of a CA unit must be afforded the opportunity to complete the FC and its associated training program. A failure of the FC would preclude the deployment of a member overseas, unless they were granted a waiver.

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[97]H.A. Wenger, B-GL-382-003/FP-001, *Army Fitness Manual (Technical Report)* (Toronto: Canadian Armed Forces, 2001).

[98]*Ibid*, 13.

[99]Commander of the Canadian Army, *Canadian Army Physical Fitness,* Canadian Armed Forces: Canadian Army Order, 24-02, June 2017.

The physicality of the CA is an important factor in explaining its fitness profile. Its soldiers are tested more regularly, incorporate a wide variety of physical tasks into their daily work, and are under additional pressure to succeed during the FC or face exclusion from deployments and possibly even a remuster to other services. There are however intangibles, related to both CA culture and leadership practices that play just as large a role in its performance. In a conversation with the Army Sargent Major, Chief Warrant Officer J.M. Smith, he stressed the importance of all levels of the force, from Commanders to corporals, buying into the concepts of readiness and resilience.[100] These two concepts are at the core of the CA's Integrated Performance Strategy (CAIPS), which was released in 2015, and updated in 2016.[101] Readiness is about the CA being prepared to deploy on operations on short notice, while resiliency is the ability of soldiers to adapt, resist, and thrive in the face of stress. From an operational perspective, this has developed into what the ASM described as a "Combat Arms lifestyle" or a culture of fitness within Army lines in which all Command Teams lead by example.

Practically, this manifests on three fronts starting with a progressive, consistent, and balanced approach to physical activity (1 hour per day / 5 days per week). This activity is viewed as essential and incorporated into the CA's daily battle rhythm. Secondly, competition between units is highly encouraged, through team sports or individual competitions such as the Army Run or Iron Warrior.[102] Finally, all soldiers are

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[100]J.M. Smith, In-person conversation, 4 February 2022.

[101]Government of Canada, "Canadian Army Integrated Performance Strategy (CAIPS)," accessed April 5, 2022, https://strongproudready.ca/missionready/en/canadian-army-integrated-performance-strategy-caips/.

[102]Iron Warrior is run annually at CFB Petawawa and is a 50-kilometre event that sees competitors run or march 32 km, portage a canoe four km, then paddle eight km, and finally conclude with a six km sprint wearing a weighted rucksack.

pushed to exceptional levels of competence in everything they do, which means leveraging PSP as a resource to the greatest extent possible across multiple soldier fitness domains.[103] The development of these competencies in the physical fitness domain, and to some extent the emotional fitness domain, is a key element of transformational leadership, in which soldiers are encouraged to look beyond their own self-interests for the good of the group.[104] There is a wide and deep understanding, as articulated by Chief Warrant Officer Smith that a fighting and highly mobile force in the field is only as strong as its weakest member.

Another emergent leadership theory, Character Based Leadership (CBL) uses a common framework of character traits, competencies, and commitment to build effective leaders.[105] Traits and competencies are continually honed, reflected on, and improved, resulting in a more robust culture, and a heightened wellbeing for all members. The Army's practical approach to developing fitness along multiple domains, is built upon its identified character traits of personal readiness and resilience. These traits among others are found in its CAIPS, and demonstrates the application of CBL. This transformational, or character-based approach to improving the RCN's approach to physical fitness could very well lead to noted future improvements.

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[103]The sevens domains listed in the CAIPS include Physical, Emotional, Social, Spiritual, Intellectual, Familial, and Leadership.

[104]Bernard M. Bass and Bruce J. Avolio, "Transformational Leadership and Organizational Culture," *Public Administration Quarterly* 17, no. 1 (1993): 112–21.

[105]Mary Crossan, Gerard Seijts, and Jeffrey Gandz, *Developing Leadership Character* (New York: Routledge, 2015), https://doi.org/10.4324/9781315739809.

Case Study 2 – HMCS *Protecteur* Fire

There is no denying that as a point of comparison to the CA, a majority of hard sea trades within the RCN are more technically focused, and as a result more sedentary. Combat operators and technicians after completing basic training, undergo long developmental periods in a classroom setting, before being posted to their first operational unit. Naval Combat Information Operators (NCIOPs), Naval Electronic Sensor Operators (NESOPs), and Sonar Operators while on watch are behind a Command Management System screen in the Operations Room. Naval Communicators (NAVCOMMs), as well as Marine and Weapon Engineering Technicians are more mobile only in the sense that they need to travel efficiently around the ship to reach a system requiring repair or maintenance. Despite this reality, all members of the RCN are sailors first, meaning that through commonly delivered individual training and education, they can be called upon to conduct seamanship evolutions, assist casualties, contain floods, and collectively fight an onboard fire.

On 26 February 2014, HMCS *Protecteur* departed Pearl Harbor, Hawaii to conduct a return transit to Canadian Forces Base (CFB) Esquimalt following a seven-week deployment on Mid-Pac Oiler. The next day, at approximately 6:30 pm, a power blackout drill was initiated as part of pre-scheduled training.[106] All initial power recovery actions by the machinery control room (MCR) went smoothly until the port turbo alternator in the engine room (ER) was flashed up. During the flash up, a pressure gauge

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[106]Canadian Armed Forces, 3769-1080-1374-13-FIR-14-006, *Board of Inquiry Report: Fire, Actions and Casualties on board HMCS PROTECTEUR* (Esquimalt: DND Canada, 12 August 2014). While the document in question has not been released to the public, unclassified sections were released to the author on behalf of the convening authority.

broke away from the unit and sprayed relay oil onto various hot equipment surfaces. The relay oil ignited almost immediately. Over the course of the next four hours and 43 minutes, ten separate attack teams (AT) advanced into the ER in a prolonged attempt to put out the fire. During this period smoke spread extensively through the forward house of the ship and the fire consumed the ER. Major heat damage from the fire included warping and quenching of pipes, damage to wiring, cables and hoses, and the rendering of both the ER and MCR inoperable. At 11:40 pm, a command decision was made to enable the Aqueous Film Forming Foam fitted system within the space. This action ensured the fire was put out just after midnight on 28 February 2014.

The first team that would have attacked the fire was the rapid action team, which at the time was composed exclusively of professional CAF firefighters. All other ATs were made up of members of the ship's company, who would have completed basic ship firefighting training. The team would have been directed remotely under the authority of the Marine Systems Engineering Officer, who is the ship's damage control officer. The Executive Officer would have been overall in charge of the internal ship battle from a position on the bridge.

The firefighting equipment donned by members of the ATs, including bunker gear and a self-contained breathing apparatus (SCBA) are heavy and cumbersome, weighing as much as 70 pounds when wet.[107] The 1.5-inch to 2.5-inch hoses used on ship are an additional 17-27 pounds each, not including the weight of the water when energized.[108]

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[107]City of Airdrie, "How Much Does a Firefighter's Gear Weigh?," accessed April 5, 2022, https://www.airdrie.ca/index.cfm?serviceID=665&ID=241.

[108]Mike Pertz, "How Much Does Fire Hose Weigh? (Hint: It's Heavy!)," FirefighterNOW, accessed April 5, 2022, https://firefighternow.com/how-much-does-fire-hose-weigh-hint-its-heavy/.

As SCBAs contain at most 45 minutes worth of air each, every breath taken during a firefighting evolution is critical. In a conversation with the RCN's Fire Safety Certification Officer Lieutenant-Commander (LCdr) Peter O'Hagan, he noted that VO2 max was one of the baseline variables which would determine an individual's air consumption rate.[109] Equally important was breathing regulation. Hyperventilation or rapid and deep breathing by sailors have resulted in a 4500 psi, Dräger SCBA bottle becoming devoid of oxygen in as little as 6 minutes. To emphasize the importance of air consumption, the longer a four-person AT can stay on air, the more water they can apply to the fire and possibly extinguish the blaze. Physically out of shape sailors consume air at a significantly greater rate as they direct a firehose, or simply struggle to make their way to the seat of the fire after they go on air after encountering smoke. Fighting a fire is also an extremely stressful situation akin to combat operations; a sailor physically struggling would undoubtably jeopardize their ability to stay calm and focus on the task at hand.

Unclassified portions of the HMCS *Protecteur* fire board of inquiry shed light on some of the fitness difficulties sailors encountered during the situation. Overall, the conditions faced by the 10 ATs were unprecedented and chaotic, with extreme heat and smoke conditions preventing some of the teams from only putting water on the ER fire for only a few minutes. AT3 withdrew from the ER almost immediately upon entry, as one of its members was in physical distress. AT4 likewise also withdrew after about 15 minutes when one member encountered breathing difficulties. AT5 when it arrived on scene was required to untangle and reposition hoses in the boiler room, which was the

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[109]Pete O'Hagan, Telephone Conversation, 16 March 2022.

fire attack path to the ER. As a result, they attacked the fire for five minutes before pulling out at 9:35 pm because a member of the team was low on air. AT6 was able to put water on the fire for roughly two minutes, before the team became "ineffective" in the words of the AT leader. The final four ATs seemed to have had greater success, each putting about 20 minutes worth of water on the fire before the final command decision was made to activate fitted systems and extinguish the blaze.

There were 20 key findings from the board of inquiry. One critical finding was the fact that the fire was attacked intermittently, and at one point a period of two hours and eight minutes elapsed without any AT putting water on the fire. Another finding was that 48 members of the ship's company reported injuries, including heat stress, smoke inhalation, musculoskeletal injuries (back, ankle and hand sprains), sleep disturbance, fatigue, throat irritation and chest pain.

It would be unreasonable to conclude that the fire would have been extinguished, or all injuries avoided if the physical fitness of the crew had been greater. However, from the clear medical research presented above, performance and injury prevention are enhanced through increased levels of physical fitness. Any unfit sailors on HMCS *Protecteur* would have had no time to get in shape to prepare for the prolonged, sustained, and life-threatening situation they encountered. Other incidences such as the deadly 2004 fire on HMCS *Chicoutimi*, and the 11 fire and smoke incidents experienced by Canada's frigates since 2018, are stark reminders of the risk to personnel, and the need to efficiently battle fires as quickly as possible.[110]

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[110]Murray Brewster, "Canada's Front-Line Frigates Have Suffered 10 Fire and Smoke Incidents since 2018 | CBC News," accessed April 5, 2022, https://www.cbc.ca/news/politics/navy-frigate-fires-1.5453216.

Barriers to Fitness Within the RCN

As of February 2022, the RCN had 8410 personnel, serving in its largest two formations, those being MARLANT with 3460 personnel, and Maritime Forces Pacific (MARPAC) with 4650 personnel.[111] Embedded within MARLANT is Canadian Fleet Atlantic with 1897 personnel, containing a fleet of 15 warships.[112] MARPAC has 1397 personnel, and is home to 14 warships. CFB Halifax, the largest military base in Canada by population, and CFB Esquimalt are found within MARLANT and MARPAC respectfully. With the release of BALANCE, a greater emphasis on understanding the culture of fitness in these locations, as well as the physical and mental wellbeing of sailors accelerated. As life onboard ship is a unique aspect of being a member of the RCN, much of the discussion of barriers to physical readiness and exercise availability will be connected to these locations.

Warships provide sailors with a small amount of personal living space. While some ship classes such as Harry DeWolf offer spaces comparable to a civilian work site, frigates lack dedicated space for exercise equipment, with hallways, corner areas, and only small space aft dedicated as a make shift mini-gym. When flying without a helicopter, the hangar and flight deck can be used to house and conduct group fitness classes. PSP staff do deploy with ships on named operations, although their presence on ship outside of longer deployments are not always guaranteed.[113] Being at sea can have a

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[111]Royal Canadian Navy, *RCN Managed Workforce Health – Current TES vs. Positions*, (Ottawa, ON: Directorate of Naval Personnel, 1 November 2021).

[112]Government of Canada, "MARLANT Units | Maritime Forces Atlantic | Royal Canadian Navy," accessed April 5, 2022, http://www.navy-marine.forces.gc.ca/en/about/structure-marlant-units.page.

[113]Samantha Noseworthy, "Barriers to Physical Activity at CFB Halifax," PowerPoint presentation, CFB Halifax, NS, 2019.

large impact on both the mental and physical wellbeing of sailors. A scientific report published by DRDC in 2017 explored the work and sleep patterns of the crew of HMCS *Calgary* during Trident Fury 2015.[114]

During the high tempo exercise, a sample of crew from each department were analyzed during their on-duty and off-duty activities, and a calibrated DRDC fatigue model was used to investigate average fatigue ratings using the Stanford sleepiness scale (Table 3). It found that the average off-duty time was 12.7 hours, including a mean daily sleep time of 8.3 hours. On-duty time was 11.3 hours, distributed across five activities which included: (a) administration, (b) watch, (c) messing (eating and socializing), (d) evolutions, and (e) conducting maintenance. Personnel in the three largest departments (Combat, Combat Systems Engineering, and Marine System Engineering), followed a 1-in-2 watch rotation, meaning an 8 hour on / 4 hours off / 4 hours on / 8 hours off daily schedule while at sea. Average daily fatigue ratings for sailors averaged between 2 (functioning at a high level but not peak), and 3 (relaxed but not at full alertness). By diving further into the data however, fatigue ratings over a 24-hour period routinely exceeded 4 (foggy), and peaked at 6 (sleepiness) in some cases. This was especially true for those working day shifts (non-watch standers or day workers) and those conducting watching between midnight and 0400 hrs as seen in Figure 9 below.

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[114]Department of National Defence, DRDC-RDDC-2017-R048, *Sailors' Work/Rest Schedule and Fatigue on a Canadian Patrol Frigate During Exercise* (Ottawa: Defence Research and Development Canada, 2017).

1 - Feeling active and vital; alert; wide awake
2 - Functioning at a high level, but not at peak, able to concentrate
3 - Relaxed; awake; not at full alert ness, responsive
4 - A little foggy; not at peak; let down
5 - Fogginess; beginning to lose interest in remaining awake; slowed down
6 - Sleepiness; prefer to be lying down; fighting sleep; woozy
7 - Almost in reverie; sleep onset soon; lost struggle to remain awake

Table 3 - The Stanford Sleepiness Scale

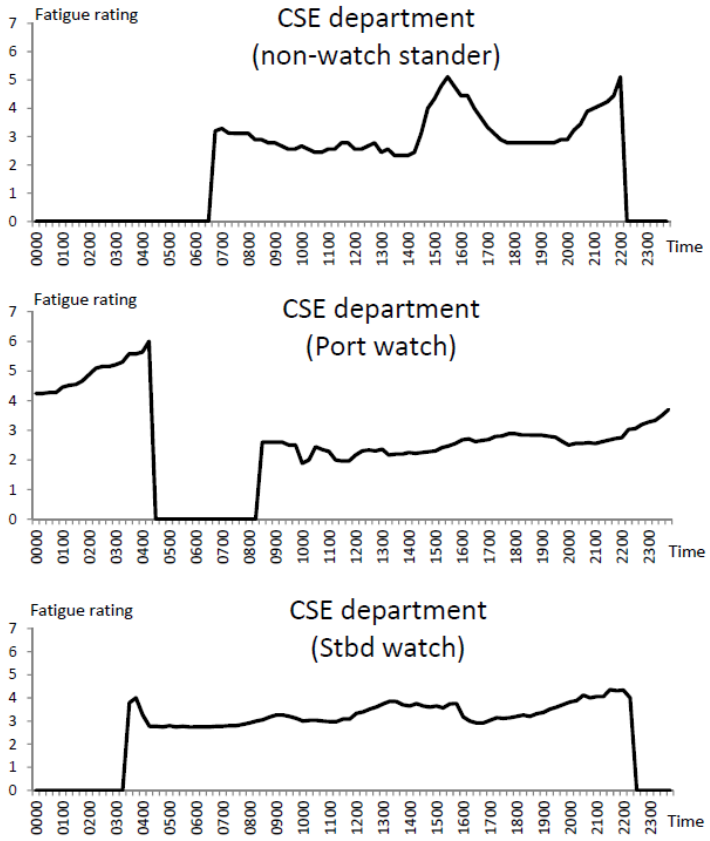

Figure 9 - Fatigue Profiles for Non-watch, Port, and Starboard Watches in the Combat Systems Engineering Department

The International Maritime Organization defines fatigue as:

> "A reduction in physical or mental capability as the result of physical, mental, or emotional exertion which may impact nearly all physical abilities including: strength, speed, reaction time, coordination, decision making, or balance."[115]

In a 2017 review of the physiological and psychological health and wellbeing of naval service personnel in *Military Medical Research*, it concluded that "Fatigue has been identified as a serious occupation risk onboard ships, and is a major factor in accidents onboard ship."[116] The duration and quality of sleep was found to be on average lower than those who worked day shifts, due to broken sleep periods, noise, vibration, and adverse weather conditions.[117] As fitness on ship is often conducted during a short period of time between being asleep and coming off watch, it is clear to see how fatigue and a lack of energy plays a large role in a lack of physical activity, that may lead to obesity or other health related complications. In a pre-sail survey of HMCS *Windsor* in 2019, 53.5% of the crew stated they were very likely or likely to exercise at sea, with the frequency of that exercise being anywhere from one to five days a week.[118] This is likely an optimistic assessment, as space, food choices, and fitness equipment are even more constrained on a Victoria Class diesel electric submarine.

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[115]International Maritime Organization, "Guidance on fatigue mitigation and management," (London: International Maritime Organisation; 2001), last accessed 4 April 2022, https://wwwcdn.imo.org/localresources/en/OurWork/HumanElement/Documents/1014.pdf.

[116]Cliodhna Sargent, Cormac Gebruers, and Jim O'Mahony, "A Review of the Physiological and Psychological Health and Wellbeing of Naval Service Personnel and the Modalities Used for Monitoring," *Military Medical Research* 4, no. 1 (January 18, 2017): 14, https://doi.org/10.1186/s40779-016-0112-3.

[117]Marcus Oldenburg, Xaver Baur, and Clara Schlaich, "Occupational Risks and Challenges of Seafaring," *Journal of Occupational Health* 52, no. 5 (2010): 249–56, https://doi.org/10.1539/joh.K10004.

[118]CFB Halifax Health Promotion, "Summary Report HMCS WINDSOR: Nutrition and Fitness Strategy (Draft)," Halifax, NS, April 2021, 10.

Only limited research on the effects of sailing on physical readiness and obesity are available, however two papers do shed light on the topic. A large study on 26362 newly minted, young male sailors posted to U.S. Aircraft Carriers, large submarines (nuclear-power ballistic missile), and small submarines (fast attack) over a one-year period found those in small submarines had higher overall levels of overweight and obesity prevalence, as well as lower physical readiness test scores.[119] The differences while statistically relevant, were small enough as to preclude making a judgment on any clinical differences that would be observed between the groups. Despite this, the study also concluded that regardless of the small differences, more cohort data, especially in older sailors could show more robust differences in weight gain and physical readiness.

In an older study of a U.S. Navy, Sea, Air, and Land (SEALs) Special Forces personnel team deployed on a submarine for 33 days, their running performance and heart rate recovery profiles were found to be impaired.[120] Ten male subjects sent onboard the USS *Kamehameha* were given identical fitness tests both before and after their deployment, and the results compared to nine of their colleagues who remained on Fort Island, Pearl Harbor. No limitations were placed on the deployed SEAL team in terms of physical fitness. The study concluded that the decrease in performance was likely due to a combination of "… deconditioning resulting from reduced levels of activity and

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[119]Marion A. Gregg and Christopher J. Jankosky, "Physical Readiness and Obesity Among Male U.S. Navy Personnel With Limited Exercise Availability While at Sea," *Military Medicine* 177, no. 11 (November 2012): 1302–7, https://doi.org/10.7205/MILMED-D-12-00016.

[120]David Fothergill and J Sims, "Aerobic Performance of Special Operations Forces Personnel after a Prolonged Submarine Deployment," *Ergonomics* 43 (October 1, 2000): 1489–1500, https://doi.org/10.1080/001401300750003925.

alterations in training regimens during deployment", and disruptions in the asynchrony of circadian rhythms both on board and during post deployment air travel.

There have been attempts to analyze RCN fleet and base challenges concerning physical fitness going back over the last eight years. Culture of fitness surveys were conducted by PSP at both CFB Halifax and Esquimalt in the fall of 2014. Numerous focus groups, surveys, and pilot projects have been launched in MARLANT to capture the relevant concerns of sailors regarding the barriers to increasing physical activity. Many of these initiatives were informally structured and involved small sample sizes, but nonetheless yield corroborating information to more formally structured initiatives. In addition to this work, two research studies are underway on both HMCS *Windsor* and HMCS *Winnipeg* by DRDC and PSP Health Promotion to quantify the health and fitness of RCN sailors during operational deployments.[121] Results from these studies will be released in 2022.

Culture of fitness survey reports for both CFB Esquimalt, and CFB Halifax yielded similar results. For the purposes of this paper, specifics will be drawn from CFB Esquimalt as to balance out any coastal bias that might be interpreted on behalf of the reader.[122] Forty-five questions were asked to 115 CAF personnel in Esquimalt, looking at

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[121]The goal of the study on board HMCS *Windsor* is to ensure the health of submariners was maintained, or improved during an operational deployment. To accomplish this, modifications to the food, fitness equipment, and physical activity plans of the ship were made as part of a pilot program. Surveys both before and after deployment would be used to then determine any next steps forward. The purpose of the study on board HMCS *Winnipeg* is to quantify the health and fitness of a sample of RCN sailors before and during an operational deployment. Specifically, the objectives are to quantify: 1) physical activity levels, 2) Physical fitness, 3) sleep patterns, 4) Nutritional habits, 5) mental health states, and 6) musculoskeletal injuries.

[122]Julie Martin and Michael Spivock, Directorate of Fitness, *Culture of Fitness Survey Report Canadian Forces Base Esquimalt Halifax* (Ottawa: Canadian Forces Morale and Welfare Services, August, 2016), 3.

five dimensions of fitness culture including: (a) shared fitness values, (b) cultural norms, (c) cultural touch points, (d) peer support, and (e) work climate. Responses to the questions were captured using the Likert scale, a five-point rating scale which measured levels of agreement from “strongly agree” to “strongly disagree”. The results were then stratified across a percentage score range, as seen in Table 4 below. The base was given an overall score of 41.6%, interpreted as the culture is not sending strong signals for fitness. Some of the salient strengths and weaknesses, broken down along the five dimensions of culture from the report, are as follows:

1. Shared Values – Responses were equally balanced (agreement vs. disagreement) between the CAF and the unit making fitness a top priority in the unit;
2. Culture Norms – 60.9% of personnel believed it was normal to be active, however only 37.4% agreed it was normal to use work breaks and time to engage in fitness. Less than half of respondents (49.5%) were striving to improve their FORCE evaluation;
3. Cultural Touch Points – Unit COs and command teams being fitness role models (13% agreed), stood out. 80.8% of personnel also could not agree that people were regularly assessed on how they are doing in terms of living a fit lifestyle. 16.5% of respondents felt the unit had traditions which celebrated fitness. More positively, 60% agreed that the exercise choices you made, were free of judgment or almost never discouraged;
4. Peer Support – 57.4% of respondents perceived an overall positive peer support atmosphere from colleagues and supervisors with regards to fitness; and

5. Work Climate – Only 19.7% of personnel did not perceive an overall positive work climate. Note the questions for this category were not fitness specific.

Score Range	Score Range Color	Meaning
67-100%	Green	The culture is sending a positive message that supports fitness
34-66%	Yellow	The culture is not sending strong signals for fitness
0-33%	Red	The culture is working against fitness

Table 4 - Overall scoring system used across all CAF bases

As a follow-up to the results of the Culture of Fitness surveys, the Active Living & Injury Prevention Working Group (ALIP) of MARLANT conducted a Barriers to PT survey in April 2019 to determine the best path forward to increase activity levels.[123] The ALIP was aware of the results of the 2013/2014 HLIS, and had aggregate health related fitness scores from the FORMeFIT system, both of which served as justifying factors in conducting the Barriers survey. Two questions were asked. How often does your direct supervisor provide opportunities for you to be physically active during an average work week, and are there any specific barriers that prevent you from being physically active during working hours? Over 1533 respondents, 75.6% of which were military responded to the survey. Of the military respondents, 74.5% identified as Navy, and the breakdown of ranks were equally comparative to the demographics at CFB Halifax. The complete results of the survey are seen in Figure 10. As an adjunct to the surveys, small focus groups were held, and a variety of supporting information related to these results were accumulated (Annex B). Although the full scope of the results will not be explored, the

[123]Samantha Noseworthy, "Barriers to Physical Activity …," 11. Members of the ALIP and co-authors of the survey included: CPO1 Tim Blonde, Isaac Habib, Major Dan Trudel, Captain Bonnie Nadeau, Captain Chelsey Llewellyn, and Stacey Robichaud.

most relevant quantitative and qualitative points which arose from the working groups are as follows:

1. During deployments, 18% of respondents said that a lack of PSP staff was a barrier to conducting PT, while 60% said they were too tired to participate in PT;
2. Workload is the largest barrier to PT. Even when the CoC encourages PT, during busier times such as pre-deployment windows, less priority is given to PT;
3. Access is the second largest barrier to PT. This is a particularly acute problem for CFB Halifax after the Stadacona gym was closed in 2018. Parking and space at both Dockyard and Shearwater gyms is limited; and
4. The Force Test rewards system should include a day off to reward a significant improvement in one's score, or achieving a high level of PT.

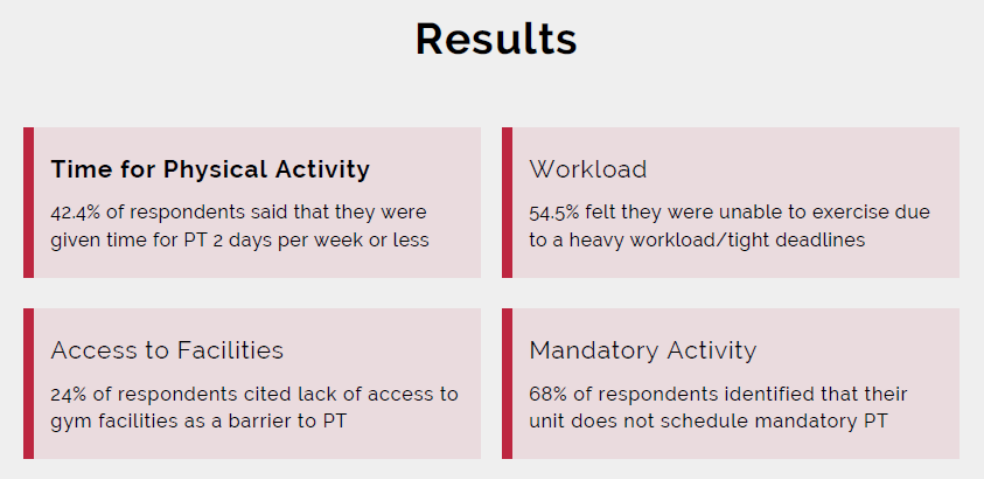

Figure 10 - Results of the Barriers to PT at CFB Halifax

The purpose of gathering this information, is to ultimately create achievable and specific objectives which can reverse the negative health trends being experienced by the RCN. The strong belief in the need and utility to be physically active is a common and

positive thread amongst all data sets. There is however a failing trend throughout past fitness initiatives to raise the appropriate level of awareness of the challenges, and a lack of resource and leadership commitment to make lasting change. Direct leadership intervention, as well as appropriate accountability frameworks that highlight positive and negative trends, could support greater progress towards sailors adopting a healthier lifestyle, leading to increased operational readiness.

CHAPTER 4 – REMOVING BARRIERS AND MAKING CHANGE

"While not all changes lead to improvement, all improvement requires change."[124] This quote, found in the bestselling workplace culture book *The Improvement Guide: A Practical Approach to Enhancing Organization Performance*, is representative of the situation the CAF and in particular the RCN, finds itself in today. FORCE policies and programs regarding fitness have not precipitated meaningful change, as they are not connecting with those who would most benefit. This includes two institutional policies released over the last 14 years. Both policies had the intent of reversing the years of documented decline in the health and fitness of CAF members.

Case in point is the audit of the 2008 CF Health and Physical Fitness Strategy by the Chief of Review Services, that could not determine if its goals had been achieved. The audit also found that it created unrealistic expectations and lacked accountability mechanisms.[125] While an assessment of BALANCE has been hampered by the onset of COVID-19, the lack of visibility by CAF members on the strategy is concerning. This has been further complicated by the release of the *Defence Team Total Health and Wellness Strategy* in March 2022.[126] This new strategy will only serve to add additional layers of complexity and bureaucracy to the problem at hand, while offering no new financial investments or support to those change initiatives currently underway.

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[124]G.J. Langley, R.D. Moen, K.M. Nolan *et al*, *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance* (San Francisco, CA: Jossey-Bass Publishers, 2009).

[125]Department of National Defence, *Audit of the CF Health and Physical Fitness Strategy and CF Fitness Program Delivery* (Ottawa, ON: Chief of Review Services, February 2014), 9.

[126]National Defence, "The Defence Team Total Health and Wellness Strategy," March 4, 2022, https://www.canada.ca/en/department-national-defence/services/benefits-military/health-support/total-health-and-wellness-strategy.html.

Kicking off effective change is challenging. Most importantly it should lead to specific improvement ideas. In the case of RCN fitness levels, this means addressing operational fitness as measured by the FORCE program and reducing health concerns that contribute to attrition, which impacts readiness. In a paper that examined systemic obstacles to culture change in the CAF, Allan English, a recognized subject matter expert on Canadian military culture stated "Efforts by senior leaders to effect such major culture change in the CAF in the past three decades using similar methods have seldom been successful."[127] He made these comments in the wake of the release of the External Review into Sexual Misconduct and Sexual Harassment in the CAF.[128] Additionally, he outlined simple steps to enact change, beginning with a coherent and holistic plan based on observations, and "…attainable goals that respond to the specific needs of the change." Considering the observations and findings considered in this paper, proposals for an initial actionable plan can take shape. First, it is important to review the findings, through a lens that examines the physical fitness of RCN sailors today:

a. Finding 1 – From an historical perspective which does not waver to present day, physical fitness will continue to be a key factor in ensuring the CAF is operationally effective. As ordered by the CDS, "Fitness is essential to our profession and is a critical part of our operational readiness. Do your FORCE test, encourage personal and collective fitness training, and maintain your own fitness level. Be ready."[129]
b. Finding 2 – To date, CAF fitness strategies have not resulted in positive, measurable change. The FORMeFIT reporting system does provide the DND and

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[127]Allan English, "Sexual Harassment and Sexual Assault in the Canadian Armed Forces: Systemic Obstacles to Comprehensive Culture Change," (paper written for IUS Canada Conference, Ottawa, ON 21-23 October 2016), 1.

[128]National Defence, "External Review into Sexual Misconduct and Sexual Harassment in the Canadian Armed Forces," April 30, 2015, https://www.canada.ca/en/department-national-defence/corporate/reports-publications/sexual-misbehaviour/external-review-2015.html.

[129]General Wayne Eyre, Twitter post, 15 March 2022, 7:46 a.m. EST, https://twitter.com/CDS_Canada_CEMD?ref_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Eauthor.

CAF with an important tool to measure the operational fitness, and health related fitness of its members;

c. Finding 3 – Physical fitness and activity levels in the CAF are declining as we fight an external battle against the general Canadian population. The issue is particularly acute for the RCN, because it has the highest rate of obesity, and the lowest operational fitness scores amongst the three major services;

d. Finding 4 – Medical research is clear and unequivocal; by achieving recommended physical activity guidelines, you maximize risk reduction for illness and all-cause mortality. A reduction in abdominal fat, and a strengthening of musculoskeletal health which is linked to injury prevention are some of the key benefits. Musculoskeletal injuries represent 41% of all CAF medical releases;

e. Finding 5 - The four top behavioural change techniques related to increasing physical activity are: (1) provide consequences of behaviour in general, (2) prompt rewards contingent on effort or progress towards behaviour, (3) provide instructions on how to perform the behaviour, and (4) facilitate social comparison;

f. Finding 6 – Although sailors conduct work which is increasingly more technical and sedentary in nature, they can be called upon to conduct highly physical tasks at short notice. An example of this is fighting a shipborne fire, such as the one that occurred in HMCS *Protecteur*; and

g. Finding 7 – The two greatest barriers to fitness on RCN bases today as identified by sailors are workload and access. Once deployed, fatigue and a lack of training space become the major challenges.

To ensure success of any initial action plan, it must include not just the necessary steps to obtain widespread buy-in, but an understanding of why change is necessary. To paraphrase Albert Einstein, we cannot solve our problems using the same thinking in which they were created. The RCN cannot continue to treat physical fitness as an adjunct to its Ready Naval Forces program, but rather as a distinct part of it.[130] For this reason, John Kotter's 8-step change model, albeit in a condensed form will be used as a framework.[131] Originally used in a corporate context, it has been applied in a multitude of

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[130]National Defence, "Evaluation of Ready Naval Forces," March 4, 2020, https://www.canada.ca/en/department-national-defence/corporate/reports-publications/audit-evaluation/evaluation-ready-naval-forces.html.

[131]John P. Kotter, Inc OverDrive, and OverDrive ebook, *Leading Change - John Kotter*, 1st ed., Book, Whole (Namur, Belgium: Primento Publishing, 2012), https://go.exlibris.link/bcR44x2w.

settings including the education and medical fields.[132] The three change concepts to be explored that align directly with the Kotter conceptional change model will be: (a) Increase Urgency; to include elements of Getting the Right Vision and Communication, (b) Selecting the Right Team and Empowering Action and (c) Leveraging Short Term wins and Initiatives; to include elements of Consolidating Improvements and Institute Change.

Increase Urgency

One of the largest challenges facing the CAF today is a lack of personnel. The ongoing standard rates of attrition, compounded by the effects of COVID-19 over the last two years have reduced recruiting to approximately one-third of normal rates.[133] The CDS Planning Directive for CAF Reconstitution, released in July 2021, makes clear the urgency to fill nearly 10000 vacant positions, representing a shortfall in leadership and planning capacity.[134] Keeping current members, and avoiding what human resources experts refer to as unhealthy or avoidable retention, is only briefly mentioned in one place of the directive.[135] A task provided to Military Personnel Command is "Implementing the CAF Retention Strategy with a view of enhancing retention and protecting operational capability."[136] However, the CAF Retention Strategy has yet to be

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[132]Mary R. C. Haas et al., "#DidacticsRevolution: Applying Kotter's 8-Step Change Management Model to Residency Didactics," *The Western Journal of Emergency Medicine* 21, no. 1 (December 19, 2019): 65–70, https://doi.org/10.5811/westjem.2019.11.44510.

[133]Canadian Armed Forces, *CDS Planning Directive For Canadian Armed Forces Reconstitution* (Chief of Defence Staff, 9 July 2021), 2.

[134]*Ibid, 5.*

[135]Rudraksh Dubey, "Understanding Employee Attrition Pattern through HR Analytics - Generating Meaningful Insights," *Psychology and Education Journal* 57, no. 9 (December 30, 2020): 4020–26, https://doi.org/10.17762/pae.v57i9.1620.

[136]Canadian Armed Forces, *CDS Planning …*, 30.

released.[137] A key, and measurable goal of the strategy must be to reduce unhealthy attrition, including medical releases, as well as those who voluntarily release due to dissatisfaction. Increasing levels of physical fitness in the force is one of, if not the singular most important solution to this problem because every CAF member can contribute in a way that benefits both the force and themselves. Besides, what we definitively know medically, as listed in Finding 4 above, is that exercise wards off depression, relieves stress, sharpens brain functions, improves sleep, and overall contributes to a higher quality of life.[138]

Naval Readiness as defined in Canadian Forces Controlled Document 129 – the RCN's Readiness and Sustainment Policy is "The ability of forces at a given point in time to execute their assigned missions." [139] The document is meant to operationalize the first pillar of the RCN's Results Framework: Ready Naval Forces. Missions are further accomplished through RCN Force Elements, such as ships and special teams, which are then combined into Force Packages like a Naval Task Group. The first and most important pillar of naval readiness is personnel, followed by materiel, collective training and sustainment. To be blunt, ships cannot drive and fight themselves.

The personnel risk to Naval Readiness at this point of time has never been higher with over 1000 regular force positions currently vacant. In addition to this number, 2020 DGMPRA attrition information show that many RCN occupations, including NESOP,

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[137]National Defence, "Personnel," July 8, 2020, https://www.canada.ca/en/department-national-defence/corporate/reports-publications/proactive-disclosure/supplementary-budget-b-2019-2020/other-issues/personnel.html.

[138]Diane L. Gill et al., "Physical Activity and Quality of Life," *Journal of Preventive Medicine and Public Health* 46, no. Suppl 1 (January 2013): S28–34, https://doi.org/10.3961/jpmph.2013.46.S.S28.

[139]Department of National Defence, B-GN-005-RCN/RQ-001, "CFCD 129 Readiness and Sustainment Policy," Halifax, NS: Assistant Chief of Naval Staff, 16 July, 2018.

NCIOP, NAVCOMM, Marine Technician, and Naval Technical Officers are well below average strength, and suffer significantly higher attrition than many other occupations.[140] In addition to this attrition, current information from Director Naval Personnel shows an average of 7% of RCN personnel unable to be employable due to medical limitations.[141] A combination of these facts, along with Finding 3 above establishes that the RCN should act with a sense of urgency.

Rear-Admiral Chris Sutherland, the outgoing Deputy Commander RCN agreed in a conversation that, based on the current health profile of the RCN, change is necessary.[142] He believes those changes to be threefold, and include an organizational plan outlining how we increase FORCE metrics, aided by new incentives and accountability schemes that have teeth. While noting improvements to nutrition offerings, and tailored fitness programming to sailors on ships and bases over the last decade, these changes have clearly not been enough to offset what he termed an inconsistent philosophy regarding physical fitness amongst supervisors and COs. While some COs understand the benefits fitter and healthier sailors bring to the fight, others deem fitness as just another check in the box, and only engage when someone cannot meet the minimum standard on their FORCE evaluation.

In his past role as Base Commander of CFB Halifax, Rear-Admiral Sutherland also recalled a vicious cycle in which "sick people made healthy people sick." The cycle

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[140]Straver, M. (2020) *Annual Update of Regular Force Attrition* (Director General Military Personnel Research and Analysis – unpublished slide deck). Ottawa, ON: Defence Research and Development Canada.

[141]Lee Pothier (Naval Technical Officer Occupation Manager), "Attrition vs. Medical Release Data," email with Graham Hill, 16 November 2021.

[142]C. Sutherland, In-person conversation, 14 April 2022.

would begin with a sailor who had neglected their health, and as a result could not sail on exercise or operations. To then fill those unoccupied positions and enable mission success, healthy sailors recently posted to Base from ship, to fill less high tempo positions, would be called back to the fleet. That individual would then experience years of high operational tempo, without a sufficient rest period. The result would be a reduction in their operational fitness and mental health, effectively breaking the individual and restarting the cycle. Compounding the loop over the last five years has been high rates of attrition, the inability to meet our strategic intake numbers via recruitment, and finally the large number of unqualified sailors sitting on the basic training list.[143]

An institutional directive and program, similar to how the RCN developed an RCN Code of Conduct framework in response to its Internal Review of Personal Conduct could be the recommended solution.[144] Once named, it can be widely publicized to create excitement and encourage initial uptake and participation. Culture of fitness surveys in both Halifax and Esquimalt confirm that although PT is formally supported, barriers including workload while alongside and fatigue while at sea, prevent its prioritization and conduct (Finding 7). The goal of such a program must therefore be to change the mindset of the force writ large that PT is not simply a secondary enabler of work, but rather "is" work. The CA is an aspirational example demonstrating that this mindset is possible. Unit and fleet schedules must therefore be mandated to include periods of PT from the

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[143]The operationally functional point is when a member has achieved the qualification requirements for first employment in a military occupation. It is at this point when you are posted off the basic training list, and are considered fully employable in your trade.

[144]Royal Canada Navy, "Executive Summary: Internal Review of Personal Conduct," accessed April 18, 2022, http://www.navy-marine.forces.gc.ca/en/about/baines_report.page.

Commander RCN down, to ensure the greatest amount of standardization across the whole of the RCN. PT would be formally incorporated as a unit objective.

For ships at sea, sailors would ideally conduct PT while on watch in a 1-in-2 rotation, excluding during the conduct of operations, and at a period of time DRDC's own studies reveal fatigue to be at its lowest.[145] Programs such as HIFT, or the Five Basic Exercises (5BX Plan) developed by Dr. Bill Orban for the RCAF in the late 1950s can be accomplished with minimal equipment, space, and time requirements, allowing personnel to achieve a high level of fitness.[146]

In a conversation with the Chief Petty Officer of the Navy, Chief Petty Officer 1st Class David Steeves, he pointed to the release of Naval General Order (NAVGEN) 007/19 as the progress that the RCN has already taken towards institutionalizing fitness quality of life time while at sea.[147] Using research compiled by the United States Navy on the need to balance combat effectiveness, rest, and a sailor's quality of life while at sea, the RCN mandated that outside of high tempo threat situations, the primary watch rotation would become what is termed 1-in-4 Alpha (A).[148] 1-in-4A splits up the ship's company, and more precisely each department into four teams, also called watches (Table 5). This equates to each sailor over a 24-hour period working or being "on watch" for 6 hours, conducting 6 hours of departmental administration/training, 9 hours of rest to best

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[145]Department of National Defence, DRDC-RDDC-2017-R048, *Sailors' Work/Rest Schedule and Fatigue on a Canadian Patrol Frigate During Exercise* (Ottawa: Defence Research and Development Canada, 2017).

[146]"Performance and Competency Evaluation (PaCE)," accessed April 18, 2022, http://www.cmp-cpm.forces.gc.ca/pace-epc/en/index.asp?Redirect=/pace-epc/en/index-LO.asp.Royal Canadian Air Force, "5BXPlan, 3rd Edition," accessed April 18, 2022, https://csclub.uwaterloo.ca/~rfburger/5bx-plan.pdf.

[147]D. Steeves, In-person conversation, 11 April 2022.

[148]Royal Canadian Navy, *Update to RCN Watch Rotations*, Canadian Armed Forces: NAVGEN, 007/19, 261621Z FEB 19,

maintain a circadian rhythm, and finally three hours of fitness / quality of life time.[149] Chief Steeves noted that RCN leadership has also stressed the need to provide flexibility with regards to PT during the traditional 1-in-2 defence watch. From all accounts, these changes have been widely lauded, and demonstrated through shipborne trials to not impact the flow of operations from periods of lower tempo, to more dynamic situations.

		ROTATION	00	01	02	03	04	05	06	07	08	09	10	11
1:4A	1st STBD	ALPHA	ON WATCH			REST CYCLE						ALL SHIP TIME		
	2nd STBD	BRAVO	REST CYCLE			ON WATCH			FITNESS QoL TIME			ALL SHIP TIME		
	1st PORT	CHARLIE	REST CYCLE						ON WATCH			ALL SHIP TIME		
	2nd PORT	DELTA	REST CYCLE									ON WATCH		

		ROTATION	12	13	14	15	16	17	18	19	20	21	22	23
1:4A	1st STBD	ALPHA	ON WATCH			ALL SHIP TIME			FITNESS QoL TIME			REST CYCLE		
	2nd STBD	BRAVO	ALL SHIP TIME			ON WATCH			REST CYCLE					
	1st PORT	CHARLIE	ALL SHIP TIME			FITNESS QoL TIME			ON WATCH			REST CYCLE		
	2nd PORT	DELTA	ALL SHIP TIME						FITNESS QoL TIME			ON WATCH		

Table 5 - 1-in-4A Routine

Another important goal needs to be the incorporation of operational fitness, and health related fitness objectives into the newly released Performance and Competency Evaluation tool.[150] In a similar fashion to how society has evolved to discuss suicide and mental health issues more openly, supervisors cannot shy away from providing information on the consequences of poor physical conditioning.

Such avoidance, while knowing the facts surrounding the benefits of PT and the issues currently facing the RCN regarding its lack of personnel, only serves to trade short-term discomfort for a longer-term dysfunction. While individual members may be

[149]A circadian rhythm or cycle, is the body's internal process that regulates the natural sleep-wake cycle over a 24-hour period.

[150]National Defence, "Performance and Competency Evaluation (PaCE)," accessed April 18, 2022, http://www.cmp-cpm.forces.gc.ca/pace-epc/en/index.asp?Redirect=/pace-epc/en/index-LO.asp.

reluctant to provide their precise cardiorespiratory (VO2 max) or waist circumference health related scores, the colour of one's individual performance on the FORCE evaluation is sufficient to providing the member with information on how monitored improvements should be pursued.

Select the Right Team and Empowering Action

Unit command Teams must be at the forefront of acting on any institutional changes. The required changes can be accomplished through the exercise of Deck Plate Leadership, which is the act of engaging, teaching, and ultimately knowing subordinates in their workplaces.[151] A program that originated in MARPAC by Captain (Navy) Todd Bonnar, the former CO of HMCS *Protecteur,* is a practical example of Deck Plate Leadership which has proven both successful and popular with sailors in Esquimalt. Plan 360º began in 2011 on HMCS *Protecteur* with the intent of increasing the operational readiness of its sailors through a greater focus on both their mental health and physical fitness. It accomplished this by establishing a formal system of recognition in line with the CF Health and Physical Fitness Strategy at the time, using a point-based incentive plan.

In a conversation with Captain (Navy) Bonnar, he stated that the program was rolled out in two phases.[152] The first phase was educational and done in conjunction with PSP and CFB Esquimalt Health Promotion Services. It involved members of the ship's company trialing new dietary options, and learning about the latest research in sleep science. The second phase involved a pointed system based upon units of physical

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[151]Royal Canadian Navy, *Royal Canadian Navy Code of Conduct* (Canadian Armed Forces: NAVORD 1001-0), 18 November 2015, http://www.navy-marine.forces.gc.ca/en/about/leadership-conduct.page.

[152]T. Bonnar, Telephone conversation, 19 November 2021.

activity.[153] Once you accumulated 360 points, you were granted two days of short leave.[154] A maximum of two days of short leave per quarter could be granted. The benefit of the point-based system was that all individuals had an equal opportunity to be rewarded, independent of individual fitness. In other words, those sailors who were in the higher spectrum of operational fitness, and those who strived to incrementally improve their health profile are both rewarded. A theme that came from the 2019 Culture of Fitness working groups in Halifax found that the FORCE Rewards system should incorporate "… a day off given as a reward for passing a fitness threshold [incentive level], or achieving an improved level on the FORCE test."[155] Since the release of the first 360º plan on HMCS *Protecteur*, other ships and shore units in MARPAC have also adopted the plan. An example of a standing order employed at Naval Fleet School Pacific is included in Annex C.

Equally important is for Unit Command Teams to be held directly accountable for the performance of their teams. Command analytic software, including the data available from the FORMeFIT system can form the basis of this accountability. Culture of Fitness surveys found that a mere 13% of personnel in CFB Esquimalt found their Unit COs to be PT unit role models. Only 16.5% felt that their unit had a tradition of celebrating fitness. These numbers need to be improved. One way this can be accomplished is through greater Interfleet competition. Programs such as the MARLANT MEGA sports

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[153]Canadian Forces Morale and Welfare Services, "CF Physical Fitness Award of Aerobic Excellence," accessed April 18, 2022, https://www.cafconnection.ca/National/Programs-Services/For-Military-Personnel/Military-Fitness/Fitness-Programs/CF-Physical-Fitness-Award-of-Aerobic-Excellence.aspx.

[154]National Defence, "Leave Policy," policies, May 29, 2013, https://www.canada.ca/en/department-national-defence/corporate/policies-standards/leave-policy-manual.html.

[155]Canadian Forces Morale and Welfare Services, *Acting Living and Injury Presentation Focus Group Summary March 2019* (Halifax, NS: Personnel Support Programs, March 2019), 2.

championship must be reinvigorated.[156] And participation in wider events such as the Navy Bike Ride and Navy Run more highly touted.[157] A wide array of RCN specific Honours and Awards, could also be reviewed with the intent of incorporating elements of one's health and fitness profile. One award which could serve as a starting point for change would be the Admiral's Cup. [158] The cup is presented annually to the ship that demonstrates the best efficiency, morale and leadership in the fleet. A unit which chooses to prioritize output, but sacrifice the health of its members to achieve short-term success in operations, should not be so easily rewarded.

Scientific literature related to motivation at the group level, characterized by the Köhler effect also supports placing a greater emphasis on inter-unit competition, and other esprit de corps building fitness related activities.[159] The Köhler effect occurs when lower performing team members are motivated in a group setting to perform difficult tasks better, and see higher proportional gains when compared to their more skilled counterparts. For the RCN, this could mean pushing some of the expected 50% of sailors currently outside the FORCE incentive program into the bronze level of rewards.

The Fleet Diving units are powerful examples of where a strong culture of fitness can be inculcated within RCN lines. Fleet Diving Unit Atlantic (FDU(A)) had the highest

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[156]"MEGA Championship Events," accessed April 18, 2022, https://www.cafconnection.ca/Halifax/Adults/Sports/MEGA-Championship-Events.aspx. Interunit sport competitions in Halifax used to operate under three distinct banners for the Base, Fleet, and 12 Wing Shearwater. Due to reduced participation, these three distinct competitions were condensed down into one called MEGA.

[157]Royal Canadian Navy, "Navy Bike Ride – Défi Vélo de La Marine," accessed April 18, 2022, https://navybikeride.ca/.; Royal Canadian Navy, "CFB Esquimalt Navy Run," accessed April 18, 2022, https://navyrunesquimalt.com/.

[158]Maritime Forces Atlantic, "HMCS St.John's Wins Admiral's Cup," Trident Newspaper, March 10, 2020, https://tridentnewspaper.com/hmcs-st-johns-wins-admirals-cup/.

[159]Kaitlynn A. Osborn et al., "The Köhler Effect: Motivation Gains and Losses in Real Sports Groups," *Sport, Exercise, and Performance Psychology* 1, no. 4 (2012): 242–53, https://doi.org/10.1037/a0026887.

operational and health related fitness scores for any RCN unit in 2019.[160] In a conversation with their CO LCdr Neville Lockyer, he mentioned that although the selection process for the Clearance Diver occupation is rigorous and requires a high level of physical fitness to make it through selection, once you join the occupation it is up to the individual to maintain their required standard of fitness.[161] There is no annual test like the Army's FC, which sets the standard needed to perform as a clearance diver. Only the annual FORCE evaluation is conducted. Rather, the unit's culture of fitness combined with the willingness of its leadership to break down any barriers to performing PT for its members is the recipe for its success.

Every level of leadership, from the Command Team down to its most junior members participate in daily physical activity. LCdr Lockyer noted that this commitment to fitness does not stop at just the Clearance Divers at the unit, but rather involves the large number of the Combat Support Services, including logisticians and engineers who enable the unit's high level of operational readiness. He also noted that over the last several years, the unit has made a concerted effort to expand its facilities, and hence physical activity access for FDU(A) members. This has included the construction of mini-gyms, lockers, and changing facilities as close to the member's workplace as possible. Additionally, he has provided direction to all his principal staff that maximum flexibility be given to members to conduct PT during the working hours, to include either starting or finishing the workday at a fitness facility of their choice.

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[160]Daryl Allard, "Royal Canadian Navy Fitness Profile 19/20 Reporting," (presentation, Deputy Commander Royal Canadian Navy, Ottawa, ON, September 2020).

[161]W. Barter, "Recruiting Considerations for Clearance Diving," (Joint Command and Staff Programme Paper, Canadian Forces College, 2018-2019), 3.

The problem of access to adequate facilities and equipment, as well as a larger plan to address shortfalls in baseline funding were identified as issues that were left unaddressed as a result of the 2008 CF Health and Physical Fitness Strategy.[162] The Chief of Review Services audit specifically states that the risks of not addressing current shortfalls includes "Military members being unable to maintain their [regular] physical fitness activity and, their operational readiness …" due to a lack of facilities, and a declining level of service.[163]

Ad-hoc solutions such as the ones used by FDU(A) while seemingly successful in the short term, must therefore not become the norm across the DND as a whole. Rather, anticipated increases in defence spending must be redirected to close gaps that affect the quality of life of military members and ultimately assist with retention.[164]

Leverage Short-term Wins and Initiatives

There are several programs and initiatives in play currently, that can be leveraged by the RCN to build momentum towards positive change. As discussed in the previous chapter, the Halifax Class did not incorporate a dedicated fitness space into the ship. Rather, hallways and corner areas were utilized for single pieces of fitness equipment, and during mid-life refit a small space aft was converted into a ship mini-gym. During the design phase of the Harry DeWolf Class however, several technical requirements related to fitness were incorporated into the contract design specification.[165] These included the

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[162]Department of National Defence, *Audit of the CF Health and Physical Fitness Strategy and CF Fitness Program Delivery* (Ottawa, ON: Chief of Review Services, February 2014), 13.

[163]*Ibid.*

[164]CBC News, "Defence Minister Says She's Considering 'aggressive Options' to Increase Canada's Military Spending | CBC News," CBC, March 16, 2022, https://www.cbc.ca/news/politics/anand-defence-spending-1.6387361.

[165]Daniel Lougheed (Hull Systems Engineering Manager, Arctic Offshore Patrol Ship Project), "AOPS Fitness Facilities," email with Graham Hill, 19 November 2021.

need for the ship to have a dedicated exercise and fitness room no smaller than 30 m^2, and that the space was to be outfitted with a variety of robust, commercial gym equipment. Pictures of the newly developed space can be seen in Annex D. In a press release on 22 March 2021, the gym on HMCS *Harry DeWolf* is touted as spacious and appealing. It also notes that it contains a variety of fitness equipment that appeals broadly to the ship's company, and has an adjacent head and wash place which allows for quick changing and access to water.[166] The inclusion of this quality of life space on the Harry DeWolf Class will increase access to shore like fitness facilities for sailors, and alleviate some of the stress related to working out in a more constrained environment as found on the Halifax Class.

The second BCT as listed above in Finding 5 is to utilize prompt rewards contingent on efforts of progress towards behavioural change. The system utilized by the CAF to encourage members to strive for a higher level of fitness as measured by the FORCE test is the FORCE Rewards Program.[167] The program rewards include being provided an article of fitness clothing if you achieve a silver, or gold incentive level. For achieving platinum, you receive an article of clothing, certificate of recognition, and pin to be worn on your uniform.

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[166]National Defence, "New Ships Mean Improvements in Quality of Life at Sea," accessed April 18, 2022, http://www.navy-marine.forces.gc.ca/en/news-operations/news-view.page?doc=new-ships-mean-improvements-in-quality-of-life-at-sea/kmjsps7v. On the Halifax Class, there is generally no heads or wash place near fitness areas and equipment. This added an additional barrier to PT because one needed to bring Naval Combat Dress to a workout and change in the open, or alternatively transit to and from a sleeping area in the event of an emergency.

[167]Canadian Forces Morale and Welfare Services, "FORCE Rewards Program," accessed April 18, 2022, https://www.cafconnection.ca/National/Programs-Services/For-Military-Personnel/Military-Fitness/Fitness-Programs/FORCE-Rewards-Program.aspx#.

Although no research, such as questionnaires or focus groups have been conducted to judge the efficacy of the program to date, conversations with PSP leadership, and the CAF members referenced in this paper reveal that the reception to the program has been lackluster. In fact, research on extrinsic motivating factors such as rewards, and PSPs own work conducted in advance of the FORCE Rewards Program roll-out would have indicated its expected limitations. The FORCE Rewards Program is an example of a social recognition approach, used to increase the likelihood of CAF members becoming life-long exercisers. For extrinsic motivation to be most effective it must be used sparingly. This ensures that the value of the reward does not decrease. This is known as the over-justification effect.[168]

In a 2015 article for the Canadian Military Journal by Dr. Mike Spivock, the previous lead Human Performance Researcher with the Directorate of Fitness, he outlines in great detail the main drivers behind both intrinsic and extrinsic motivations, and what would best motivate CAF members to perform at a higher fitness standard.[169] He cites research which describes reward motivation as "… a spectrum from most to least autonomous [actions], where more autonomous motivation represents a higher likelihood of lifelong behavioural adherence."[170] While pointing out that various HLIS have shown that CAF members are becoming more sedentary and less physically active, hence not

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[168]Shu-Hua Tang and Vernon C. Hall, "The Overjustification Effect: A Meta-Analysis," *Applied Cognitive Psychology* 9, no. 5 (1995): 365–404, https://doi.org/10.1002/acp.2350090502.

[169]National Defence, "Canadian Military Journal Vol. 15, No. 4," accessed April 18, 2022, http://www.journal.forces.gc.ca/vol15/no4/page55-eng.asp.

[170]E.L. Deci and R.M. Ryan, "Human autonomy: The basis for true self-esteem," in *Efficacy, agency, and self-esteem*. [M. Kemis [Ed.] (New York: Plenum, 1995). pp. 31–49.

being driven entirely intrinsically to remain fit, Dr. Spivock outlines that the next most effective form of extrinsic motivation is regulation through identification (Figure 11).

This form of extrinsic motivation requires "… consciously valuing a goal or regulation so that said action is accepted as personally important."[171] An example of this type of motivation via reward is "I will perform better on my fitness test, if it advances me in my career – promotions are important to me."[172] The social recognition approach administered as part the FORCE Rewards Program is not only known to be less effective than regulation through identification, but its current design violates the basic premise of effective use of extrinsic motivation by essentially providing a CAF member the same thing (an article of clothing) year over year.

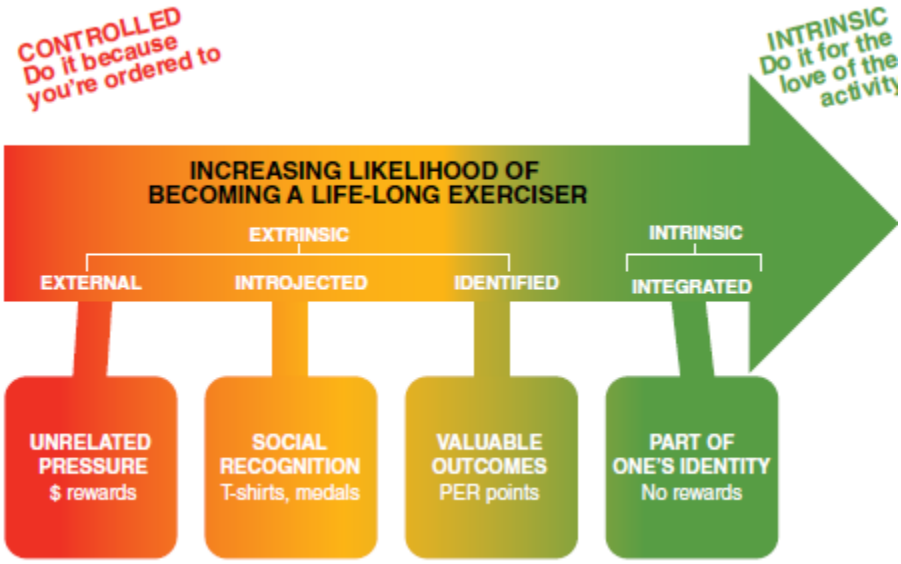

Figure 11 - Different Levels of Motivation and the Nature of Rewards Adapted from Deci and Ryan, 1995

[171] *Ibid.*
[172] National Defence, "Canadian Military Journal Vol. 15, No. 4."

In line with a survey conducted on over 15000 CAF members throughout 2014 to 2015, a plan was presented to the Armed Forces Council (AFC) in February 2015 to individually reward members with promotion merit board points, if they achieved a bronze level or above on the FORCE test. RCN data in particular indicated that 46% of members supported this approach, followed by 31% of members wanting time off. Other options including certificates, tickets to sporting events, clothing, or recognition on the uniform, each garnered less than 5% of the total responses.[173] A review of AFC minutes around this time did not explain why this proposal was rejected.

The conversation with the PSP DFIT revealed the RCN and the RCAF opposed the tenets of such a plan due to concerns over the potential lack of inclusivity of all members, especially those with temporary medical limitations.[174] While such concerns at the time might have been well founded, current FORCE test data indicating problematic operational fitness levels in the RCN should necessitate a second look at the merit board points plan. After all, similar arguments around individual fairness and inclusion could also be made regarding other commonly used promotion criteria, such as access to second language training, or other post-secondary and professional credentials.

Another interesting PT pilot program underway in MARLANT is called the "Go for Green" initiative.[175] Three units, balanced between shore and ship environments were

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[173]Canadian Forces Morale and Welfare Services, *FORCE Fitness Profile and Incentive Program Implementation (Draft)* (Ottawa, ON: Military Personnel Command, 22 March 2016), 12.

[174]Daryl Allard, Microsoft Teams conversation, 18 November 2021.

[175]Canadian Forces Morale and Welfare Service, "PT Pilot Project," accessed April 18, 2022, https://admin.cafconnection.ca/Halifax/Adults/Health-Wellness/Health-Promotion/PT-Pilot-Project.aspx.Go for Green in a play on words for moving your health and operational fitness scores into the Higher Health Related FORCE test zone and beyond, as seen in Figure 3 of this paper.

selected for the pilot which runs until July 2022.[176] The basis behind the project is to use a tailored approach to physical activity interventions, health education, and lifestyle practices to improve the health-related fitness of CAF members.

While unit FORCE test results before and after the pilot are intended to be one measure of success, other data points will be gathered including: (a) participation rates to group PT sessions, (b) the delivery of fundamental information sessions on healthy eating, (c) meal planning sessions, and (d) stress management sessions. Most importantly, a social contract between Health Promotion staff administering the pilot, and unit command teams was enacted to ensure that clear direction was in place regarding the intrinsic need to participate in the program. Combining the results of this pilot, along with the data being collected on both HMCS *Windsor* and *Winnipeg* could very well demonstrate to RCN leadership that personally tailored programs, driven by consistent command intervention will result in positive behavioural changes.

To conclude, there are many initiatives underway within the RCN today that could be leveraged as a starting point to enact change. These initiatives alone neither carry sufficient authority nor reach to reverse the general air of malaise regarding the primacy of physical fitness in the RCN today. A standardized, flag hoist signal from the Commander RCN to all sailors must highlight both the need for change, as well as the benefits a changed mindset regarding physical fitness will bring to both individuals and the group.

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[176]The units involved in the Go for Green pilot are: Real Property Operations Unit (Atlantic), Trinity – Maritime Operational Support and Intelligence Centre, and the future HMCS *Margaret Brooke.*

In a recent briefing to the Standing Committee on Government Operations and Estimates, the Commander RCN said "My top priority is people. Without the sailors and public servants that crew and support our fleet, we cannot be operationally effective through the spectrum of activity in which we are asked to operate."[177] The retention, and health of our people must therefore be key to our future approach. Combining this reality with the available research, potential incentives, and use of programs we already know to be effective, must be at the forefront of new change initiatives.

[177]Parliament of Canada, "*OGGO Meeting No. 10*," accessed April 18, 2022, https://parlvu.parl.gc.ca/Harmony/en/PowerBrowser/PowerBrowserV2?fk=11571431.

CHAPTER 5 – CONCLUSION

As detailed in this paper, the most recent FORCE evaluation data as well as numerous past HLIS conclusively demonstrate that the RCN is in a lower state of health-related fitness. Not only is the RCN the lowest performing environment in terms of physical fitness, but it also has the highest rate of obesity and other risk factors for cardiovascular disease as compared to the CAF as a whole. It is no surprise that there is universal agreement amongst experts, and senior leaders in both PSP and the RCN, that the status quo is no longer acceptable.

Compounding these findings, the RCN is currently facing challenges related to personnel shortages. An unhealthy level of attrition, combined with poor operational and health related physical fitness levels are placing additional strain on its regular force strength. With the RCN poised to grow its future surface and subsurface fleets over the next two decades, new ways of thinking must be adopted if we are to continue to provide value to the government and people of Canada. The Canadian naval fleet is unique in its ability to provide a variety of diplomatic, industrial, economic and informational benefits to the state through the use of both soft and hard power alongside and on the open seas. There exists a real risk that the RCN will be unable to properly staff the very ships the force endeavors to build and use for these whole of government purposes.

Increasing the levels of PT and fitness fleet wide, is an area of improvement that all sailors have both the ability and shared responsibility to achieve. The movement of heavy equipment, storing of ship, firefighting, and unit esprit de corps activities are a few examples of the tasks that require high levels of health fitness to complete safely and efficiently. Well-founded research and other success stories in the CAF must form the

basis of necessary change, to include elements of institutional direction and communication, new incentives for getting in shape, and removing the identified barriers to fitness. Accountability would be instilled individually using the Performance and Competency Evaluation tool, with command analytics used in tandem at both the unit and Formation level. Finally, a culture of fitness in the RCN, must come to be viewed as a core element of operations, as opposed to a secondary enabler. Improving this culture must be a goal incorporated into the future daily operation of our business.

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Annex A - Process, Behaviour and Performance Indicators from BALANCE

Process, Behaviour,
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Annex B – Active Living and Injury Prevention Focus Group Results, March 2019

ALIP Focus Groups - Data Final 05.04.pdf

Annex C – Plan 360 Physical Fitness and Operational Readiness for Naval Fleet School Pacific

Plan 360 - Physical Fitness and Operati

Annex D – Pictures of the New Fitness Space on board HMCS *Harry DeWolf*