THE IMPACT OF APPLYING DIFFERENT BLOOD PRESSURE CUT-POINTS FOR PHYSICAL ACTIVITY PARTICIPATION CLEARANCE

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Abstract

The primary objective of this study was to determine the impact of applying opinion-based blood pressure (BP) cut-points on exercise clearance rates versus the evidence-based BP cut-point of 160/90 mmHg. All participants (n= 1670) participated in moderate-to-vigorous-to-maximal intensity physical activity (PA) with no adverse events. The percentage cleared for each of the opinion-based BP cut-points was: 130/80 mmHg (85.3%), 140/90 mmHg (93.4%), 144/90 mmHg (94.6%), 144/94 mmHg (96.3%), 150/100 mmHg (98.6%), versus the evidence-based BP cut-point of 160/90 mmHg (95.6%). Those not cleared were individuals who undoubtedly would benefit from PA participation since they were significantly older, had a higher BMI and were less aerobically fit than participants who were below the cut-points. The use of some opinion-based BP cut-points currently used by many fitness agencies provides an unnecessary significant and burdensome barrier to PA participation and it is recommended that a cut-point of 160/94 mmHg be used.

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Abbreviations and Definitions

ACSM: American College of Sports Medicine

BMI: Body mass index

BP: Blood pressure

CHEP: Canadian Hypertension Education Program

CSEP: Canadian Society for Exercise Physiology

DBP: Diastolic blood pressure

ePARmed-X+: electronic Physical Activity Readiness Medical Examination

HR: Heart Rate

Older: refers to the relative age of study participants, it is not synonymous with elderly

PA: Physical Activity

PAR-Q+: Physical Activity Readiness Questionnaire for Everyone

SBP: Systolic blood pressure

VO_2 max: Maximal Oxygen Consumption

CHAPTER 1: GENERAL INTRODUCTION

1.1 Physical Activity and Chronic Disease

The positive impact of habitual physical activity (PA) participation on both primary prevention and secondary management of many non-communicable chronic diseases or conditions is well established, yet many Canadians remain physically inactive. Statistics Canada reports that only 15.4% of Canadian adults achieved the recommended 150 minutes of moderate-to-vigorous intensity PA between 2007-2009 (Colley et al., 2011). Low levels of PA participation are associated with an increased risk of developing a variety of chronic conditions such as hypertension, cancer, obesity, cardiovascular disease and type 2 diabetes mellitus (Colley et al., 2011; Knight, 2012). PA is a modifiable risk factor for many chronic diseases and the prevalence of physical inactivity in the population is the highest among other modifiable risk factors and has a substantial economic burden (Katzmarzyk, Gledhill, & Shephard, 2000; Warburton, Nicol, & Bredin, 2006). To reduce and manage this risk, it is important for individuals to engage in safe and progressive PA, in particular moderate-to-vigorous-to-maximal intensity exercise. PA is a term that encompasses a whole range of bodily movements including active transport, activities of daily living, structured exercise and non-exercise PA (Gledhill, 1990). Not only has PA been found to be beneficial for decreasing the risk of developing chronic conditions, it has also been determined to improve other aspects of health and well-being including increasing life expectancy, mitigating age-related biological changes, ameliorating depression and anxiety disorders, and preserving functional capacity with age (Chodzko-Zajko et al., 2009).

Chronic conditions can negatively influence an individual's quality of life (Megari, 2013). Research has shown that PA has the potential to enhance quality of life and in turn improve self-esteem and self-efficacy (McAuley et al., 2006). The majority of health care spending is related to the treatment of chronic diseases, which are more prevalent in older individuals and place a significant economic burden on the health care system (Chase, 2014). With the rise in chronic diseases and the associated increased health care costs, PA provides an important intervention to mitigate these health issues and their consequences as well as to improve an individual's well-being. As a critical first step, individuals wanting to increase their

PA participation, in particular to engage in structured exercise, should undergo evidence-based pre-participation screening.

1.2 Physical Activity Participation Screening

The "best practice" procedure for PA participation screening in the health, wellness and fitness industry involves the measurement of pre-exercise blood pressure (BP) and heart rate (HR) measurements in combination with evidence-based screening tools such as the Physical Activity Readiness Questionnaire for Everyone (PAR-Q+) (2016/2017) and, if required, further screening through the ePARmed-X+ (www.eparmedx.com). Following self-administration of one or both of these screening tools, the individual receives a directive for restricted or unrestricted progressive intensity PA participation. Such screening practices are put into place to determine an individual's risk category (e.g. low, intermediate, and high) before increasing PA levels and thereby ensure an appropriate progressive PA prescription.

Figure 1 shows the risk continuum for PA progression developed by the PAR-Q+ Collaboration (Bredin, Gledhill, Jamnik, & Warburton, 2013). The risk continuum determines personal risk during PA based on an individual's disease status and number of co-morbidities. By using the pre-PA screening PAR-Q+ tool, an individual can be cleared as being at low or intermediate risk if they have no known co-morbidities or a well-controlled chronic condition. However, individuals who have numerous co-morbidities and/or severe chronic conditions may be deemed at high risk for sudden death, myocardial infarction, stroke and other disease-specific complications and potentially restricted from any PA participation.

The intent of the pre-participation PA screening process is to ensure safe PA participation and progression, whereby individuals are screened into restricted or unrestricted moderate-to-vigorous-to-maximal intensity PA participation. A major shortcoming of this pre-participation screening process is that most recommended BP cut-points applied along with the PAR-Q+ are both opinion-based and inconsistent between organizations, and most are so conservative that they may unnecessarily screen individuals out of undergoing a fitness test or a PA session, especially those older or unfit individuals (who have a low maximal oxygen consumption) who would benefit the most from PA participation both acutely and chronically (Warburton et al., 2006).

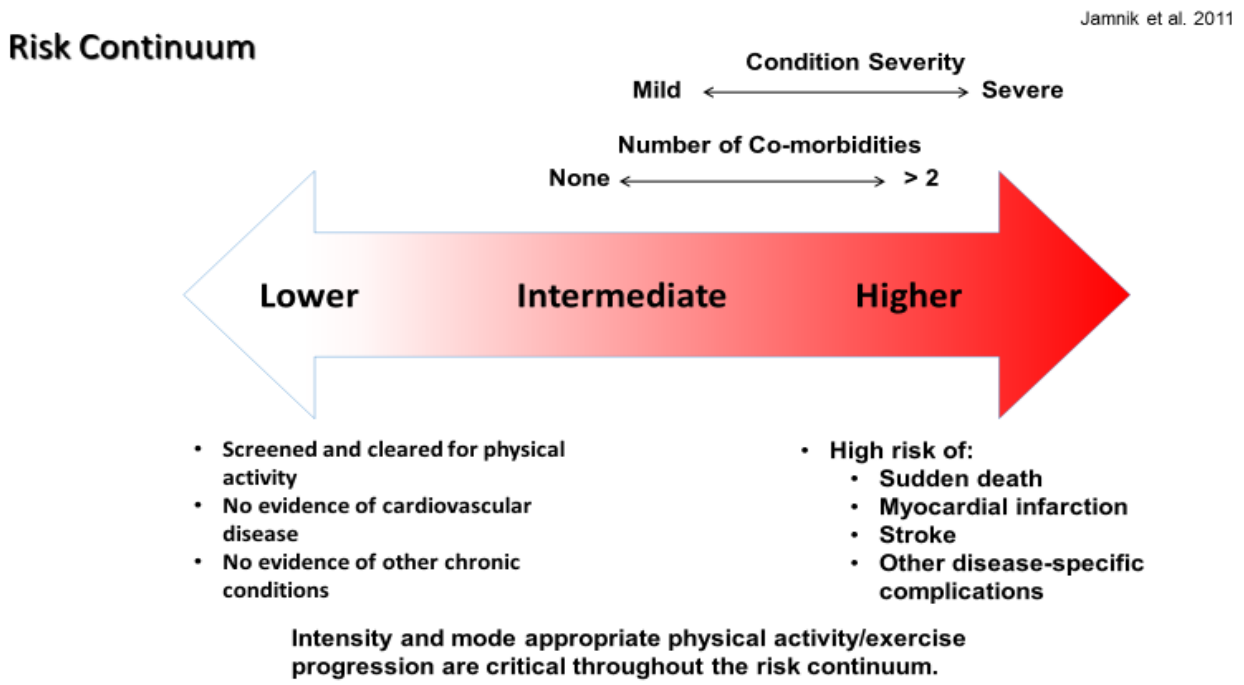

Figure 1: Risk Continuum for Physical Activity Showing that Appropriate Intensity Progression for Physical Activity is Critical Throughout the Continuum

In addition to screening for PA participation, the screening practice of measuring resting HR and BP is also a component of the screening process for job-related physical plus physiological fitness assessment in physically demanding public safety occupations. These occupations include police services, wildland firefighters, correctional officers, and other emergency related or public safety physically demanding jobs which require specific physical and physiological fitness standards to ensure safe and effective job performance (Gumieniak, Jamnik, & Gledhill, 2013; Jamnik, Gumienak, & Gledhill, 2013). During the process of measuring a prospective candidate's or incumbent's resting BP, if the BP is equal to or above the organization's designated resting BP pre-participation screening cut-point, the individual would be restricted from undergoing the job-related physical plus physiological fitness tests required for successful completion of the job application.

While the best practice procedure is to measure resting BP prior to a structured PA participation program or a health-related physical plus physiological fitness test or a physically demanding job-related physical plus physiological fitness test, in practice BP screening remains a challenge to many organizations and agencies. The confusion over which pre-exercise BP cut-

point is most effective and safe to use has created some unease within the commercial fitness industry and in particular the public safety occupation domain.

Because BP cut-points are also used in job-related physical and physiological fitness tests, individuals who are applying for physically demanding public safety occupations may be unfairly restricted from undergoing the physical plus physiological testing portion of a job application, which leaves the institutions questioning the value of the cut-points. The BP cut-points that are assigned to the pre-participation screening test battery for these occupations are often arbitrarily assigned and create confusion among hiring agencies (Serra et al., 2007). When combining a resting BP measurement with other evidence-based PA screening tools, the risk of PA participation is managed. However, even if an individual is cleared when using another tool, organizations generally use BP cut-points as the final determining factor for exercise clearance.

These systolic (SBP) and diastolic (DBP) BP cut-points differ depending on the thresholds adopted by the agency from a range of recommended cut-points: 130/80 (Canadian Diabetes Association, 2013), 140/90 mmHg (Balady et al., 1998; Pescatello, Arena, Riebe, & Thompson, 2014), 144/90 mmHg (www.fire-1.ca/wfxfit.html), 144/94 mmHg (Canadian Society for Exercise Physiology, n.d.), 150/100 mmHg (Director General Personal Family Support Services Directorate of Fitness (DFIT), 2012; Jetté, Landry, & Sidney, 1991), and most recently160/90 mmHg (Thomas, Goodman, & Burr, 2011). The most conservative cut-point of 130/80 mmHg is the target BP for diabetic individuals (Canadian Diabetes Association, 2013). However, organizations often adopt this threshold as a PA participation screening cut-point for exercise clearance in non-diabetic individuals. The pre-exercise BP cut-points applied in common physically demanding public safety occupation fitness assessments and by health and fitness organizations are summarized in Table 1.

Table 1: Pre-Exercise Blood Pressure Cut-Points for Physical Activity Participation Clearance Used in 2016 by Common Canadian Physically Demanding Occupational Screening Tests, and by North American Health and Fitness Organizations.

Occupation or Organization	130/80 mmHg	140/90 mmHg	144/90 mmHg	144/94 mmHg	150/100 mmHg	160/90 mmHg
Canadian Diabetes Association	X					
ACSM		X				
Wildland Firefighter			X			
CSEP				X		
Paramedic				X		
Correctional Officer				X		
Police Services				X		
Canadian Forces					X	
PAR-Q+ Collaboration						X

* For PA participation clearance BP must be less than the cut-point values used for SBP and DBP for an individual to be cleared for unrestricted PA participation.
ACSM (American College of Sports Medicine), BP (Blood Pressure), CSEP (Canadian Society for Exercise Physiology), PA (Physical Activity), PAR-Q+ (Physical Activity Readiness Questionnaire for Everyone), SBP (systolic blood pressure), DBP (diastolic blood pressure)

CHAPTER 2: REVIEW OF LITERATURE

2.1 Blood Pressure

BP is the force exerted on the walls of the blood vessels by blood circulating through the vascular system and is dependent on the volume of blood flow and the vessel's resistance to flow or compliance (how easily it can be stretched) (Powers & Howley, 2009; Sherwood & Kell, 2010). Typically, arterial BP is measured indirectly using a sphygmomanometer, an external inflatable cuff that is attached to a pressure gauge (Sherwood & Kell, 2010).

The measurement of BP determines the efficiency of the vascular system at transporting blood to the rest of the body. BP can be influenced by the viscosity of blood in the system, cardiac output (the amount of blood pumped from the heart) and total vascular resistance (the sum of resistance to flow from all systemic blood vessels) (Powers & Howley, 2009). An increase in any of these factors could result in an increase in blood pressure, while a decrease could result in a decrease in pressure.

BP is also regulated acutely through the sympathetic nervous system, while long-term regulation is determined through the kidneys by controlling blood volume. Baroreceptors or pressure receptors in the carotid artery and aorta are sensitive to changes in arterial BP and regulate BP by sending signals to the cardiovascular system to decrease sympathetic nervous system activity (Powers & Howley, 2009). This results in a lowering of cardiac output and/or total vascular resistance which leads to a reduction in BP (Powers & Howley, 2009). Reductions in BP may also trigger reductions in baroreceptor activity to the brain, causing the vascular system to increase sympathetic activity raising BP back to normal.

BP is the net effect of cardiac output, total vascular resistance, baroreceptor activity and vascular structure. The measured pressure can be separated by systolic BP (SBP) and diastolic BP (DBP). SBP is the maximal pressure exerted in the arteries during systole, when blood is ejected from the heart (Powers & Howley, 2009). DBP is the minimum pressure during relaxation of the ventricles (diastole), when the heart fills with blood (Powers & Howley, 2009).

2.2 Pre-Exercise Resting Blood Pressure

As moderate-to-vigorous-to-maximal intensity PA induces a rise in BP as a natural response, it is important to determine an individual's resting BP before the PA session is initiated. The rise in BP during exercise enables the supply of blood to working muscles (Tuka, Rosa, Dedinova, & Matoulek, 2015). Resting BP has been found to have a close relationship to the BP response during incremental to maximal effort PA (Bassett et al., 1998; Durstine, Moore, Painter, & Roberts, 2003; Laukkanen & Kurl, 2012). Research indicates that a high pre-exercise BP is associated with an exaggerated response in SBP during incremental to maximal intensity exercise (Bassett et al., 1998). As a result, if an individual's measured resting BP is high, he or she could exhibit an exaggerated increase in BP during a PA session. Individuals who exhibit a more exaggerated increase in exercise BP are at a higher risk of developing hypertension (Bassett et al., 1998; Laukkanen & Kurl, 2012). Laukkanen and Rauramaa also posit that an exaggerated BP response during exercise may increase the likelihood of sudden cardiac death as the result of plaque ruptures (Laukkanen & Rauramaa, 2013).

In 2011, Thomas et al. published a systematic review on the evidence-based risk assessment and recommendations for PA participation in individuals with cardiovascular disease. The researchers reviewed 193,598 publications with the key words "BP" plus "Exercise" and they reviewed in detail 50 papers with randomized control tests related to hypertension and exercise testing and/or exercise training. Thomas et al. (2011) concluded that there is limited evidence to suggest an increased risk of adverse events in individuals with hypertension and found strong evidence for the benefits of PA in individuals with pre-hypertension, Stage II hypertension and Stage II hypertension. However, they advised great caution when clearing individuals who have a resting BP of greater than 200 mmHg SBP and/or 110 mmHg DBP. The American College of Sports Medicine (ACSM) has also indicated that a resting BP of > 200 mmHg for SBP and/or > 110 mmHg DBP is considered a contraindication for exercise testing (Durstine et al., 2003).

Thomas et al. (2011) recommended that individuals with diagnosed and pharmacologically treated hypertension of less than 160/90 mmHg and are medically stable should be considered low risk. Since the cut-points that are currently used by some organizations are more conservative than the recommendation of 160/90 mmHg, they may be unnecessarily prohibiting individuals from engaging in PA or becoming more physically active. That is, the

more conservative opinion-based cut-points of 130/80 mmHg, 140/90 mmHg, 144/90 mmHg, 144/94 mmHg and 150/100 mmHg could be screening out individuals who would greatly benefit from PA participation, even though research does not support the argument that there is a greater risk of an adverse event occurring due to their PA participation.

Certainly, pre-exercise BP should be measured to determine a participant's risk for an adverse event and to ensure that they are exercising at an appropriate intensity. However, depending on which cut-point is applied, the cut-point itself may create an unwarranted barrier for individuals looking to undertake PA and/or increase their current PA level or for an applicant or incumbent undergoing a job-related physical plus physiological fitness test. Currently, there is a wide range of pre-exercise BP cut-points, with higher cut-points considered more liberal than lower or more conservative cut-points. If an individual's resting or pre-exercise BP is above the applied cut-point, it is recommended that he/she refrain from performing moderate-to-vigorous-to-maximal intensity PA participation until they attain further clearance from their physician or a qualified exercise professional. Many of the opinion-based cut-points were determined from research trials involving clinical populations and are currently being applied to the general apparently healthy population (World Health Organisation, 2005). While these cut-points are in place to help mitigate risk to participants, research shows that there is little evidence to support the more conservative cut-points particularly when pre-exercise BP is combined with other evidence-based tools such as the PAR-Q+ (and ePARmed-X+).

2.3 Blood Pressure Variability

If an individual's BP is equal to or greater than the various pre-exercise resting BP cut-points they cannot engage in moderate-to-vigorous-to-maximal intensity exercise without further clearance. The challenge that exercise professionals face in determining which pre-exercise resting BP cut-point to use is, that depending on the cut-point applied, an increasing number of participants may be unnecessarily restricted from exercise. These cut-points are predominantly within the Stage I hypertension classification, meaning that individuals have a SBP of 140-159 mmHg and/or a DBP of 90-99 mmHg. However, while an individual's measured pre-exercise BP may fall into a hypertensive classification, it is not a definitive indication that the individual has hypertension and could simply be a reflection of the immediate circumstance.

BP is a dynamic physiological response that is constantly changing based on behavioural factors and cardiovascular mechanisms (Hussein & Chang, 2015; Ruilope, 2014). Various factors such as stress and posture can affect BP and a "white coat effect" can be observed when an individual's BP is elevated during a BP measurement conducted by a professional but is otherwise normal (Rim, 2008). This effect is a common source of error when measuring BP and is often found in older men and women (Frese, Fick, & Sadowsky, 2011). In addition to behavioural and environmental influences, resting BP also follows a circadian rhythm and has natural fluctuations and patterns that affect the measured values (Biaggioni, 2008). In healthy individuals, the measured resting BP will exhibit a peak in the early morning and trough during sleep (Biaggioni, 2008). As a result of this variability, it is prudent to determine an average of a number of resting BP measurements to account for acute differences in measured BP. Variability in BP is also common in older individuals and can be associated with arrhythmias and stiff arteries. In addition, medications, anxiety, time of day and other stimuli can affect the measurement (Frese et al., 2011).

2.4 Blood Pressure Procedure

Measuring BP accurately is critical when making important healthcare decisions and providing PA prescription (Frese et al., 2011). An individual may be falsely classified as hypertensive, or non-hypertensive if standardized procedures are not followed. As a result, this may lead to inappropriate clinical decisions and treatment. It is important for a person's health and the determination of appropriate lifestyle modification to accurately measure BP and control for error (Frese et al., 2011).

There are various factors that can affect the accurate measurement of BP and may commonly provide a falsely high result, these factors include incorrect cuff size, cuff placed over clothing, body unsupported during measurement and incorrect body or arm posture, the individual not resting before measurement or talking, laboured breathing, full bladder and pain (American Diagnostic Corporation, n.d.). The correct size BP cuff is essential to ensure accurate measurement. A cuff that is placed on a person that is too small for his or her arm will determine an overestimate of his or her BP (Williams, Brown, & Conlin, 2009). The American Heart Association has released guidelines specifying the correct cuff length (80% of the arm

circumference) and width (at least 40% of the arm circumference), however, this factor in the measurement of BP remains a common error (Frese et al., 2011).

In addition to procedural factors, the accurate measurement of BP is also related to the client or participant adhering to the pre-measurement instructions and being seated in the correct posture during the measurement (Chobanian et al., 2003). The client should be seated quietly for at least 5 minutes prior to the measurement, with his or her feet on the ground, and the arm supported at heart level (Chobanian et al., 2003; Williams et al., 2009). In the 30 minutes before having his or her blood pressure measured, the client should also refrain from caffeine use, exercise and smoking (Chobanian et al., 2003; Frese et al., 2011; Williams et al., 2009).

The equipment used for the measurement of BP should also be regularly maintained in order to provide accurate results. The individual who is performing the measurement must also be trained in the correct procedure and standardized technique for measurement (Frese et al., 2011).

2.5 Classification of Hypertension

Resting BP is routinely measured in a physician's office and is generally determined from an average of 2 or more readings. The specific classification of an individual's hypertension is determined by a qualified health care professional who has received specialized training in measuring BP, typically a physician (Hypertension Canada: Canadian Hypertension Education Program (CHEP), 2016). When classifying resting BP, a standard classification table can be used as presented in Table 2 (Heyward & Gibson, 2014).

Table 2: Classification of Blood Pressure for Adults 18 yrs. or Older*

BP Classification	SBP mmHg	DBP mmHg
Normal	<120	and <80
Pre-hypertension or high normal	120-139	or 80-89
Stage I Hypertension	140-159	or 90-99
Stage II Hypertension**	≥ 160	or ≥ 100

*Adapted from Chobanian, A. V., Bakris, G. L., Black, H. R., Cushman, W. C., Green, L. A., Izzo, J. L., … Roccella, E. J. (2003). Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension*.
** prior to the 2003 recommendations, Stage II Hypertension was expanded into:
Stage II (SBP 160-179 mmHg and/or DBP 100-109 mmHg) and;
Stage III Hypertension (SBP ≥ 180 mmHg and/or DBP ≥ 110 mmHg)

BP (blood pressure), SBP (systolic blood pressure), DBP (diastolic blood pressure)

When comparing the classifications in Table 2 to the pre-exercise BP cut-points in Table 1, most organizations use an exercise clearance resting BP cut-point that is within the classification of Stage I hypertension. An individual does not need both SBP and DBP to be equal to or greater than the classification cut-point to be classified as having Stage I hypertension— having either SBP or DBP is sufficient. This is also true when classifying individuals as being high normal BP (pre-hypertension) or Stage II hypertension. Individuals who are classified as pre-hypertensive or Stage I hypertensive are typically advised to use lifestyle modifications such as increasing their level of PA participation to manage their BP and if that is not successful, pharmacotherapy may be needed (Heyward & Gibson, 2014).

The basis of the resting BP classifications is to identify individuals who are at greater risk of future adverse events, since chronic higher resting BP is a predictor of future cardiovascular

morbidity and mortality (Tuka et al., 2015). However, for Stage I hypertension there is little evidence for increased risk during exercise. While the classifications were intended to infer future risk based on clinical status and co-morbidities, they are often interpreted as determining risk during a PA session alone. Unfortunately, this has led some organizations to adopt a more conservative risk management strategy that includes more conservative pre-exercise BP cut-points. While this may be prudent from a liability perspective, it prevents or restricts people from participating in PA even though PA participation has been documented to be beneficial for chronic disease management (Durstine et al., 2003).

2.6 Physical Activity and Hypertension

During exercise SBP increases, and this increase is critical to ensure adequate transport of oxygenated blood to the working muscles (Durstine et al., 2003). If an individual's resting BP is already high, it could result in an even greater increase in BP during exercise, as exercise SBP is strongly correlated to resting SBP (Bassett et al., 1998). The increase in BP is also proportional to the exercise intensity performed (Tuka et al., 2015) and due to the increased demands of vigorous-to-maximal intensity exercise as compared to moderate-to-low intensity exercise, the former has the greater capacity to increase BP. Hence, it is prudent to adjust the exercise intensity prescribed depending on a person's resting BP.

It is well documented that habitual PA participation has a beneficial effect on high BP with both aerobic exercise and resistance training lowering BP in individuals with hypertension (Pescatello, MacDonald, Lamberti, & Johnson, 2015). Pescatello et al. (2015) performed a systematic review on the topic of hypertension and exercise prescription. From a total search of 5,412 reports, 33 meta-analyses and 283 exercise trials were reviewed in detail, and of those, 7 meta-analyses and 63 exercise trials were determined to be most relevant and included in the review (Pescatello et al., 2015). The researchers determined that moderate intensity aerobic activity and moderate intensity resistance training should be recommended for persons with hypertension. They also suggested that based on emerging evidence, since BP reductions are dose-dependent based on the exercise intensity, the recommendations for persons with hypertension could be expanded to include vigorous intensity PA (Pescatello et al., 2015).

2.7 Chronic Hypertension

It is well documented that chronic hypertension pre-disposes individuals to future cardiovascular disease and stroke as the primary risk factor for these conditions (Heyward & Gibson, 2014). However, both acute and chronic PA participation have been shown to be beneficial for individuals with hypertension and there is little evidence to support a greater risk during PA in individuals with hypertension (Warburton et al., 2011). When the measurement of pre-exercise BP is performed in conjunction with other evidence-based screening tools, critical co-morbidities that could increase a participant's risk during exercise are identified and taken into account. If an individual is living with many co-morbidities, a screening tool such as the PAR-Q+ would screen the individual out of moderate-to-vigorous-to-maximal intensity exercise until further clearance even if they do not have a resting BP that is equal to or above the organization's cut-point.

2.8 Hypertension Guidelines and Recommendations

Guidelines from Hypertension Canada's CHEP program recommend lifestyle modification for both the management of hypertension and to decrease the risk of future hypertension in individuals not yet classified as hypertensive. CHEP recommends prescribing 30-60 minutes of moderate intensity aerobic exercise 4-7 days per week with additional resistance training.

The Australian Association for Exercise and Sports, also recommends PA participation as part of their position statement on exercise and hypertension (Sharman & Stowasser, 2008). They recommend that individuals with hypertension perform moderate-to-vigorous intensity aerobic activity up to 5 days/week with an additional 2 days of resistance training. They state that vigorous intensity exercise is usually safe for most people, including those with hypertension, however, older individuals with coronary artery disease who also have hypertension may be at risk of an adverse event during vigorous exercise (Sharman & Stowasser, 2008). The researchers also state that exercise testing should not be undertaken if an individual's resting BP is $\geq$ 180 mmHg systolic and/or $\geq$ 110 mmHg diastolic. The position statement also acknowledges that acute BP measurements may be influenced by white coat hypertension, circadian BP rhythms, and incorrect measurement technique.

Similarly, the American College of Sports Medicine (ACSM) has a position statement that recommends lifestyle interventions for the prevention, treatment, and control of hypertension with exercise at its core (Pescatello et al., 2004). They determined that aerobic exercise training elicits a reduction in resting BP in individuals with and without hypertension, with the greatest reduction found in hypertensive individuals. As hypertension is a very prevalent chronic condition, interventions that can prevent/manage/treat this disease are important with PA and structured exercise being low-cost interventions (Pescatello et al., 2004). They also recommend moderate intensity PA participation on most days of the week for aerobic activity with additional resistance exercise.

Recently, new pre-participation screening PA participation recommendations were released by the ACSM. They underline the fact that the purpose of the pre-participation screening process is to identify individuals who are at high risk for adverse events during exercise (Magal & Riebe, 2016; Riebe et al., 2015). The researchers acknowledge that a potential barrier to engaging in PA is the pre-participation screening process that may require individuals to receive additional medical clearance before engaging in PA. While vigorous intensity exercise has a small increased risk of an adverse event, the pre-participation screening process itself should not create a barrier to individuals wanting to become physically active while mitigating the risk of exercise (Riebe et al., 2015). The current ACSM exercise clearance guidelines were put into place to reduce the risk of individuals experiencing myocardial infarction and other cardiovascular events during exercise. However, the absolute and relative risks of such an event occurring are low during vigorous intensity exercise in asymptomatic persons (Riebe et al., 2015). Since it is difficult under the best of circumstances to engage individuals in PA participation, screening measures should not create an unnecessary barrier for individuals.

The ACSM's previous recommendations included classifying individuals along a risk continuum based on the number of cardiovascular disease risk factors and the presence of signs and symptoms, with additional medical clearance if required. The new recommendations include the removal of the cardiovascular disease risk factor profile and thus eliminates the stratification of individuals into risk categories. Individuals assessed using the new pre-participation screening process would be referred for medical clearance based on signs or symptoms and/or known cardiovascular, metabolic, or renal disease, and additionally PA status. As well, under the new

guidelines, the risk associated with having a resting BP of ≥ 140 mmHg systolic and/or ≥ 90 mmHg diastolic has been eliminated.

Globally, the prevalence of hypertension in the adult population is estimated to be 15%-40% (Heyward & Gibson, 2014). Because the more conservative pre-exercise BP cut-points used would screen an individual with Stage I hypertension out of moderate-to-vigorous-to-maximal intensity PA, a sizable portion of the population would be excluded from participating in higher intensity PA or fitness tests for physically demanding job applications. Unfortunately, these more conservative BP cut-points unnecessarily screen out those individuals who would benefit the most of PA participation under acute or chronic conditions. Individuals who typically have higher resting BP are usually older, have lower aerobic fitness and/or high BMI.

2.9 Relationship Between Blood Pressure with Age, Aerobic Fitness and Body Mass Index

High resting BP is a common health concern for adults aged 60 and older, in Canada between 2007-2009, adults aged 60-79 had a prevalence of hypertension that was 53% (aged 20-39= 2%, aged 40-59= 18%) (Wilkins et al., 2010). A higher prevalence was found in the United States with 67% of adults aged 60 and older being hypertensive (Del Giudice, Pompa, & Aucella, 2010). These older adults are usually classified as hypertensive through isolated systolic hypertension, meaning that their SBP is greater than 140 mmHg while their DBP is lower than 90 mmHg. This increased SBP without a corresponding increase in DBP occurs more often in older individuals and could be the result of reduced arterial compliance and changes to arterial stiffness (Del Giudice et al., 2010; Pinto, 2007).

Resting BP also tends to be elevated in those with low aerobic fitness. Researchers have also found that aerobic fitness assessed using a standardized exercise test (followed a protocol that is standard among exercise testing) is inversely related to the rate of progression from pre-hypertension to hypertension (Kokkinos, 2014). As a result, PA interventions used to improve aerobic or cardiorespiratory fitness could aid in the prevention of hypertension. In addition, hypertensive individuals who exhibit an exaggerated rise in BP during a PA session may be able to have this rise attenuated with increasing aerobic fitness levels as fitter individuals have been found to have significantly lower SBP during exercise at 5 MET (metabolic equivalent) intensity when compared with the SBP of those with lower aerobic fitness (Kokkinos, 2014).

Researchers have also found a positive relationship between body mass index (BMI) and BP with those individuals having higher BMI typically having higher BP (Drøyvold, Midthjell, Nilsen, & Holmen, 2005; Dua, Bhuker, Sharma, Dhall, & Kapoor, 2014). BMI is calculated by dividing body mass in kilograms by height in metres squared. While BMI has the ability to determine potential health risk, its measurement does not take into account body fat percentage or the location of body fat but only uses height and body mass to determine health risk. A population-based health study from Norway (n= 74,994) examined different health variables including body mass, height and BP at baseline and at an 11-year follow-up (Drøyvold et al., 2005) . The researchers found that men and women who had an increased BMI at follow-up also had an increased SBP compared to those with consistent BMI. Similarly, individuals who had a reduced BMI at follow-up had a significantly lower SBP compared to those who did have a change in BMI.

As a result of these relationships between age, aerobic fitness, and BMI with increased BP, older individuals who are also less aerobically fit, and have a higher BMI may be disproportionately screened out of moderate-to-vigorous-to-maximal intensity PA as a result of higher resting BP. However, these are the individuals who could derive the greatest benefits from PA interventions.

2.10 Physical Activity and Post-Exercise Hypotension

PA participation has been found to be beneficial for individuals with diagnosed hypertension or pre-hypertension as a result of its BP lowering effects post-exercise. Following an acute bout of PA, transient physiological responses occur that lower blood pressure for the immediate time following the PA session and similarly, after chronic accumulated bouts of acute exercise, more permanent adaptations may occur leading to a consistent improved BP (Hamer, 2006). Individuals who engage in more PA have been found to have a reduction in the incidence of hypertension due to the chronic effects of a PA bout on resting blood pressure, and additionally due to the acute effects of the exercise session that elicit an immediate reduction in BP post-exercise (Hamer, 2006).

Chronic PA or exercise training has been found to be beneficial for reducing BP and may induce vascular adaptations that result in improved BP. Participating in chronic PA has been found to elicit anti-hypertensive mechanisms such as reduced sympathetic nerve activation

which leads to attenuated peripheral vasoconstriction, and vascular structure adaptations that result in improved vascular compliance and lower peripheral resistance (Hamer, 2006).

The reduction in BP immediately following an acute single bout of exercise is referred to as post-exercise hypotension, with a greater reduction in BP found in hypertensive individuals (Kenney & Seals, 1993). The reduction in BP is consequent to the reduction in cardiac output following an exercise bout which declines more quickly than systemic vascular resistance recovers and can last up to 12 hours in hypertensive individuals (Halliwill, 2001). If a hypertensive individual engages in regular PA on most days of the week, these regular periods of post-exercise hypotension could provide a non-medicated avenue for BP management. Both structured exercise and non-exercise PA have been shown to decrease BP, but the intensity of regular exercise has the added benefit of reducing the risk for certain cancers, diabetes, and obesity, as well as increasing quality of life and reducing depression, stress and anxiety (Colley et al., 2011).

Eicher et al. (2010) examined post-exercise hypotension after performing vigorous-to-maximal intensity exercise on a cycle ergometer. Participants then completed moderate intensity exercise, low intensity exercise and a non-exercise control trial to compare to the vigorous intensity exercise. Post-exercise hypotension was measure through ambulatory BP taken in the 9 hours following the exercise session.

The study participants were men with an average age of 43.9 ± 1.4 years, and with an average awake ambulatory BP of 144.5 ± 1.5 mmHg SBP and 85.4 ± 1.2 mmHg DBP (Eicher et al., 2010). The ambulatory BP monitor took random BP measurements three times an hour during waking hours (6am to 11pm) and once an hour during sleep (11pm to 6am). The research participants were instructed to go about their daily actives, but to keep their arm still during the BP measurements. In addition to ambulatory BP monitoring, participant's resting BP was also measured as an average of three seated readings. The participants' resting BP ranged from pre-hypertensive to Stage I hypertension (130 to ≤ 160 mmHg systolic and/or 85 to ≤ 100mmHg diastolic), but were otherwise apparently healthy. In a normal exercise setting, these individuals with elevated BP could have been screened out of the moderate-to-vigorous intensity exercise component based on their BP values being greater than many of the cut-points used by different fitness professionals.

Participants were excluded from the study if they had cardiovascular disease, diabetes, asthma and other chronic conditions. Participants were also asked to discontinue anti-hypertensive medication during the study, but were then excluded if the withdrawal of medications resulted in a resting SBP ≥ 160 mmHg and/or a resting DBP ≥ 100 mmHg. Eligible participants first completed the vigorous intensity exercise (graded exercise test) to determine the appropriate intensity for the following exercise trials. They were then randomly assigned to one of three groups: 1) non-exercise control, 2) low intensity exercise, and 3) moderate intensity exercise. Following the first exercise intensity session, all participants performed the remaining two exercise intensity sessions in random order. The experiments were performed at the same time of day to account for diurnal variation of BP (Eicher et al., 2010).

After performing the exercise sessions, ambulatory BP was measured during the following 9-hour period. The researchers found that SBP increased after low and moderate intensity PA, but decreased after vigorous intensity PA. However, each exercise intensity condition tended to increase less than the non-exercise control group for SBP, with the low intensity group increasing 2.7 ± 1.6 mmHg less than the control group, the moderate intensity group increasing 5.4 ± 1.4 mmHg less than the control group and the vigorous intensity group eliciting a SBP 11.7 ± 1.5 mmHg less than the control group. This reduction or difference in BP as compared to the control group was found to be significant for the vigorous intensity and moderate intensity group. The researchers also reported that DBP decreased over the following 9-hour period for all exercise conditions, although the vigorous intensity group was the only significant association and elicited a 4.9 ± 1.3 mmHg reduction in DBP compared to the control group.

Eicher et al. also performed a linear regression on the data and found that for every 10% increase in relative exercise intensity, there was a 1.5mmHg reduction in SBP and a corresponding 0.6mmHg reduction in DBP. However, vigorous exercise elicited a high peak SBP of almost 222 mmHg with little change in DBP (Eicher et al., 2010). A rise in SBP is common during vigorous-to-maximal PA, however, reaching a SBP of 250 mmHg or greater is in an indicator to terminate exercise (Durstine et al., 2003). As a result of the greater BP lowering effect of vigorous intensity exercise, the benefits of higher intensity PA could be greater than the benefits of low-to-moderate intensity PA alone.

CHAPTER 3: OBJECTIVES AND HYPOTHESIS

The objectives of the present study were 1) to determine the impact of the currently recommended BP cut-points on exercise clearance rates when using the recently recommended evidence-based BP cut-point of 160/90 mmHg as the referent, 2) to determine the ages of individuals who would be screened out of participating in moderate-to-vigorous-to-maximal intensity PA based on various pre-PA participation BP cut-points and 3) to determine the aerobic fitness or maximal oxygen consumption (VO_2 max), and BMI of those individuals who would be screened out of participating in moderate-to-vigorous-to-maximal intensity PA based on recommended pre-PA participation BP cut-points. The purpose of the research was to answer the following questions:

1) Which pre-PA participation screening BP cut-points act as a barrier to moderate-to-vigorous-to-maximal intensity PA participation? How many people would be prevented from engaging in moderate-to-vigorous-to-maximal intensity PA if the existing opinion-based cut-points were applied?
2) What are the ages of individuals who would be screened out of moderate-to-vigorous-to-maximal intensity PA when various pre-exercise BP cut-points are applied?
3) What are the aerobic fitness levels, and BMI of individuals who would be screened out of moderate-to-vigorous-to-maximal intensity PA based on various pre-exercise BP cut-points?

We hypothesized that the majority of the pre-exercise BP cut-points that are currently recommended by many organizations to screen individuals out of moderate-to-vigorous-to-maximal intensity PA participation would be unnecessarily conservative, and create a barrier for many people to engage in PA. Using these recommended BP cut-points would eliminate people from engaging in moderate-to-vigorous-to-maximal intensity PA who would otherwise benefit from higher intensity PA participation. We also hypothesized that individuals who are older, have lower aerobic fitness, and/or high BMI would be screened out to a greater extent from participating in moderate-to-vigorous-to-maximal PA.

CHAPTER 4: METHODS

4.1 Methods

The present study used both a recruited participant cohort and secondary analysis of data from participants who had taken part in previous investigations in our laboratory at which time they agreed to have their data analyzed and reported in an anonymized group format in future research. Participants were recruited through friends, colleagues, and recruitment posters placed around York University (Appendix A). Four-hundred and sixty-eight participants between the ages of 18 and 61 years were recruited and there were 1202 sets of data from participants age 18 to 66 years in the secondary analysis cohort. In total, the results from 1670 study participants were analyzed. The majority of study participants attended our laboratory as part of a physical fitness assessment for physically demanding occupations. The individuals were random participants of whom the investigators did not have any prior knowledge and in this way comparable to the average individual attending a fitness facility for an exercise session. When comparing the BP values of the study participants to the Canadian population data on BP in adults from 2012-2015 from the Canadian Health Measures Survey (CHMS), the average BP values of the participants in the present study (SBP 117.4 ± 11.5 mmHg, DBP 73.3 ± 8.9 mmHg) are comparable and as a result representative of the Canadian population (SBP 113 mmHg, DBP 72 mmHg) (Statistics Canada. Health Statistics Division, 2016). The participants from this study and the participants from the CHMS had BP measurements that would place them into the normal BP category. This research project was approved by the York University Human Participants Review Committee, whose research ethics guidelines are in accordance with the Canadian Tri-Council research ethics guidelines. Figure 2a provides a breakdown of the recruited cohort and Figure 2b provides a breakdown of the secondary analysis participant cohort. Both Figures 2a and 2b separate the participants based on sex, medication use and one of three similar moderate-to-vigorous-to-maximal intensity exercise sessions. Study participants completed one of the following exercise sessions: 1) moderate-to-vigorous-to-maximal intensity treadmill walking or running exercise followed by discrete functional physically demanding task exercises (lifting, carrying or relocating resistances that ranged in weight from 4.5 - 90.9 kg) or 2) moderate-to-vigorous-to-maximal intensity time-based circuit

comprised of functional physically demanding task exercises (lifting, carrying or relocating resistances that ranged in weight from 4.5 - 90.9 kg) or 3) moderate-to-vigorous-to-maximal intensity treadmill walking or running exercise.

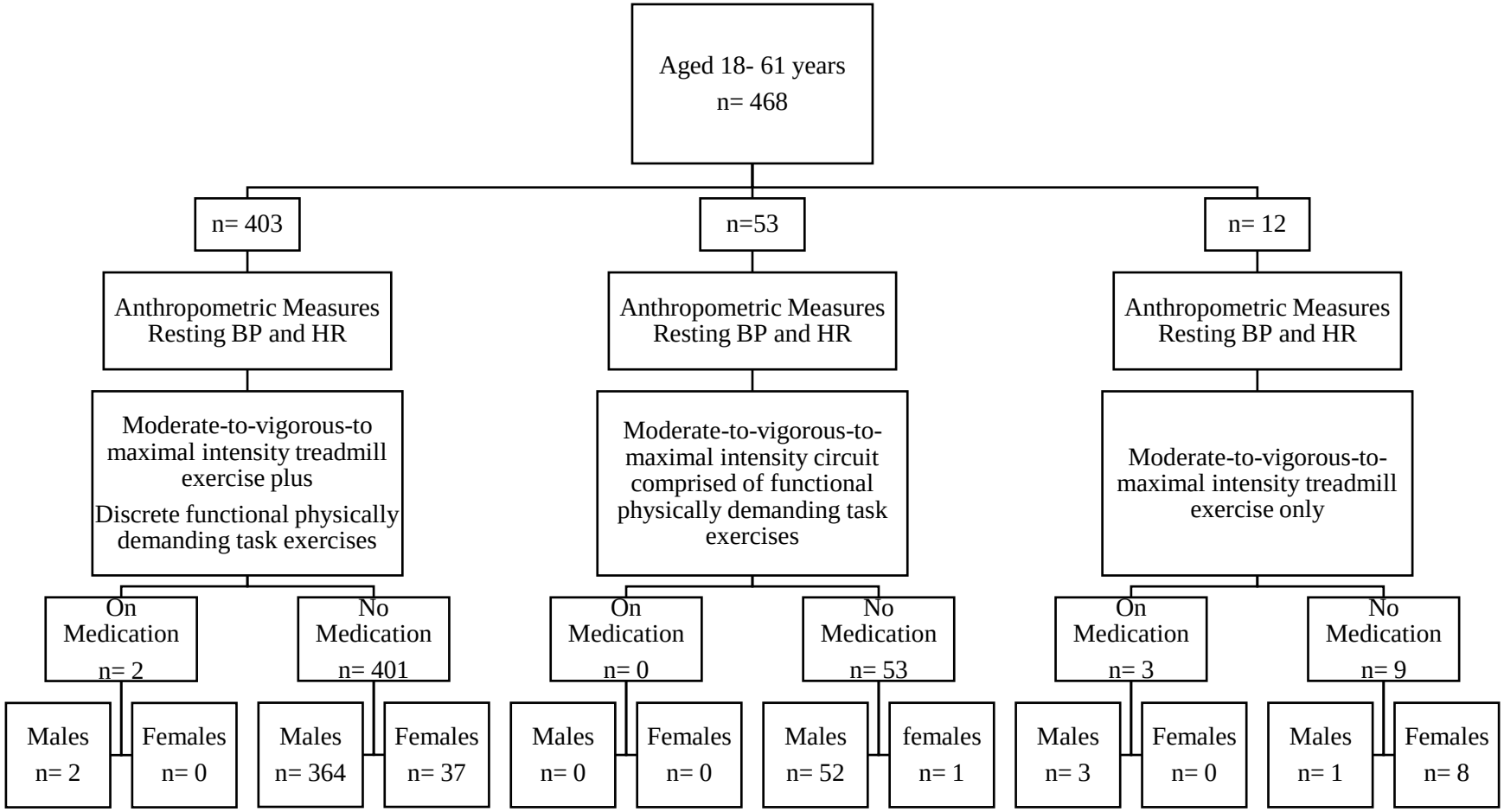

Figure 2a: Overview of the Recruited Study Cohort Separated by Type of Assessments (moderate-to-vigorous-to-maximal intensity treadmill exercise and/or vigorous-to-maximal effort job-related circuit), Sex, and Who Were on Medication or Not on Medication

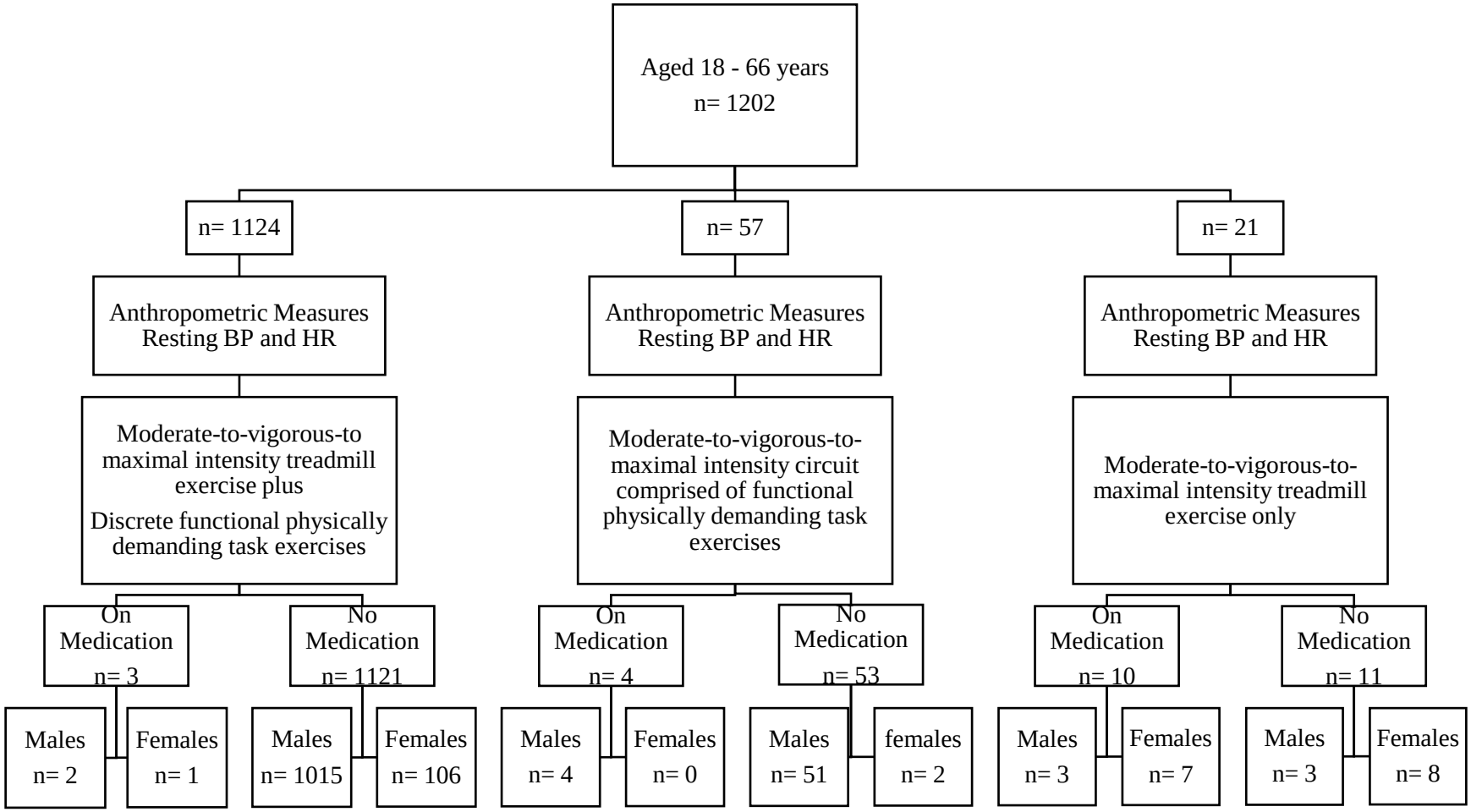

Figure 2b: Overview of the Secondary Analysis Cohort Separated by Type of Assessments (moderate-to-vigorous-to-maximal intensity treadmill exercise and/or vigorous-to-maximal effort job-related circuit), Sex, and Who Were on Medication or Not on Medication

All study participants attended the laboratory on one occasion and completed an informed consent form prior to participation (Appendix B). During this session, participants were required to undergo the pre-participation screening procedure which includes the PAR-Q+ (2016 or 2017) (Appendix C) and, if necessary, participants underwent further screening through the ePARmed-X+ (www.eparmedx.com) along with the measurement of resting BP. These evidence-based questionnaires have been validated for use across the lifespan in individuals who are healthy or who have stable chronic conditions and they are considered the pre-participation screening gold standard or best practice for exercise testing and all PA participation (Bredin et al., 2013). All study participants were cleared for unrestricted PA participation (i.e. moderate-to-vigorous-to-maximal intensity exercise) based on their responses to the questions in these tools regardless of their measured resting BP, which were further reviewed by a qualified exercise professional with advanced specialized training and/or if required by a physician.

Resting BP was measured by a qualified exercise professional. Prior to the study test day, the participants received a reminder email with pre-test instructions including no exercising, smoking or caffeine use prior to the test. The procedure used for the BP measurements was selected to attenuate the variance in BP that can be observed when certain factors are present causing an overestimation or underestimation of resting BP. Factors such as using a BP cuff that is too small, or measuring BP over clothing can cause an overestimation or underestimation of BP between 10-40 mmHg (American Diagnostic Corporation, n.d.). A summary of factors affecting BP measurements is presented in Table 3.

Table 3: Factors Affecting the Measurement of Blood Pressure*

Cause of Variance	BP Increase (mmHg)	BP Decrease (mmHg)
Cuff is too small	10-40	
Cuff over clothing	10-40	10-40
Back/feet unsupported	5-15	
Legs are crossed	5-8	
Not resting 3-5 minutes	10-20	
Patient talking	10-15	
Laboured breathing	5-8	
Full bladder	10-15	
Pain	10-30	
Arm below heart level	1.8/inch	
Arm above heart level		1.8/inch

*Adapted from American Diagnostic Corporation. (n.d.). How to Take Blood Pressure. Retrieved May 16, 2017, from http://adctoday.com/learning-center/about-sphygmomanometers/how-take-blood-pressure

Automated BP Measurement Protocol

In order to determine accurate BP measurements, a standardized procedure was followed. The BpTRU (BpTRU Medical Devices Ltd, Coquitlam, British Columbia, Canada) automated BP device was used to collect six BP and HR readings (the machine automatically discards the first reading) with 1 minute intervals between readings and the remaining 5 readings are used to generate an average pre-exercise BP and HR value. Pre-exercise BP was later used in the data analysis, however, pre-exercise HR was not analysed as the main focus of this study was resting BP. Any hypertensive values were confirmed using the oscillatory BP measurement method. The BpTRU has been found to attenuate "white coat hypertension" by taking repeated measures with limited client and health care professional interaction during the process (Edwards, Hiremath, Gupta, McCormick, & Ruzicka, 2013). The proper BP cuff size was chosen for each individual to ensure accurate readings and measurements were taken with the BP cuff placed

directly on the skin. Participants were instructed to sit quietly with the back and feet supported, with legs uncrossed and with the left arm supported at heart level during the measurement while the exercise professional exited the room to decrease participant nervousness and anxiety.

Following the resting BP measurement, all participants underwent select anthropometric measures then one of the following exercise protocols: 1) moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises; 2) moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises; and 3) moderate-to-vigorous-to-maximal intensity treadmill exercise only. Participants' height was measured without footwear using a wall-mounted stadiometer and body mass was measured using a digital scale (Seca Alpha, Germany) while wearing light clothing and no footwear. During the moderate-to-vigorous-to-maximal intensity treadmill exercise, oxygen consumption was measured at each workload via indirect calorimetry using discrete component open circuit spirometry to determine maximal aerobic power (VO_2 max). This procedure required participants to inhale air from the atmosphere and exhale air through a two-way valve (Ewald Koegal Co, San Antonio Texas) into a 120L Tissot gasometer (Warren E Colling LTD. Braintree, Massachusetts) while wearing a nose plug. The exhaled air was collected during the last 30 seconds of each incremental stage of exercise and was then analyzed by rapid response gas analyzers (Applied Electrochemistry, Model S-3A and CD-3S, Sunnyvale, California) to measure the concentration of expired oxygen and carbon dioxide. Polar HR monitors (Polar, Kempele, Finland) were used to measure participants' HR during each test workload. The collected test variables were then used to calculate the participant's VO_2 max using the Haldane transformation formula $VO_2 = (V_I \times F_IO_2) - (V_E \times F_EO_2)$ where F_IO_2 = fraction of oxygen in inspired air, and F_EO_2 = fraction of oxygen in expired air.

The moderate-to-vigorous-to-maximal intensity treadmill exercise protocol involved either walking or running. Initially all participants performed a brief walking warm up on the treadmill during which time they were familiarized with the testing protocol and equipment. During the running protocol, participants began running at 5 mph and at an incline of 2% or 4% based on body mass. Following the completion of each 2 minute stage, first the treadmill speed was increased to a maximal speed of 6.5, 7, or 7.5 mph based on individual running biomechanics, after which the incline was progressively increased by 2% at each subsequent

stage. For the moderate-to-vigorous-to-maximal intensity walking protocol, the maximum walking speed (2.9-4.0 mph) was established when the participant elicited a HR of 50%-70% of their age predicted maximal HR calculated using 220 bpm-age, after which the incline was progressively increased by 2%. Participants were motivated to walk or run for as many continuous stages as possible. When a participant was no longer able to complete a 2 minute stage, the treadmill speed was lowered to a comfortable walking speed for a 2 minutes active recovery which marked the start of the discontinuous protocol. Following the 2 minutes of walking, participants walked or ran again at the same maximum speed that had been determined during the continuous portion with the incline raised by an additional 2%. This procedure of a 2 minute active recovery and 2 minutes walking/running for the discontinuous portion of the test continued until VO_2 max was reached. The test was also terminated if the participant could no longer complete a workload, or if the VO_2 max criteria (a decrease or no further increase in VO_2) were reached as determined by the qualified exercise professional who administered the test (Howley, Bassett, & Welch, 1995).

4.2 Statistical Analysis

Statistical analysis of the data was then performed using IBM SPSS version 24 for Windows. A univariate analysis was undertaken to determine the sample demographics both for the group as a whole and for each BP category. Two additional BP categories were added to the analysis in addition to the opinion-based cut-points (< 130/80 mmHg, < 140/90mmHg, < 144/90 mmHg, < 144/94mmHg and < 150/100mmHg) and the evidence-based cut-point (< 160/90 mmHg). The hypothetical cut-points of < 160/94 mmHg and < 160/100 mmHg were added to the analysis for comparison.

A bivariate analysis was performed to assess differences between individuals who were above each opinion-based or hypothetical BP cut-point to those who were below. An independent samples T-test was performed for each BP category separately to assess differences between individuals who were above or below each cut-point based on age, sex, height, body mass, BMI, VO_2 max, and circuit completion time (seconds).

It is important to emphasize that in this investigation all of the participants underwent moderate-to-vigorous-to-maximal intensity exercise with no adverse events regardless of their

measured resting BP. While all of the study participants were cleared for moderate-to-vigorous-to-maximal intensity exercise, in fitness facilities, community centres, etc. the participants whose measured BP exceeded the cut-point would likely not have been cleared for moderate-to-vigorous-to-maximal intensity exercise participation. A logistic regression analysis was performed to assess the association between exercise clearance when using evidence-based cut-point of 160/90 mmHg as the referent, and each of the different opinion-based and hypothetical BP cut-points as covariates. Since an individual's BP could fall under multiple BP categories, each BP category was conducted as a separate model. The logistic regression compared exercise clearance based on BP below 160/90mmHg to each BP category and other associated covariates. Each model was adjusted for age, sex, BMI, VO_2 max and circuit completion time.

Some of the secondary analysis and recruitment participants had undergone a fitness assessment including select anthropometric measures, and had their pre-exercise BP taken using the BpTRU, then completed an incremental-to-maximal intensity treadmill protocol followed by discrete functional physically demanding task exercises or just completed an incremental-to-maximal intensity treadmill protocol. A sub-set of both the secondary analysis cohort and recruited cohort participants did not undergo a moderate-to-vigorous-to-maximal intensity treadmill exercise but they completed moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises. These data were analyzed as a sub-set using post-exercise heart rate values to confirm that the exercise was completed at a moderate-to- vigorous-to-maximal intensity and in that way comparable to the demands of the incremental-to-maximal intensity treadmill protocol using the same statistical procedures as described above.

5.0 RESULTS

5.1 Data Analysis

Both the secondary analysis and recruited participant cohorts experienced no adverse events during or following the exercise session across all resting BPs.

Initially, the data analysis was performed on the sub-sets of the total secondary study population (n= 1202) as 1) participants who completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises who were not on medication (n= 1121); 2) participants who completed moderate-to-vigorous-to-maximal intensity followed by discrete functional physically demanding task exercises who were on medication (n= 3); 3) participants who completed a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises who were not on medication (n= 53); 4) participants who completed a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises who were on medication (n= 4); 5) participants who only completed the moderate-to-vigorous-to-maximal intensity treadmill exercise and were not on medication (n= 11); and 6) participants who completed who only completed the moderate-to-vigorous-to-maximal intensity treadmill exercise and were on medication (n= 10). An analysis was also performed on sub-sets of the recruited cohort as 1) males who completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises (n= 364) and moderate-to-vigorous-to-maximal intensity treadmill exercise only who were not on medication (n= 1); 2) females who completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises (n= 37) and moderate-to-vigorous-to-maximal intensity treadmill exercise only who were not on medication (n= 8); 3) males who completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises (n= 2) and moderate-to-vigorous-to-maximal intensity treadmill exercise only who were on medication (n= 3); 4) males (n= 52) and females (n= 1) who completed a vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises who were not on medication (n= 53). There were no recruited female study participants on medication. After completing these analyses by medication status, the results

were found to not be powered sufficiently due to small group size of participants above the BP cut-points. The results from these analyses are contained in Appendix D.

Following the completion of the sub-set analyses for each exercise protocol and broken down by medication status, the groups were collapsed to be more powered and an analysis was conducted on the entire study population (n= 1670) with all exercise protocols combined regardless of medication status. A second analysis was also completed on participants who were on medication. The results are presented as 1) all cohorts combined who participated in moderate-to-vigorous-to-maximal intensity exercise protocols along with combined medication status and 2) a sub-set of all cohorts who participated in moderate-to-vigorous-to-maximal intensity exercise protocols and were on medication.

All study participants from both the recruited cohort and secondary data analysis cohort completed moderate-to-vigorous-to-maximal intensity exercise regardless of the mode of activity without any adverse events.

5.2 Data Analysis of All Cohorts Combined with Participants Who Participated in Moderate-to-Vigorous-to-Maximal Intensity Exercise Protocols and Combined Medication Status

The statistical analysis of data was conducted on the study population as a whole with all exercise protocols and medication status combined (n= 1670). A breakdown of the exercise protocols can be found previously in Figures 2a and 2b. Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table 4.

Table 4: Demographic characteristics of all cohorts with all exercise protocols combined as a whole and stratified based on exercise clearance when applying evidence-based blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and/or less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	All	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years) (total group)	28.2 ± 6.9 (n= 1670)	27.9 ± 6.7 (n= 1596)	34.0 ± 7.9 (n= 74)	***p*< 0.01**
Male	27.9 ± 6.2 (n= 1500)	27.6 ± 6.1 (n= 1433)	33.8 ± 7.4 (n= 67)	***p*< 0.01**
Female	30.3 ± 10.6 (n= 170)	30.1 ± 10.5 (n= 163)	35.3 ± 12.9 (n= 7)	0.21
Sex (% of population)				
Male	89.8	89.8	90.5	
Female	10.2	10.2	9.5	
Body Mass (kg)	85.0 ± 13.3	84.8 ± 13.2	90.0 ± 14.5	***p*< 0.01**
Male	86.4 ± 12.6	86.2 ± 12.5	91.7 ± 13.6	***p*< 0.01**
Female	72.5 ± 12.6	72.5 ± 12.6	73.0 ± 13.2	0.92
Height (cm)	178.8 ± 7.6	178.8 ± 7.6	177.7 ± 7.9	0.22
Male	180.0 ± 6.8	180.0 ± 6.7	178.8 ± 7.3	0.15
Female	168.3 ± 6.5	168.4 ± 6.6	167.3 ± 5.7	0.65
BMI (kg/m^2)	26.5 ± 3.5	26.5 ± 3.5	28.4 ± 3.8	***p*< 0.01**
Male	26.7 ± 3.4	26.6 ± 3.4	28.6 ± 3.5	***p*< 0.01**
Female	25.5 ± 4.0	25.5 ± 3.9	26.4 ± 6.5	0.57
Average Resting SBP (mmHg)	117.4 ± 11.5	116.3 ± 10.3	140.7 ± 11.5	***p*< 0.01**
Male	117.9 ± 11.3	116.9 ± 10.1	140.3 ± 11.6	***p*< 0.01**
Female	112.6 ± 11.9	111.2 ± 9.9	144.6 ± 11.1	***p*< 0.01**
Average Resting DBP (mmHg)	73.3 ± 8.9	72.3 ± 7.8	94.6 ± 4.6	***p*< 0.01**
Male	73.5 ± 8.9	72.5 ± 7.8	94.6 ± 4.8	***p*< 0.01**
Female	71.7 ± 8.8	70.7 ± 7.4	95.3 ± 3.0	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 1560	50.2 ± 7.6 (n= 1560)	50.5 ± 7.6 (n= 1490)	44.3 ± 6.8 (n= 70)	***p*< 0.01**
Male (n= 1393)	51.1 ± 6.9 (n= 1393)	51.4 ± 6.9 (n= 1330)	44.9 ± 5.9 (n= 63)	***p*< 0.01**
Female (n= 167)	42.5 ± 8.8 (n= 167)	42.7 ± 8.7 (n= 160)	38.9 ± 11.6 (n= 7)	0.26
Time to Complete Circuit (sec); n= 110	485.4 ± 123.6 (n= 110)	483.2 ± 123.5 (n= 106)	543.8 ± 131.0 (n= 4)	0.34
Male (n= 107)	478.8 ± 118.1 (n= 107)	476.3 ± 117.5 (n= 103)	543.8 ± 131.0 (n= 4)	0.26
Female (n= 3)	719.3 ± 98.7 (n= 3)	719.3 ± 98.7 (n= 3)	N/A* (n= 0)	N/A*

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A* All female participants who completed the circuit would have been cleared for PA, a T-test was not performed

The results from the bivariate analysis of evidence-based BP cut-point < 160/90 mmHg determined that the overall study participants were predominantly male (89.8%, n= 1500), aged 28.2 ± 6.9 years, overweight using the BMI metric (26.5 ± 3.5 kg/m²), and with a normal resting BP (SBP 117.4 ± 11.5 mmHg, DBP 73.3 ± 8.9 mmHg). When comparing the combined group's rate for exercise clearance using the evidence-based BP cut-point < 160/90 mmHg significant differences were found in participants' age, body mass, BMI, SBP, DBP, and VO_2 max. The 74 participants (4.4%) who would not have been cleared for exercise were older (34.0 ± 7.9 years, $p < 0.01$), heavier (90.0 ± 14.5 kg, $p < 0.01$), had a higher BMI (28.4 ± 3.8 kg/m², $p < 0.01$), had significantly higher BP (SBP 140.7 ± 11.5 mmHg, $p < 0.01$; DBP 94.6 ± 4.6 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 44.3 ± 6.8 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were significantly older (33.8 ± 7.4 years, $p < 0.01$), had a higher body mass (91.7 ± 13.6 kg, $p < 0.01$), had a higher BMI (28.6 ± 3.5 kg/m², $p < 0.01$), higher SBP (140.3 ± 11.6 mmHg, $p < 0.01$), higher DBP (94.6 ± 4.8 mmHg, $p < 0.01$) and a lower VO_2 max (44.9 ± 5.9 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences only in SBP and DBP. Female participants who had a measured BP above the cut-point had significantly higher SBP (144.6 ± 11.1 mmHg, $p < 0.01$) and significantly higher DBP (95.3 ± 3.0 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points and hypothetical BP cut-points that could be employed by agencies in determining PA participation clearance for moderate-to-vigorous-to-maximal intensity PA participation and fitness assessment applications was also performed. The results of these analyses are presented in Table 5a for opinion-based BP cut-point < 130/80 mmHg, Table 5b for opinion-based BP cut-point < 140/90 mmHg, Table 5c for opinion-based BP cut-point < 144/90 mmHg, Table 5d for opinion-based BP cut-point < 144/94 mmHg, Table 5e for opinion-based BP cut-point < 150/100 mmHg, Table 5f for hypothetical BP cut-point < 160/194 mmHg, and Table 5g for hypothetical BP cut-point < 160/100 mmHg.

Table 5a: Bivariate analysis of all cohorts with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and/or less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	27.4 ± 6.1 (n= 1425)	32.8 ± 8.9 (n= 245)	***p*< 0.01**
Male	27.2 ± 5.6 (n= 1273)	32.0 ± 8.1 (n= 227)	***p*< 0.01**
Female	28.9 ± 9.4 (n= 152)	42.5 ± 12.4 (n= 18)	***p*< 0.01**
Sex (% of population)			
Male	89.3	92.7	
Female	10.7	7.3	
Body Mass (kg)	84.0 ± 12.9	91.0 ± 14.2	***p*< 0.01**
Male	85.4 ± 12.2	91.9 ± 13.7	***p*< 0.01**
Female	71.6 ± 12.0	80.0 ± 15.6	***p*< 0.01**
Height (cm)	178.8 ± 7.6	178.8 ± 7.6	0.76
Male	180.1 ± 6.8	179.5 ± 6.8	0.26
Female	168.4 ± 6.6	167.8 ± 6.0	0.72
BMI (kg/m^2)	26.2 ± 3.4	28.5 ± 3.7	***p*< 0.01**
Male	26.3 ± 3.3	28.5 ± 3.6	***p*< 0.01**
Female	25.2 ± 3.6	28.5 ± 5.7	***p*< 0.05**
Average Resting SBP (mmHg)	114.0 ± 8.0	136.9 ± 8.8	***p*< 0.01**
Male	114.5 ± 7.9	136.8 ± 8.5	***p*< 0.01**
Female	109.6 ± 7.7	137.4 ± 12.1	***p*< 0.01**
Average Resting DBP (mmHg)	71.2 ± 7.3	85.6 ± 7.7	***p*< 0.01**
Male	71.4 ± 7.3	85.4 ± 7.8	***p*< 0.01**
Female	69.8 ± 6.7	87.9 ± 7.0	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 1560	50.8 ± 7.2 (n= 1337)	46.4 ± 8.9 (n= 223)	***p*< 0.01**
Male (n= 1393)	51.7 ± 6.7 (n= 1188)	47.6 ± 7.5 (n= 205)	***p*< 0.01**
Female (n= 167)	43.8 ± 7.5 (n= 149)	32.5 ± 12.0 (n= 18)	***p*< 0.01**
Time to Complete Circuit (sec); n= 110	475.2 ± 123.8 (n= 88)	526.2 ± 117.0 (n= 22)	0.08
Male (n= 107)	466.6 ± 115.9 (n= 85)	526.2 ± 117.0 (n= 22)	***p*< 0.05**
Female (n= 3)	719.3 ± 98.7 (n= 3)	N/A* (n= 0)	N/A*

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A* All female participants who completed the circuit would have been cleared for PA, a T-test was not performed

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, body mass, BMI, SBP, DBP and VO_2 max. The 245 participants (14.7%) who would not have been cleared for exercise were older (32.8 ± 8.9 years, $p < 0.01$), heavier (91.0 ± 14.2 kg, $p < 0.01$), had a higher BMI (28.5 ± 3.7 kg/m², $p < 0.01$), had significantly higher BP (SBP 136.9 ± 8.8 mmHg, $p < 0.01$; DBP 85.6 ± 7.7 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 46.4 ± 8.9 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (32.0 ± 8.1 years, $p < 0.01$), had a higher body mass (91.9 ± 13.7 kg, $p < 0.01$), had a higher BMI (28.5 ± 3.6 kg/m², $p < 0.01$), higher SBP (136.8 ± 8.5 mmHg, $p < 0.01$), higher DBP (85.4 ± 7.8 mmHg, $p < 0.01$), lower VO_2 max (47.6 ± 7.5 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$), and had a slower time to complete the time-based circuit (526.2 ± 117.0 sec, $p < 0.05$). The female participants also found significant differences when comparing those who were above versus below the BP cut-point with those above being significantly older (42.5 ± 12.4 years, $p < 0.01$), with a higher body mass (80.0 ± 15.6 kg, $p < 0.01$), a higher BMI (28.5 ± 5.7 kg/m², $p < 0.05$), higher SBP (137.4 ± 12.1 mmHg, $p < 0.01$), higher DBP (87.9 ± 7.0 mmHg, $p < 0.01$), and lower VO_2 max (32.5 ± 12.0 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. Women who completed the vigorous-to-maximal intensity circuit were all cleared for PA participation so an analysis could not be conducted between those above versus below the cut-point.

Table 5b: Bivariate analysis of all cohorts with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 140 mmHg systolic and/or less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	27.7 ± 6.5 (n= 1558)	33.9 ± 8.9 (n= 112)	***p*< 0.01**
Male	27.5 ± 5.9 (n= 1398)	33.5 ± 8.2 (n= 102)	***p*< 0.01**
Female	29.8 ± 10.2 (n= 160)	38.5 ± 13.9 (n= 10)	0.08
Sex (% of population)			
Male	89.7	92.7	
Female	10.3	7.3	
Body Mass (kg)	84.6 ± 13.1	91.0 ± 14.4	***p*< 0.01**
Male	86.0 ± 12.4	92.6 ± 13.7	***p*< 0.01**
Female	72.4 ± 12.7	74.7 ± 12.4	0.57
Height (cm)	178.8 ± 7.6	178.1 ± 7.9	0.33
Male	180.0 ± 6.7	179.2 ± 7.0	0.26
Female	168.5 ± 6.6	166.5 ± 5.2	0.35
BMI (kg/m^2)	26.4 ± 3.5	28.6 ± 3.7	***p*< 0.01**
Male	26.5 ± 3.4	28.8 ± 3.4	***p*< 0.01**
Female	25.4 ± 3.9	27.2 ± 5.7	0.19
Average Resting SBP (mmHg)	115.6 ± 9.3	142.1 ± 9.9	***p*< 0.01**
Male	116.2 ± 9.2	141.8 ± 9.9	***p*< 0.01**
Female	110.6 ± 8.7	145.0 ± 9.7	***p*< 0.01**
Average Resting DBP (mmHg)	72.1 ± 7.7	90.4 ± 7.6	***p*< 0.01**
Male	72.3 ± 7.7	90.3 ± 7.7	***p*< 0.01**
Female	70.5 ± 7.3	91.5 ± 6.6	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 1560	50.5 ± 7.5 (n= 1453)	45.1 ± 7.6 (n= 107)	***p*< 0.01**
Male (n= 1393)	51.5 ± 6.9 (n= 1296)	46.1 ± 6.1 (n= 97)	***p*< 0.01**
Female (n= 167)	43.0 ± 8.3 (n=10)	35.5 ± 13.2 (n= 160)	0.11
Time to Complete Circuit (sec); n= 110	481.6 ± 123.0 (n= 105)	564.4 ± 122.5 (n= 5)	0.14
Male (n= 107)	474.6 ± 116.9 (n= 102)	564.4 ± 122.5 (n= 5)	0.10
Female (n= 3)	719.3 ± 98.7 (n= 3)	N/A* (n= 0)	N/A*

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A* All female participants who completed the circuit would have been cleared for PA, a T-test was not performed

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 mmHg determined significant differences when comparing the combined group's rate for exercise clearance for participants' age, body mass, BMI, SBP, DBP, and VO_2 max. The 112 participants (6.6%) who would not have been cleared for exercise were older (33.9 ± 8.9 years, $p < 0.01$), heavier (91.0 ± 14.4 kg, $p < 0.01$), had a higher BMI (28.6 ± 3.7 kg/m², $p < 0.01$), had significantly higher BP (SBP 142.1 ± 9.9 mmHg, $p < 0.01$; DBP 90.4 ± 7.6 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 45.1 ± 7.6 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing the male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were significantly older (33.5 ± 8.2 years, $p < 0.01$), had a higher body mass (92.6 ± 13.6 kg, $p < 0.01$), had a higher BMI (28.8 ± 3.4 kg/m², $p < 0.01$), higher SBP (141.8 ± 9.9 mmHg, $p < 0.01$), higher DBP (90.3 ± 7.7 mmHg, $p < 0.01$) and a lower VO_2 max (46.1 ± 6.1 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences between those above and below the BP cut-point only in SBP and DBP. Participants who were above the BP cut-point had significantly higher SBP (145.0 ± 9.7 mmHg, $p < 0.01$) and DBP (91.5 ± 6.6 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. Women who completed the vigorous-to-maximal intensity circuit were all cleared for PA participation so an analysis could not be conducted between those above versus below the cut-point.

Table 5c: Bivariate analysis of all cohorts with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based blood pressure P cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and/or less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	27.8 ± 6.6 (n= 1579)	34.1 ± 8.1 (n= 91)	***p*< 0.01**
Male	27.6 ± 6.0 (n= 1417)	33.7 ± 7.5 (n= 83)	***p*< 0.01**
Female	30.0 ± 10.3 (n= 162)	37.4 ± 13.3 (n= 8)	0.05
Sex (% of population)			
Male	89.7	91.2	
Female	10.3	8.8	
Body Mass (kg)	84.7 ± 13.2	90.1 ± 13.6	***p*< 0.01**
Male	86.1 ± 12.6	91.7 ± 12.7	***p*< 0.01**
Female	72.4 ± 12.7	73.5 ± 12.3	0.82
Height (cm)	178.8 ± 7.6	178.0 ± 7.7	0.30
Male	180.0 ± 6.7	179.1 ± 7.0	0.22
Female	168.4 ± 6.6	166.7 ± 5.5	0.47
BMI (kg/m^2)	26.4 ± 3.5	28.4 ± 3.6	***p*< 0.01**
Male	26.5 ± 3.4	28.5 ± 3.3	***p*< 0.01**
Female	25.5 ± 3.9	26.7 ± 6.1	0.40
Average Resting SBP (mmHg)	115.9 ± 9.7	142.3 ± 11.0	***p*< 0.01**
Male	116.5 ± 9.6	141.9 ± 11.0	***p*< 0.01**
Female	110.9 ± 9.3	145.8 ± 10.8	***p*< 0.01**
Average Resting DBP (mmHg)	72.2 ± 7.7	92.5 ± 6.4	***p*< 0.01**
Male	72.4 ± 7.7	92.4 ± 6.5	***p*< 0.01**
Female	70.6 ± 7.3	93.8 ± 5.2	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 1560	50.5 ± 7.5 (n= 1473)	44.9 ± 7.4 (n= 87)	***p*< 0.01**
Male (n= 1393)	51.4 ± 6.9 (n= 1314)	45.8 ± 6.0 (n= 79)	***p*< 0.01**
Female (n= 167)	42.9 ± 8.4 (n= 159)	36.0 ± 13.4 (n= 8)	0.19
Time to Complete Circuit (sec); n= 110	483.2 ± 123.5 (n= 106)	543.8 ± 131.0 (n= 4)	0.34
Male (n= 107)	476.3 ± 117.5 (n= 103)	543.8 ± 131.0 (n= 4)	0.26
Female (n= 3)	719.3 ± 98.7 (n= 3)	N/A* (n= 0)	N/A*

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A* All female participants who completed the circuit would have been cleared for PA, a T-test was not performed

The results from the bivariate analysis of opinion-based BP cut-point < 144/90 mmHg determined that when comparing clearance rate for exercise clearance using the opinion-based BP cut-point < 144/90 mmHg significant differences were found in participants' age, body mass, BMI, SBP, DBP, and VO_2 max. The 61 overall participants (5.4%) who would not have been cleared for exercise were older (34.1 ± 8.1 years, $p < 0.01$), heavier (90.1 ± 13.6 kg, $p < 0.01$), had a higher BMI (28.4 ± 3.6 kg/m², $p < 0.01$), had significantly higher BP (SBP 142.3 ± 11.0 mmHg, $p < 0.01$; DBP 92.5 ± 6.4 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 44.9 ± 7.4 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (33.7 ± 7.5 years, $p < 0.01$), had a higher body mass (91.7 ± 12.7 kg, $p < 0.01$), had a higher BMI (28.5 ± 3.3 kg/m², $p < 0.01$), higher SBP (141.9 ± 11.0 mmHg, $p < 0.01$), higher DBP (92.4 ± 6.5 mmHg, $p < 0.01$) and a lower VO_2 max (45.8 ± 6.0 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences only in SBP and DBP, with participants above the BP cut-point with higher SBP (145.8 ± 10.8 mmHg, $p < 0.01$) and higher DBP (93.8 ± 5.2 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. Women who completed the vigorous-to-maximal intensity circuit were all cleared for PA participation so an analysis could not be conducted between those above versus below the cut-point.

Table 5d: Bivariate analysis of all cohorts with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based blood pressure cut-point less than 144/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and/or less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/94 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	27.9 ± 6.6 (n= 1609)	34.3 ± 9.0 (n= 61)	***p*< 0.01**
Male	27.7 ± 6.1 (n= 1447)	33.8 ± 8.2 (n= 53)	***p*< 0.01**
Female	30.0 ± 10.3 (n= 162)	37.4 ± 13.3 (n= 8)	0.05
Sex (% of population)			
Male	89.9	86.9	
Female	10.1	13.1	
Body Mass (kg)	84.8 ± 13.3	89.5 ± 13.9	***p*< 0.01**
Male	86.2 ± 12.6	91.9 ± 12.5	***p*< 0.01**
Female	72.4 ± 12.7	73.5 ± 12.3	0.82
Height (cm)	178.8 ± 7.6	178.2 ± 7.7	0.55
Male	180.0 ± 6.8	179.9 ± 6.4	0.98
Female	168.4 ± 6.6	166.7 ± 5.5	0.47
BMI (kg/m^2)	26.5 ± 3.5	28.1 ± 3.8	***p*< 0.01**
Male	26.6 ± 3.4	28.4 ± 3.3	***p*< 0.01**
Female	25.5 ± 3.9	26.7 ± 6.1	0.40
Average Resting SBP (mmHg)	116.2 ± 9.9	147.2 ± 9.3	***p*< 0.01**
Male	116.8 ± 9.8	147.4 ± 9.2	***p*< 0.01**
Female	110.9 ± 9.3	145.8 ± 10.8	***p*< 0.01**
Average Resting DBP (mmHg)	72.6 ± 8.1	93.1 ± 7.7	***p*< 0.01**
Male	72.8 ± 8.1	93.0 ± 8.0	***p*< 0.01**
Female	70.6 ± 7.3	93.8 ± 5.2	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 1560	50.4 ± 7.5 (n= 1501)	45.1 ± 8.3 (n= 59)	***p*< 0.01**
Male (n= 1393)	51.3 ± 6.9 (n= 1342)	46.5 ± 6.2 (n= 51)	***p*< 0.01**
Female (n= 167)	42.9 ± 8.4 (n= 159)	36.0 ± 13.4 (n= 8)	0.19
Time to Complete Circuit (sec); n= 110	485.9 ± 124.6 (n= 108)	459.5 ± 55.7 (n= 2)	0.77
Male (n= 107)	479.2 ± 119.0 (n= 105)	459.5 ± 55.7 (n= 2)	0.82
Female (n= 3)	719.3 ± 98.7 (n= 3)	N/A* (n= 0)	N/A*

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A* All female participants who completed the circuit would have been cleared for PA, a T-test was not performed

The results from the bivariate analysis of opinion-based BP cut-point < 144/94 mmHg determined that when comparing individuals who would have been cleared versus would not have been cleared for exercise significant differences were found in participants' age, body mass, BMI, SBP, DBP, and VO_2 max. The 61 overall participants (3.7%) who would not have been cleared for exercise were older (34.3 ± 9.0 years, $p < 0.01$), heavier (89.5 ± 13.9 kg, $p < 0.01$), had a higher BMI (28.1 ± 3.8 kg/m², $p < 0.01$), had significantly higher BP (SBP 147.2 ± 11.0 mmHg, $p < 0.01$; DBP 93.1 ± 7.7 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 45.1 ± 8.3 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (33.8 ± 8.2 years, $p < 0.01$), had a higher body mass (91.9 ± 12.5 kg, $p < 0.01$), had a higher BMI (28.4 ± 3.3 kg/m², $p < 0.01$), higher SBP (147.4 ± 9.2 mmHg, $p < 0.01$), higher DBP (93.0 ± 8.0 mmHg, $p < 0.01$) and a lower VO_2 max (46.5 ± 6.2 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences only in SBP and DBP, with those above the BP cut-point having higher SBP (145.8 ± 10.8 mmHg, $p < 0.01$) and higher DBP (93.8 ± 5.2 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. Women who completed the vigorous-to-maximal intensity circuit were all cleared for PA participation so an analysis could not be conducted between those above versus below the cut-point.

Table 5e: Bivariate analysis of all cohorts with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based blood pressure cut-point less than 150/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 150 mmHg systolic and/or less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 150/100 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	28.0 ± 6.7 (n= 1646)	36.1 ± 9.6 (n= 24)	***p*< 0.01**
Male	27.8 ± 6.2 (n= 1480)	33.9 ± 7.8 (n= 20)	***p*< 0.01**
Female	29.9 ± 10.2 (n= 166)	47.5 ± 10.7 (n= 4)	***p*< 0.01**
Sex (% of population)			
Male	89.9	83.3	
Female	10.1	16.7	
Body Mass (kg)	84.9 ± 13.3	91.2 ± 14.1	***p*< 0.05**
Male	86.3 ± 12.6	94.2 ± 12.0	***p*< 0.01**
Female	72.4 ± 12.6	76.7 ± 16.7	0.50
Height (cm)	178.8 ± 7.6	178.3 ± 8.8	0.75
Male	180.0 ± 6.8	180.6 ± 7.2	0.70
Female	168.4 ± 6.5	167.0 ± 7.4	0.67
BMI (kg/m^2)	26.5 ± 3.5	28.7 ± 4.4	***p*< 0.01**
Male	26.6 ± 3.4	28.9 ± 3.4	***p*< 0.01**
Female	25.5 ± 3.9	28.0 ± 8.5	0.60
Average Resting SBP (mmHg)	116.8 ± 10.6	154.5 ± 9.4	***p*< 0.01**
Male	117.4 ± 10.5	154.5 ± 10.0	***p*< 0.01**
Female	11.6 ± 10.0	154.8 ± 7.1	***p*< 0.01**
Average Resting DBP (mmHg)	73.0 ± 8.5	95.5 ± 9.3	***p*< 0.01**
Male	73.2 ± 8.5	96.4 ± 9.7	***p*< 0.01**
Female	71.2 ± 8.3	91.3 ± 6.6	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 1560	50.3 ± 7.5 (n= 1537)	41.9 ± 7.8 (n= 23)	***p*< 0.01**
Male (n= 1393)	51.2 ± 6.9 (n= 1374)	44.9 ± 5.5 (n= 19)	***p*< 0.01**
Female (n= 167)	42.9 ± 8.4 (n= 163)	27.3 ± 13.3 (n= 4)	***p*< 0.01**
Time to Complete Circuit (sec); n= 110	485.3 ± 124.2 (n= 109)	499.0 (n= 1)	N/A*
Male (n= 107)	478.7 ± 118.6 (n= 106)	499.0 (n= 1)	N/A*
Female (n= 3)	719.3 ± 98.7 (n= 3)	N/A* (n= 0)	N/A*

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A* All female participants who completed the circuit would have been cleared for PA and only 1 male participant was not cleared, a T-test was not performed

The results from the bivariate analysis of opinion-based BP cut-point < 150/100 mmHg determined that when comparing individuals who would have been cleared versus would not have been cleared for exercise significant differences were found in participants' age, body mass, BMI, SBP, DBP, and VO_2 max. The 24 overall participants (1.4%) who would not have been cleared for exercise were older (36.1 ± 9.6 years, $p < 0.01$), heavier (91.2 ± 14.1 kg, $p < 0.05$), had a higher BMI (28.7 ± 4.4 kg/m², $p < 0.01$), had significantly higher BP (SBP 154.5 ± 9.4 mmHg, $p < 0.01$; DBP 95.5 ± 9.3 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 41.9 ± 7.8 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (33.9 ± 7.8 years, $p < 0.01$), had a higher body mass (94.2 ± 12.0 kg, $p < 0.01$), had a higher BMI (28.9 ± 3.4 kg/m², $p < 0.01$), higher SBP (154.5 ± 10.0 mmHg, $p < 0.01$), higher DBP (96.4 ± 9.7 mmHg, $p < 0.01$) and a lower VO_2 max (44.9 ± 5.5 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences between those above versus below the BP cut-point with those above the cut-point being significantly older (47.5 ± 10.7 years, $p < 0.01$), with higher SBP (154.8 ± 7.1 mmHg, $p < 0.01$), higher DBP (91.3 ± 6.6 mmHg, $p < 0.01$) and lower VO_2 max (27.3 ± 13.3 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. All female participants who completed the vigorous-to-maximal intensity circuit were all cleared for PA participation and only one male participant was not cleared for PA participation so an analysis could not be conducted between those above versus below the cut-point.

Table 5f: Bivariate analysis of all cohorts with all exercise protocols combined as a whole and stratified based on exercise clearance when applying hypothetical blood pressure blood pressure cut-point less than 160/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and/or less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Hypothetical Clearance BP Cut-Point of < 160/94 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	28.0 ± 6.8 (n= 1633)	34.0 ± 8.3 (n= 37)	***p*< 0.01**
Male	27.8 ± 6.1 (n= 1468)	34.5 ± 8.2 (n= 32)	***p*< 0.01**
Female	30.3 ± 10.6 (n= 165)	30.8 ± 9.1 (n= 5)	0.92
Sex (% of population)			
Male	89.9	86.5	
Female	10.1	13.5	
Body Mass (kg)	84.9 ± 13.3	89.3 ± 14.2	***p*< 0.05**
Male	86.3 ± 12.6	91.4 ± 13.2	***p*< 0.05**
Female	72.4 ± 12.6	91.4 ± 13.2	0.51
Height (cm)	178.8 ± 7.6	177.6 ± 8.3	0.35
Male	180.0 ± 6.8	179.6 ± 6.6	0.76
Female	168.4 ± 6.6	165.0 ± 4.7	0.25
BMI (kg/m^2)	26.5 ± 3.5	28.3 ± 3.9	***p*< 0.01**
Male	26.6 ± 3.4	28.3 ± 3.3	***p*< 0.01**
Female	25.5 ± 3.9	28.2 ± 6.9	0.13
Average Resting SBP (mmHg)	116.7 ± 10.6	146.3 ± 11.7	***p*< 0.01**
Male	117.3 ± 10.4	146.9 ± 11.6	***p*< 0.01**
Female	111.7 ± 10.7	142.4 ± 12.8	***p*< 0.01**
Average Resting DBP (mmHg)	72.8 ± 8.2	98.1 ± 4.3	***p*< 0.01**
Male	73.0 ± 8.2	98.3 ± 4.6	***p*< 0.01**
Female	70.9 ± 7.7	96.8 ± 1.9	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 1560	50.3 ± 7.6 (n= 1525)	44.4 ± 7.5 (n= 35)	***p*< 0.01**
Male (n= 1393)	51.2 ± 6.9 (n= 1363)	45.2 ± 6.1 (n= 30)	***p*< 0.01**
Female (n= 167)	42.6 ± 8.7 (n= 162)	39.4 ± 13.2 (n= 5)	0.42
Time to Complete Circuit (sec); n= 110	485.5 ± 124.6 (n= 108)	459.5 ± 55.9 (n= 2)	0.77
Male (n= 107)	479.2 ± 119.0 (n= 105)	459.5 ± 55.9 (n= 2)	0.82
Female (n= 3)	719.3 ± 98.7 (n= 3)	N/A* (n= 0)	N/A*

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A* All female participants who completed the circuit would have been cleared for PA, a T-test was not performed

The results from the bivariate analysis of hypothetical BP cut-point < 160/94 mmHg determined that when comparing individuals who would have been cleared versus would not have been cleared for exercise significant differences were found in participants' age, body mass, BMI, SBP, DBP, and VO_2 max. The 37 overall participants (2.2%) who would not have been cleared for exercise were older (34.0 ± 8.3 years, $p < 0.01$), heavier (89.3 ± 14.2 kg, $p < 0.05$), had a higher BMI (28.3 ± 3.9 kg/m², $p < 0.01$), had significantly higher BP (SBP 146.3 ± 11.7 mmHg, $p < 0.01$; DBP 98.1 ± 4.3 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 44.4 ± 7.5 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (34.5 ± 8.3 years, $p < 0.01$), had a higher body mass (91.4 ± 13.2 kg, $p < 0.05$), had a higher BMI (28.3 ± 3.3 kg/m², $p < 0.01$), higher SBP (146.9 ± 11.6 mmHg, $p < 0.01$), higher DBP (98.3 ± 4.6 mmHg, $p < 0.01$) and a lower VO_2 max (45.2 ± 6.1 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences in only SBP and DBP with those above the cut-point having significantly higher SBP (142.4 ± 12.8 mmHg, $p < 0.01$), and DBP (96.8 ± 1.9 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. All female participants who completed the vigorous-to-maximal intensity circuit were all cleared for PA participation so an analysis could not be conducted between those above versus below the cut-point.

Table 5g: Bivariate analysis of all cohorts with all exercise protocols combined as a whole and stratified based on exercise clearance when applying hypothetical blood pressure cut-point less than 160/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure P of less than 160 mmHg systolic and/or less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Hypothetical Clearance BP Cut-Point of < 160/100 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	28.1 ± 6.8 (n= 1661)	35.7 ± 7.8 (n= 9)	***p*< 0.01**
Male	27.9 ± 6.2 (n= 1492)	34.5 ± 7.5 (n= 8)	***p*< 0.01**
Female	30.2 ± 10.5 (n= 169)	45.0 (n= 1)	N/A*
Sex (% of population)			
Male	89.8	88.9	
Female	10.2	11.1	
Body Mass (kg)	85.0 ± 13.3	89.5 ± 10.2	0.30
Male	86.4 ± 12.6	88.3 ± 10.1	0.68
Female	72.3 ± 12.5	99.7	N/A*
Height (cm)	178.8 ± 7.6	177.2 ± 10.0	0.54
Male	180.0 ± 6.8	179.5 ± 7.7	0.85
Female	168.4 ± 6.5	159.0	N/A*
BMI (kg/m^2)	26.5 ± 3.5	28.8 ± 4.9	0.06
Male	26.7 ± 3.4	27.4 ± 2.9	0.53
Female	25.5 ± 3.9	39.4	N/A*
Average Resting SBP (mmHg)	117.1 ± 11.0	161.3 ± 9.0	***p*< 0.01**
Male	117.7 ± 10.9	160.9 ± 9.5	***p*< 0.01**
Female	112.3 ± 11.2	165.0	N/A*
Average Resting DBP (mmHg)	73.2 ± 8.7	102.3 ± 6.0	***p*< 0.01**
Male	73.3 ± 8.7	102.8 ± 6.3	***p*< 0.01**
Female	71.5 ± 8.5	99.0	N/A*
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 1560	50.2 ± 7.6 (n= 1551)	41.7 ± 10.4 (n= 9)	***p*< 0.01**
Male (n= 1393)	51.1 ± 6.9 (n= 1385)	44.7 ± 5.7 (n= 8)	***p*< 0.01**
Female (n= 167)	42.7 ± 8.6 (n= 166)	17.8 (n= 1)	N/A*
Time to Complete Circuit (sec); n= 110	485.4 ± 123.6 (n= 110)	N/A* (n= 0)	N/A*
Male (n= 107)	478.8 ± 118.1 (n= 107)	N/A* (n= 0)	N/A*
Female (n= 3)	719.3 ± 98.7 (n= 3)	N/A* (n= 0)	N/A*

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A* Only 1 female participant would not have been cleared for PA and all participants who completed the circuit would have been cleared for PA, a T-test was not performed

The results from the bivariate analysis of hypothetical BP cut-point < 160/100 mmHg determined that when comparing individuals who would have been cleared versus would not have been cleared for exercise significant differences were found in participants' age, SBP, DBP, and VO_2 max. The 9 overall participants (0.54%) who would not have been cleared for exercise were older (35.7 ± 7.8 years, $p < 0.01$), had significantly higher BP (SBP 161.3 ± 9.0 mmHg, $p < 0.01$; DBP 102.3 ± 6.0 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 41.7 ± 10.4 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (34.5 ± 7.5 years, $p < 0.01$), had higher SBP (160.9 ± 9.5 mmHg, $p < 0.01$), higher DBP (102.8 ± 6.3 mmHg, $p < 0.01$) and a lower VO_2 max (44.7 ± 5.7 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. Only one female participant would not have been cleared for moderate-to-vigorous-to-maximal intensity PA participation so a bivariate analysis could not be conducted. All female participants who completed the vigorous-to-maximal intensity circuit were also cleared for PA participation so an analysis could not be conducted between those above versus below the cut-point.

The results of the logistic regression analysis are presented in Table 6. A separate logistic regression was conducted for each opinion-based BP cut-point and hypothetical BP cut-point when using the evidence-based cut-point < 160/90 mmHg as the referent to determine overall exercise clearance. Three separate regression models were performed: 1) model 1 adjusted for age, sex, BMI and VO_2 max, 2) model 2 adjusted for age, sex, BMI and circuit time, and 3) model 3 with no adjustment for covariates. As certain participants completed only the moderate-to-vigorous-to-maximal intensity time-based circuit comprised of functional physically demanding task exercises while others completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises or moderate-to-vigorous-to-maximal intensity treadmill exercise only, the regression was conducted using different models with model 1 completed on participants who underwent a VO_2 max assessment and model 2 conducted on participants who complete the moderate-to-vigorous-to-maximal intensity time-based circuit comprised of functional physically demanding task exercises.

Table 6: Logistic regression analysis of all cohorts with all exercise protocols combined. Regression analysis is comparing exercise clearance when using evidence-based blood pressure cut-point less than 160/90 mmHg in comparison to different opinion-based blood pressure cut-points and hypothetical blood pressure cut-points that could be applied by agencies and organizations for pre-participation screening of applicants and incumbents in physically demanding public safety occupations, and pre-participation screening of physical activity participation in the health, wellness and fitness industry.

	Model 1 (adjusted)[1]		Model 2 (adjusted)[2]		Model 3 (not adjusted)[3]	
	Would be Cleared for Exercise		Would be Cleared for Exercise		Would be Cleared for Exercise	
	OR	*P* value	OR	*P* value	OR	*P* value
Applying Cut-Point < 130/80 mmHg	0.000	0.985	0.000	0.996	0.000	0.985
Applying Cut-Point < 140/90 mmHg	0.000	0.983	0.000	0.997	0.000	0.983
Applying Cut-Point < 144/90 mmHg	0.000	0.982	N/A	N/A	0.000	0.982
Applying Cut-Point < 144/94 mmHg	0.009	***p*< 0.01**	0.000	0.998	0.007	***p*< 0.01**
Applying Cut-Point < 150/100 mmHg	0.015	***p*< 0.01**	0.000	1.000	0.009	***p*< 0.01**
Applying Cut-Point < 160/94 mmHg	0.000	0.997	0.000	0.998	0.000	0.997
Applying Cut-Point < 160/100 mmHg	0.000	0.999	N/A	N/A	0.000	0.999

Odds ratio (OR) is expressed as odds of being cleared for exercise

N/A group size was not large enough to conduct the analysis

[1] Model 1 adjusted for covariates of age, sex, BMI (Body mass index) and VO_2 Max (Maximum volume of oxygen consumed)

[2] Model 2 adjusted for covariates of age, sex, BMI (Body mass index) and circuit time

[3] Model 3 not adjusted for covariates

The logistic regression analyses revealed significant associations for BP cut-points 144/94 mmHg and 150/100 mmHg that were maintained when adjusting the model for age, sex, BMI and VO_2 max. No significant associations were found for BP cut-points 130/80 mmHg, 140/90 mmHg, 144/90 mmHg and the hypothetical cut-points of 160/94 mmHg and 160/100 mmHg. The analysis unadjusted for covariates revealed that when applying the evidence-based BP cut-point of 160/90mmHg as the referent to determine overall PA participation clearance, not being cleared for PA when applying BP cut-point 144/94 mmHg would results in being 99% less likely to be cleared for participation in moderate-to-vigorous-to-maximal intensity PA (OR= 0.007, $p< 0.01$) and this relationship was maintained when controlling for age, sex, BMI and VO_2 max (OR= 0.009, $p< 0.01$). Similarly, when measuring above the opinion-based BP cut-point of 150/100 mmHg as compared to evidence-based BP cut-point 160/90 mmHg, individuals who were above this opinion-based BP cut-point would again be 99% less likely to be cleared for moderate-to-vigorous-to-maximal PA participation (OR= 0.009, $p< 0.01$) and this relationship was maintained with adjustments for covariates (OR= 0.015, $p< 0.01$). That is, individuals who were above the two opinion-based cut-points would have been restricted from moderate-to-vigorous-to-maximal PA intensity participation with almost 100% certainty. However, no significance was found when adjusting for age, sex, BMI and circuit time.

A sub-set of participants (n= 299) also completed a PA questionnaire which asked participants to answer questions about participation in structured PA participation, sport participation, intensity of exercise and his or her perception of personal fitness. A Pearson product moment correlation was completed comparing the relationship between the PA questionnaire and participant's SBP, DBP, BMI, VO_2 max and responses to the questionnaire. The results are presented in Table 7, with a breakdown of responses in Table 8.

Table 7: Pearson Product Moment Correlation Analysis of Sub-Set of All Cohorts with Exercise Protocols Combined Comparing Physical Activity Participation Questionnaire and to Systolic Blood Pressure, Diastolic Blood Pressure, Body Mass Index and Maximum Volume of Oxygen.

	SBP	DBP	BMI	VO_2 max	Volume of Structured PA	Intensity of PA	Volume of Resistance Training	Perceived Personal Fitness Level
SBP		0.719**	0.316**	-0.138**	0.045	0.045	0.054	0.045
DBP			0.231**	-0.212**	0.077	0.077	0.081	0.081
BMI				-0.452**	-0.16	-0.16	-0.006	-0.017
VO_2 max					0.015	0.015	0.015	0.037
Volume of Structured PA						1.000**	0.988**	0.976**
Intensity of PA							0.988**	0.976**
Volume of Resistance Training								0.976**

n= 299

PA (physical activity); SBP (systolic blood pressure); DBP (diastolic blood pressure); BMI (body mass index); VO_2 max (maximum volume of oxygen)

*$p < 0.05$

**$p < 0.01$

Table 8: Distribution of Responses to the Physical Activity Questionnaire

	Rarely or never	Normally once or twice	At least 3 times per week	Did not answer
Volume of Structured PA (sessions per week)	12	124	162	1
Volume of Resistance Training (sessions per week)	26	104	168	1

	Light effort	Moderate effort	Vigorous Effort	Did not answer
Intensity of PA	2	58	238	1

	Very poor	Poor	Average	Good	Very Good	Did not answer
Perceived Personal Fitness Level	0	1	74	170	51	3

	Yes	No
Active Job	237	62

A Pearson product moment correlation was performed on the group of male and female participants who completed moderate-to-vigorous-to-maximal intensity exercise and were not on medication. Significant associations were found between SBP and DBP (r= 0.719, $p < 0.001$), and BMI with both SBP and DBP respectively (r= 0.316, $p < 0.001$; r= 0.231, $p < 0.001$). As SBP increases, so does DBP. Similarly, as BMI increases so do SBP and DBP. A low inverse relationship was also found between VO_2 max and SBP and DBP respectively (r= -0.138, $p < 0.001$; r= -0.212, $p < 0.001$). There was also a relationship determined between the volume of resistance training reported and the volume of structured PA reported (r= 0.988, $p < 0.001$), and the intensity of PA reported (r= 0.988, $p < 0.001$).

5.3 Data Analysis of All Cohort Combined with Participants Who Participated in Moderate-to-Vigorous-to-Maximal Intensity Exercise Protocols and Who Were on Medication

The statistical analysis of data was completed on the sub-set of participants from all cohorts who underwent moderate-to-vigorous-to-maximal intensity exercise and who were using medication (n= 22). These participants were taking medication for hypertension, hypothyroidism, dyslipidemia, and asthma. Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table 9.

Table 9: Demographic characteristics of cohorts with participants who were on medication and with all exercise protocols combined as a whole and stratified based on exercise clearance when applying evidence-based BP cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for PA participation. Participants who had a resting BP of less than 160 mmHg systolic and/or less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity PA.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	All	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	46.2 ± 11.2 (n= 22)	45.9 ± 11.6 (n= 20)	49.5 ± 6.4 (n= 2)	0.67
Male	45.9 ± 9.9 (n= 14)	45.2 ± 10.0 (n= 13)	54.0 (n= 1)	N/A**
Female	46.8 ± 13.8 (n= 8)	47.0 ± 14.9 (n= 7)	45.0 (n= 1)	N/A**
Sex (% of population)				
Male	63.6	65.0	50.0	
Female	36.4	35.0	50.0	
Body Mass (kg)	89.5 ± 19.7	88.4 ± 20.4	100.7 ± 1.3	0.42
Male	93.2 ± 19.0	92.6 ± 19.6	101.6	N/A**
Female	83.0 ± 20.6	80.7 ± 21.0	99.7	N/A**
Height (cm)	170.5 ± 9.8	170.4 ± 9.5	171.3 ± 17.3	0.91
Male	174.9 ± 8.7	174.2 ± 8.7	183.5	N/A**
Female	162.8 ± 6.2	163.3 ± 6.5	159.0	N/A**
BMI (kg/m^2)	30.8 ± 6.4	30.4 ± 6.4	34.8 ± 6.6	0.36
Male	30.5 ± 6.7	30.6 ± 7.0	30.2	N/A**
Female	31.1 ± 6.2	29.9 ± 5.6	39.4	N/A**
Average Resting SBP (mmHg)	124.3 ± 15.4	121.9 ± 12.8	149.0 ± 22.6	***p*< 0.05**
Male	125.6 ± 12.9	125.1 ± 13.2	133.0	N/A**
Female	122.0 ± 19.8	115.9 ± 10.3	165.0	N/A**
Average Resting DBP (mmHg)	79.1 ± 8.8	77.3 ± 7.0	97.0 ± 2.8	***p*< 0.01**
Male	78.9 ± 8.1	77.6 ± 6.9	95.0	N/A**
Female	79.5 ± 10.5	76.7 ± 7.6	99.0	N/A**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 18	30.4 ± 9.2 (n= 18)	31.1 ± 9.2 (n= 16)	24.2 ± 9.0 (n= 2)	0.33
Male (n= 10)	35.1 ± 8.3 (n= 10)	35.6 ± 8.6 (n= 9)	30.6 (n= 1)	N/A
Female (n= 8)	24.5 ± 6.8 (n= 8)	25.5 ± 6.8 (n= 7)	17.8 (n= 1)	N/A
Time to Complete Circuit (sec); n= 4	596.8 ± 65.8 (n= 4)	596.8 ± 65.8 (n= 4)	N/A* (n= 0)	N/A*
Male (n= 4)	596.8 ±65.8 (n= 4)	596.8 ± 65.8 (n= 4)	N/A* (n= 0)	N/A
Female (n= 0)	N/A* (n= 0)	N/A* (n= 0)	N/A* (n= 0)	N/A*

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A* no female participants completed the circuit and all circuit participants would have been cleared for PA
N/A ** only 1 female and 1 male participant would not have been cleared for PA, a T-test was not performed

The results from the bivariate analysis of evidence-based BP cut-point < 160/90 that was conducted on the sub-set of participants on medication determined that these participants were predominantly male (63.6%), middle aged (46.2 ± 11.2 years), obese using the BMI metric (male= 30.5 kg/m² ± 6.7, female= 30.8 kg/m² ± 6.4) and with a pre-hypertensive resting BP (SBP 124.3 ± 15.4 mmHg, DBP 79.1 ± 8.8 mmHg). When comparing the participant's rates for exercise clearance based on the evidence-based BP cut-point < 160/90 mmHg significant differences were found only for SBP and DBP for the group as a whole. Individuals who were above the BP cut-point had significantly higher SBP (149.0 ± 22.6 mmHg, $p < 0.05$), and higher DBP (97.0 ± 2.8 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. There was only 1 female participant and 1 male participant who would not have been cleared for PA, so a bivariate analysis separated by sex could not be performed. No female participants completed the time-based circuit, and all male participants who completed the circuit would have been cleared for PA.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points and hypothetical cut-points that could be used by agencies in determining PA participation clearance for moderate-to-vigorous-to- maximal intensity PA and fitness assessment applications was also performed. The results of this analysis are presented in Table 10a for opinion-based BP cut-point < 130/80 mmHg, Table 10b for opinion-based BP cut-point < 140/90 mmHg, Table 10c for opinion-based BP cut-point < 144/90 mmHg, Table 10d for opinion-based BP cut-point < 144/94 mmHg, Table 10e for opinion-based BP cut-point < 150/100 mmHg, Table 10f for hypothetical BP cut-point < 160/194 mmHg, and Table 10g for hypothetical BP cut-point < 160/100 mmHg

Table 10a: Bivariate analysis of cohorts with participants who were on medication and with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based BP cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for PA participation. Participants who had a resting BP of less than 130 mmHg systolic and/or less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity PA.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	42.4 ± 12.6 (n= 11)	50.0 ± 8.4 (n= 11)	0.11
Male	42.1 ± 8.5 (n= 7)	49.6 ± 10.4 (n= 7)	0.17
Female	42.8 ± 19.7 (n= 4)	50.8 ± 4.0 (n= 4)	0.48
Sex (% of population)			
Male	63.6	63.6	
Female	36.4	36.4	
Body Mass (kg)	94.3 ± 23.1	84.8 ± 12.6	0.27
Male	99.2 ± 21.6	87.3 ± 15.1	0.26
Female	85.7 ± 26.2	80.4 ± 16.9	0.75
Height (cm)	171.8 ± 11.2	169.1 ± 8.4	0.53
Male	176.3 ± 10.3	173.4 ± 7.3	0.56
Female	164.0 ± 8.9	161.5 ± 2.5	0.62
BMI (kg/m^2)	31.9 ± 7.7	29.6 ± 4.9	0.41
Male	32.2 ± 8.8	28.9 ± 3.8	0.37
Female	31.3 ± 6.4	30.9 ± 6.8	0.92
Average Resting SBP (mmHg)	113.3 ± 8.3	135.4 ± 12.6	***p*< 0.01**
Male	115.7 ± 8.6	135.6 ± 7.4	***p*< 0.01**
Female	109.0 ± 6.8	135.0 ± 20.4	0.05
Average Resting DBP (mmHg)	72.7 ± 4.8	85.5 ± 7.2	***p*< 0.01**
Male	73.4 ± 5.1	84.3 ± 6.9	***p*< 0.01**
Female	71.5 ± 4.5	87.5 ± 8.3	***p*< 0.05**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 18	29.7 ± 9.5 (n= 9)	31.1 ± 9.4 (n= 9)	0.75
Male (n= 10)	32.7 ± 9.5 (n= 5)	37.5 ± 7.1 (n= 5)	0.39
Female (n= 8)	25.9 ± 9.4 (n= 4)	23.1 ± 4.0 (n= 4)	0.60
Time to Complete Circuit (sec); n= 4	618.0 ± 31.0 (n= 2)	575.5 ± 101.1 (n= 2)	0.63
Male (n= 4)	618.0 ± 31.1 (n= 2)	575.5 ± 101.1 (n= 2)	0.63
Female (n= 0)	N/A (n= 0)	N/A (n= 0)	N/A (n= 0)

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A no female participants completed the circuit

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 that was conducted on the sub-set of participants on medication determined that when comparing the overall group based on those would not have been cleared for PA versus those who would have been cleared, individuals who would not have been cleared had significantly higher SBP (135.4 ± 12.6 mmHg, $p < 0.01$), and higher DBP (85.5 ± 7.2 mmHg, $p < 0.01$). Male participants who were above the BP cut-point also had significantly higher SBP (135.6 ± 7.4 mmHg, $p < 0.01$), and higher DBP (84.3 ± 6.9 mmHg, $p < 0.01$). Female participants who were above the BP cut-point had significantly higher DBP only (87.5 ± 8.3 mmHg, $p < 0.05$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. No female participants completed the time-based circuit so an analysis was not performed on that variable.

Table 10b: Bivariate analysis of cohorts with participants who were on medication and with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based BP cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for PA participation. Participants who had a resting BP of less than 140 mmHg systolic and/or less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity PA.

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	44.4 ± 11.3 (n= 18)	54.0 ± 6.7 (n= 4)	0.12
Male	42.8 ± 8.8 (n= 11)	57.0 ± 3.6 (n= 3)	***p*< 0.05**
Female	47.0 ± 14.9 (n= 7)	45.0 (n= 1)	N/A
Sex (% of population)			
Male	61.1	75.0	
Female	38.9	25.0	
Body Mass (kg)	89.5 ± 21.2	89.7 ± 13.0	0.99
Male	95.1 ± 20.3	86.3 ± 13.7	0.50
Female	80.7 ± 21.0	99.7	N/A
Height (cm)	170.6 ± 9.7	168.6 ± 11.7	0.86
Male	175.3 ± 8.5	173.2 ± 11.4	0.72
Female	163.3 ± 6.5	159.0	N/A
BMI (kg/m^2)	30.6 ± 6.7	31.4 ± 5.6	0.84
Male	31.1 ± 7.5	28.7 ± 1.7	0.60
Female	29.9 ± 5.6	39.4	N/A
Average Resting SBP (mmHg)	119.5 ± 11.1	146.0 ± 13.5	***p*< 0.01**
Male	121.8 ± 11.5	139.7 ± 5.8	***p*< 0.05**
Female	115.9 ± 10.3	165.0	N/A
Average Resting DBP (mmHg)	77.2 ± 7.2	87.8 ± 11.2	***p*< 0.05**
Male	77.5 ± 7.4	84.0 ± 10.1	0.23
Female	76.7 ± 7.6	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 18	30.6 ± 9.3 (n= 15)	29.2 ± 10.8 (n= 3)	0.82
Male (n= 10)	35.1 ± 9.1 (n= 8)	35.0 ± 6.1 (n= 2)	0.98
Female (n= 8)	25.5 ± 6.8 (n= 7)	17.8 (n= 1)	N/A
Time to Complete Circuit (sec); n= 4	580.0 ± 69.4 (n= 3)	647.0 (n= 1)	N/A*
Male (n= 4)	580.0 ± 69.4 (n= 3)	647.0 (n= 1)	N/A*
Female (n= 0)	N/A* (n= 0)	N/A* (n= 0)	N/A* (n= 0)

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A only one female participant would not have been cleared for PA so a T-test was not performed
N/A* no female participants completed the circuit and only one circuit participant would not have been cleared for PA so a T-test was not performed

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 determined that when comparing the overall group based on those would not have been cleared for PA versus those who would have been cleared, individuals who would not have been cleared had significantly higher SBP (146.0 ± 13.5 mmHg, $p < 0.01$), and higher DBP (87.8 ± 11.2 mmHg, $p < 0.01$). Male participants who were above the BP cut-point were significantly older (44.4 ± 11.3 years, $p < 0.05$) and had significantly higher SBP (139.7 ± 5.8 mmHg, $p < 0.05$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. No female participants completed the time-based circuit, and only one male participant who completed the circuit would not have been cleared for PA participation so no bivariate analysis was performed for that variable.

Table 10c: Bivariate analysis of cohorts with participants who were on medication and with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based BP cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for PA participation. Participants who had a resting BP of less than 144 mmHg systolic and/or less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity PA.

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	45.9 ± 11.6 (n= 20)	49.5 ± 6.4 (n= 2)	0.67
Male	45.2 ± 10.0 (n= 13)	54.0 (n= 1)	N/A
Female	47.0 ± 14.9 (n= 7)	45.0 (n= 1)	N/A
Sex (% of population)			
Male	65.0	50.0	
Female	35.0	50.0	
Body Mass (kg)	88.4 ± 20.4	100.7 ± 1.3	0.42
Male	92.6 ± 19.6	101.6	N/A
Female	80.7 ± 21.0	99.7	N/A
Height (cm)	170.4 ± 9.5	171.3 ± 17.3	0.91
Male	174.2 ± 8.7	183.5	N/A
Female	163.3 ± 6.5	159.0	N/A
BMI (kg/m^2)	30.4 ± 6.4	34.8 ± 6.6	0.69
Male	30.6 ± 7.0	30.2	N/A
Female	29.9 ± 5.6	39.4	N/A
Average Resting SBP (mmHg)	121.9 ± 12.8	149.0 ± 22.6	***p*< 0.05**
Male	125.1 ± 13.2	133.0	N/A
Female	115.9 ± 10.3	165.0	N/A
Average Resting DBP (mmHg)	77.3 ± 7.0	97.0 ± 2.8	***p*< 0.01**
Male	77.6 ± 6.9	95.0	N/A
Female	76.7 ± 7.6	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 18	31.1 ± 9.2 (n= 16)	24.2 ± 9.0 (n= 2)	0.33
Male (n= 10)	35.6 ± 8.6 (n= 9)	30.6 (n= 1)	N/A
Female (n= 8)	25.5 ± 6.8 (n= 7)	17.8 (n= 1)	N/A
Time to Complete Circuit (sec); n= 4	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Male (n= 4)	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Female (n= 0)	N/A* (n= 0)	N/A* (n= 0)	N/A* (n= 0)

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A only one male and one female participant would not have been cleared for PA so a T-test was not performed
N/A* no female participants completed the circuit

The results from the bivariate analysis of opinion-based BP cut-point < 144/90 determined that when comparing the overall group based on those would not have been cleared for PA versus those who would have been cleared, individuals who would not have been cleared had significantly higher SBP (149.0 ± 22.6 mmHg, $p < 0.05$), and higher DBP (97.0 ± 2.8 mmHg, $p < 0.01$). No other significant differences were found. Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. No female participants completed the time-based circuit and all male participants who completed the circuit would have been cleared for PA participation so an analysis was not performed on that variable.

Table 10d: Bivariate analysis of cohorts with participants who were on medication and with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based BP cut-point less than 144/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for PA participation. Participants who had a resting BP of less than 144 mmHg systolic and/or less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity PA.

	Applying a Clearance BP Cut-Point of < 144/94 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	45.9 ± 11.6 (n= 20)	49.5 ± 6.4 (n= 2)	0.67
Male	45.2 ± 10.0 (n= 13)	54.0 (n= 1)	N/A
Female	47.0 ± 14.9 (n= 7)	45.0 (n= 1)	N/A
Sex (% of population)			
Male	65.0	50.0	
Female	35.0	50.0	
Body Mass (kg)	88.4 ± 20.4	100.7 ± 1.3	0.42
Male	92.6 ± 19.6	101.6	N/A
Female	80.7 ± 21.0	99.7	N/A
Height (cm)	170.4 ± 9.5	171.3 ± 17.3	0.91
Male	174.2 ± 8.7	183.5	N/A
Female	163.3 ± 6.5	159.0	N/A
BMI (kg/m^2)	30.4 ± 6.4	34.8 ± 6.6	0.69
Male	30.6 ± 7.0	30.2	N/A
Female	29.9 ± 5.6	39.4	N/A
Average Resting SBP (mmHg)	121.9 ± 12.8	149.0 ± 22.6	***p*< 0.05**
Male	125.1 ± 13.2	133.0	N/A
Female	115.9 ± 10.3	165.0	N/A
Average Resting DBP (mmHg)	77.3 ± 7.0	97.0 ± 2.8	***p*< 0.01**
Male	77.6 ± 6.9	95.0	N/A
Female	76.7 ± 7.6	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 18	31.1 ± 9.2 (n= 16)	24.2 ± 9.0 (n= 2)	0.33
Male (n= 10)	35.6 ± 8.6 (n= 9)	30.6 (n= 1)	N/A
Female (n= 8)	25.5 ± 6.8 (n= 7)	17.8 (n= 1)	N/A
Time to Complete Circuit (sec); n= 4	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Male (n= 4)	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Female (n= 0)	N/A (n= 0)	N/A (n= 0)	N/A (n= 0)

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A only one male and one female participant would not have been cleared for PA so a T-test was not performed
N/A* no female participants completed the circuit

The results from the bivariate analysis of opinion-based BP cut-point < 144/94 determined that when comparing the overall group based on those would not have been cleared for PA versus those who would have been cleared, individuals who would not have been cleared had significantly higher SBP (149.0 ± 22.6 mmHg, $p < 0.05$), and higher DBP (97.0 ± 2.8 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. Only one male and one female participant would not have been cleared for PA participation so an analysis could not be performed with the participants separated by sex. All participants who completed the time-based circuit would have been cleared for PA participation so an analysis was not performed on that variable.

Table 10e: Bivariate analysis of cohorts with participants who were on medication and with all exercise protocols combined as a whole and stratified based on exercise clearance when applying opinion-based BP cut-point less than 150/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for PA participation. Participants who had a resting BP of less than 150 mmHg systolic and/or less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity PA.

	Applying a Clearance BP Cut-Point of < 150/100 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	46.2 ± 11.4 (n= 21)	45.0 (n= 1)	N/A
Male	45.9 ± 9.9 (n= 14)	N/A (n= 0)	N/A
Female	47.0 ± 14.9 (n= 7)	45.0 (n= 1)	N/A
Sex (% of population)			
Male	66.7	0.0	
Female	33.3	100.0	
Body Mass (kg)	89.0 ± 20.1	99.7	N/A
Male	93.2 ± 19.0	N/A	N/A
Female	80.7 ± 21.0	99.7	N/A
Height (cm)	171.0 ± 9.7	159.0	N/A
Male	174.9 ± 8.7	N/A	N/A
Female	163.3 ± 6.5	159.0	N/A
BMI (kg/m^2)	30.4 ± 6.2	39.4	N/A
Male	30.6 ± 6.7	N/A	N/A
Female	29.9 ± 5.6	39.4	N/A
Average Resting SBP (mmHg)	122.4 ± 12.7	165.0	N/A
Male	125.6 ± 12.9	N/A	N/A
Female	115.9 ± 10.3	165.0	N/A
Average Resting DBP (mmHg)	78.1 ± 7.8	99.0	N/A
Male	78.9 ± 8.1	N/A	N/A
Female	76.7 ± 7.6	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 18	31.1 ± 8.9 (n= 17)	17.8 (n= 1)	N/A
Male (n= 10)	35.1 ± 8.3 (n= 10)	N/A (n= 0)	N/A
Female (n= 8)	25.5 ± 6.8 (n= 7)	17.8 (n= 1)	N/A
Time to Complete Circuit (sec); n= 4	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Male (n= 4)	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Female (n= 0)	N/A (n= 0)	N/A (n= 0)	N/A (n= 0)

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A all male participants would have been cleared for PA and only one female participant would not have been cleared for PA so a T-test was not performed

After performing the analysis on opinion-based cut-point < 150/100 mmHg, the bivariate analysis could not be performed. Only one female participant would not have been cleared for moderate-to-vigorous-to-maximal intensity PA participation and all male participants would have been cleared for PA participation.

Table 10f: Bivariate analysis of cohorts with participants who were on medication and with all exercise protocols combined as a whole and stratified based on exercise clearance when applying hypothetical BP cut-point less than 160/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for PA participation. Participants who had a resting BP of less than 160 mmHg systolic and/or less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity PA.

	Applying a Hypothetical Clearance BP Cut-Point of < 160/94 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	45.9 ± 11.6 (n= 20)	49.5 ± 6.4 (n= 2)	0.67
Male	45.2 ± 10.0 (n= 13)	54.0 (n= 1)	N/A
Female	47.0 ± 14.9 (n= 7)	45.0 (n= 1)	N/A
Sex (% of population)			
Male	65.0	50.0	
Female	35.0	50.0	
Body Mass (kg)	88.4 ± 20.4	100.7 ± 1.3	0.42
Male	92.6 ± 19.6	101.6	N/A
Female	80.7 ± 21.0	99.7	N/A
Height (cm)	170.4 ± 9.5	171.3 ± 17.3	0.91
Male	174.2 ± 8.7	183.5	N/A
Female	163.3 ± 6.5	159.0	N/A
BMI (kg/m^2)	30.4 ± 6.4	34.8 ± 6.6	0.69
Male	30.6 ± 7.0	30.2	N/A
Female	29.9 ± 5.6	39.4	N/A
Average Resting SBP (mmHg)	121.9 ± 12.8	149.0 ± 22.6	***p*< 0.05**
Male	125.1 ± 13.2	133.0	N/A
Female	115.9 ± 10.3	165.0	N/A
Average Resting DBP (mmHg)	77.3 ± 7.0	97.0 ± 2.8	***p*< 0.01**
Male	77.6 ± 6.9	95.0	N/A
Female	76.7 ± 7.6	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 18	31.1 ± 9.2 (n= 16)	24.2 ± 9.0 (n= 2)	0.33
Male (n= 10)	35.6 ± 8.6 (n= 9)	30.6 (n= 1)	N/A
Female (n= 8)	25.5 ± 6.8 (n= 7)	17.8 (n= 1)	N/A
Time to Complete Circuit (sec); n= 4	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Male (n= 4)	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Female (n= 0)	N/A* (n= 0)	N/A* (n= 0)	N/A* (n= 0)

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A only one male and one female participant would not have been cleared for PA so a T-test was not performed
N/A* no female participants completed the circuit

The results from the bivariate analysis of hypothetical BP cut-point < 160/94 determined that when comparing the overall group based on those would not have been cleared for PA versus those who would have been cleared, individuals who would not have been cleared had significantly higher SBP (149.0 ± 22.6 mmHg, $p < 0.05$), and higher DBP (97.0 ± 2.8 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. Only one male and one female participant would not have been cleared for PA participation so an analysis could not be performed with the participants separated by sex. All participants who completed the time-based circuit would have been cleared for PA participation so an analysis was not performed on that variable.

Table 10g: Bivariate analysis of cohorts with participants who were on medication and with all exercise protocols combined as a whole and stratified based on exercise clearance when applying hypothetical BP cut-point less than 160/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for PA participation. Participants who had a resting BP of less than 160 mmHg systolic and/or less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity PA.

	Applying a Hypothetical Clearance BP Cut-Point of < 160/100 mmHg		
	Would Have Been Cleared	Would not Have Been Cleared	*P* value*
Age (years)	46.2 ± 11.4 (n= 21)	45.0 (n= 1)	N/A
Male	45.9 ± 9.9 (n= 14)	N/A (n= 0)	N/A
Female	47.0 ± 14.9 (n= 7)	45.0 (n= 1)	N/A
Sex (% of population)			
Male	66.7	0.0	
Female	33.3	100.0	
Body Mass (kg)	89.0 ± 20.1	99.7	N/A
Male	93.2 ± 19.0	N/A	N/A
Female	80.7 ± 21.0	99.7	N/A
Height (cm)	171.0 ± 9.7	159.0	N/A
Male	174.9 ± 8.7	N/A	N/A
Female	163.3 ± 6.5	159.0	N/A
BMI (kg/m^2)	30.4 ± 6.2	39.4	N/A
Male	30.6 ± 6.7	N/A	N/A
Female	29.9 ± 5.6	39.4	N/A
Average Resting SBP (mmHg)	122.4 ± 12.7	165.0	N/A
Male	125.6 ± 12.9	N/A	N/A
Female	115.9 ± 10.3	165.0	N/A
Average Resting DBP (mmHg)	78.1 ± 7.8	99.0	N/A
Male	78.9 ± 8.1	N/A	N/A
Female	76.7 ± 7.6	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$); n= 18	31.1 ± 8.9 (n= 17)	17.8 (n= 1)	N/A
Male (n= 10)	35.1 ± 8.3 (n= 10)	N/A (n= 0)	N/A
Female (n= 8)	25.5 ± 6.8 (n= 7)	17.8 (n= 1)	N/A
Time to Complete Circuit (sec); n= 4	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Male (n= 4)	596.8 ± 65.8 (n= 4)	N/A (n= 0)	N/A
Female (n= 0)	N/A (n= 0)	N/A (n= 0)	N/A (n= 0)

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A all male participants would have been cleared for PA and only one female participant would not have been cleared for PA so a T-test was not performed

After performing the analysis on hypothetical cut-point < 160/100 mmHg, the bivariate analysis could not be performed. Only one female participant would not have been cleared for moderate-to-vigorous-to-maximal intensity PA participation and all male participants would have been cleared for PA participation.

The results for the sub-group that was using medication of the logistic regression analysis are presented in Table 11. A separate logistic regression was completed for each individual opinion-based BP cut-point and hypothetical BP cut-point compared to the evidence-based cut-point < 160/90 mmHg. Three separate regression models were conducted: 1) model 1 adjusted for age, sex, BMI and VO_2 max, 2) model 2 adjusted for age, sex, BMI and circuit time, and 3) model 3 with no adjustment for covariates. This analysis was conducted similarly to the previous regression analysis on the group as a whole, with model 1 completed on participants who underwent a VO_2 max assessment and model 2 conducted on participants who complete the moderate-to-vigorous-to-maximal intensity time-based circuit comprised of functional physically demanding task exercises.

Table 11: Logistic regression analysis of all participants who were on medication with all exercise protocols combined. Regression analysis is comparing exercise clearance when using evidence-based blood pressure cut-point less than 160/90 mmHg in comparison to different opinion-based blood pressure cut-points and hypothetical blood pressure cut-points that could be applied by agencies and organizations for pre-participation screening of applicants and incumbents in physically demanding public safety occupations, and pre-participation screening of physical activity participation in the health, wellness and fitness industry.

	Model 1 (adjusted)[1]		Model 2 (adjusted)[2]		Model 3 (not adjusted)[3]	
	Would be Cleared for Exercise		Would be Cleared for Exercise		Would be Cleared for Exercise	
	OR	*P* value	OR	*P* value	OR	*P* value
Applying Cut-Point < 130/80 mmHg	0.000	0.995	N/A	N/A	0.000	0.995
Applying Cut-Point < 140/90 mmHg	0.000	0.998	N/A	N/A	0.000	0.998
Applying Cut-Point < 144/90 mmHg	N/A	N/A	N/A	N/A	N/A	N/A
Applying Cut-Point < 144/94 mmHg	N/A	N/A	N/A	N/A	N/A	N/A
Applying Cut-Point < 150/100 mmHg	0.000	0.996	N/A	N/A	0.000	1.000
Applying Cut-Point < 160/94 mmHg	N/A	N/A	N/A	N/A	N/A	N/A
Applying Cut-Point < 160/100 mmHg	0.000	0.996	N/A	N/A	0.000	1.000

Odds ratio (OR) is expressed as odds of being cleared for exercise
N/A group size was not large enough to complete analysis

[1] Model 1 adjusted for covariates of age, sex, BMI (Body mass index) and VO_2 Max (Maximum volume of oxygen consumed)

[2] Model 2 adjusted for covariates of age, sex, BMI (Body mass index) and circuit time

[3] Model 3 not adjusted for covariates

The logistic regression analysis did not determine any significant results. When completing the analysis for model 2 (adjusted for age, sex, BMI and circuit time), the logistic regression could not be completed as there was too small a sample size. When conducting mode 1 (adjusted for age, sex, BMI and VO_2 max) and model 3 (not adjusted for covariates) the analysis could not be completed for cut-points < 144/90 mmHg, < 144/94 mmHg, and < 160/94 mmHg as there was not a large enough sample size.

5.4 Summary of Data Analysis for All Cohorts and Exercise Protocols Combined

An overall summary table comparing the percent of participants cleared across all exercise protocols with both cohorts combined is presented in Table 12. All participants are combined and the percent of participants who would be considered cleared for exercise when applying opinion-based cut-points (< 130/80 mmHg, < 140/90mmHg, < 144/90 mmHg, < 144/94mmHg and < 150/100mmHg), evidence-based cut-point (< 160/90 mmHg), and hypothetical cut-points (< 160/94 mmHg and < 160/100 mmHg) are presented in the table.

Table 12: Percent Cleared for Participation in Moderate-to-Vigorous-to-Maximal Intensity Protocols Applying all Opinion-Based, Evidence-Based and Hypothetical Cut-points with Both Participant Cohorts Combined (Total population n= 1670). Hypothetical blood pressure cut-points are shown in italics.

	Applying a Clearance BP Cut-Point of:							
	Existing Cut-Points						*Hypothetical Cut-Points*	
	< 130/80 mmHg†	< 140/90 mmHg†	< 144/90 mmHg†	< 144/94 mmHg†	< 150/100 mmHg†	< 160/90 mmHg††	*< 160/94 mmHg*	*< 160/100 mmHg*
	Would Have Been Cleared for PA						*Would Have Been Cleared for PA*	
	(n= 1425)	(n= 1559)	(n= 1579)	(n= 1609)	(n= 1646)	(n= 1596)	*(n= 1633)*	*(n= 1661)*
Cleared for PA (% of total)	85.3	93.4	94.6	96.3	98.6	95.6	*97.8*	*99.5*
Sex (% of sex cleared)								
Male (n= 1500)	84.9 (n= 1273)	93.2 (n= 1398)	94.5 (n= 1417)	96.5 (n= 1447)	98.7 (n= 1480)	95.5 (n= 1433)	*97.9 (n= 1468)*	*99.5 (n= 1492)*
Female (n= 170)	89.4 (n= 152)	94.1 (n= 160)	95.3 (n= 162)	95.3 (n= 162)	97.6 (n= 166)	95.9 (n= 163)	*97.1 (n= 165)*	*99.4 (n= 169)*
On Medication; n= 22 (% of cleared on medication)								
Total (% of on medication)	50.0 (n= 11)	81.8 (n= 18)	90.9 (n= 20)	90.9 (n= 20)	95.5 (n= 21)	90.9 (n= 20)	*90.9 (n= 20)*	*95.5 (n= 21)*
Male (n= 14)	50.0 (n= 7)	78.6 (n= 11)	92.9 (n= 13)	92.9 (n= 13)	100.0 (n= 14)	92.6 (n= 13)	*92.6 (n= 13)*	*100.0 (n= 14)*
Female (n= 8)	50.0 (n= 4)	87.5 (n= 7)	87.5 (n= 7)	87.5 (n= 7)	87.5 (n= 7)	87.5 (n= 7)	*87.5 (n= 7)*	*87.5 (n= 7)*
Male (% of cleared population)								
Underweight or Normal Weight* (n= 486)	92.6 (n= 450)	97.1 (n= 472)	97.3 (n= 473)	98.4 (n= 478)	99.4 (n= 483)	97.7 (n= 475)	*99.0 (n= 481)*	*99.6 (n= 484)*
Overweight** (n= 784)	84.6 (n= 663)	93.6 (n= 734)	94.8 (n= 743)	96.4 (n= 756)	98.9 (n= 775)	96.3 (n= 755)	*98.0 (n= 768)*	*99.4 (n= 779)*
Obese*** (n= 230)	69.6 (n= 160)	83.5 (n= 192)	87.4 (n= 201)	92.6 (n= 213)	96.5 (n= 222)	88.3 (n= 203)	*94.8 (n= 218)*	*98.3 (n= 226)*
Female (% of cleared population)								
Underweight or Normal Weight* (n= 90)	93.3 (n= 84)	95.6 (n= 86)	95.6 (n= 86)	95.6 (n= 86)	97.8 (n= 88)	95.6 (n= 86)	*97.8 (n= 88)*	*100.0 (n= 90)*
Overweight** (n= 57)	91.2 (n= 52)	93.0 (n= 53)	94.7 (n= 54)	94.7 (n= 54)	98.2 (n= 56)	96.5 (n= 55)	*96.5 (n= 55)*	*100.0 (n= 57)*
Obese*** (n= 23)	69.6 (n= 16)	91.3 (n= 21)	95.7 (n= 22)	95.7 (n= 22)	95.7 (n= 22)	95.7 (n= 22)	*95.7 (n= 22)*	*95.7 (n= 22)*

BMI (body mass index); BP (blood pressure); SBP (systolic blood pressure); DBP (diastolic blood pressure); PA (physical activity)

† Opinion-Based Cut-Point

†† Evidence Based Cut-Point

* BMI < 25.0 kg/m²

** BMI ≥ 25.0 < 30.0 kg/m²

*** BMI > 30.0 kg/m²

When examining Table 12, the opinion-based BP cut-point <130/80 mmHg has the lowest percentage of individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity progressive exercise with 85.3% of individuals who would not have been cleared followed by < 140/90 mmHg, < 144/90 mmHg, <160/90 mmHg (evidence-based), < 144/94 mmHg, < 160/94 mmHg (hypothetical), < 150/100 mmHg and < 160/100 mmHg (hypothetical) with the highest percentage of individuals who would have been cleared (99.5%). When looking at participants who were on medication (n= 22), the most conservative opinion-based BP cut-point < 130/80 mmHg had the lowest percentage of participants who would have been cleared with 50% of individuals on medication who would have been cleared for moderate-to-vigorous-to-maximal intensity progressive PA participation, BP cut-point < 150/90 mmHg and hypothetical cut-point < 160/100 mmHg had the highest percentage who would have been cleared (95.5%).

When examining weight classifications, across all BP cut-points the weight classification that had the least percentage of cleared individuals was the obese category that encompasses obese class I, II and III, followed by the overweight category and with the underweight and normal weight combined category typically with the highest percentage of individuals cleared for PA. This is evident for both males and females.

6.0 DISCUSSION AND IMPLICATIONS

The primary purpose of this study was to determine the impact of applying opinion-based BP cut-points to determine PA participation clearance for moderate-to-vigorous-to-maximal intensity PA compared to the evidence-based BP cut-point of 160/90 mmHg. Secondary objectives of the study were to determine the age, aerobic fitness (VO_2 max), and BMI of those individuals who would be screened out of participating in moderate-to-vigorous-to-maximal intensity PA participation based on opinion-based pre-PA participation BP cut-points versus an evidence-based cut-point. We hypothesized that individuals who are older, have lower aerobic fitness, and/or high BMI, would be screened out to a greater extent from participating in moderate-to-vigorous-to-maximal intensity PA.

The results from this study support the hypotheses and indicate that individuals who had BP readings equal to or above the BP cut-points are generally older, less aerobically fit, and had a higher BMI than individuals who were below the cut-points. As previous research has determined that BP increases with age, it is not surprising to find that individuals who were above the BP cut-points were older than those below (Cheng, Xanthakis, Sullivan, & Vasan, 2012; Del Giudice et al., 2010; Pinto, 2007). BP readings that are above the BP cut-points would restrict these individuals from participating in moderate-to-vigorous-to-maximal intensity PA when PA participation could positively benefit older adults and help them to preserve independence and functional capacity as a result of age-related or disease-related decline (Chodzko-Zajko et al., 2009).

Our findings indicate that those above each cut-point also had significantly lower aerobic fitness and is in line with research that has determined a relationship between aerobic fitness and resting BP (Cornelissen & Fagard, 2005). These individuals would have been restricted from participation in moderate-to-vigorous-to-maximal intensity PA when PA participation could help to positively improve their health through increasing aerobic fitness. Aerobic fitness training has been found to lower both resting BP and exercise BP and may help to attenuate the progression from pre-hypertension to hypertension (Cornelissen & Fagard, 2005; Kokkinos, 2014). Researchers from the Aerobics Center Longitudinal Study also reported similar results. This prospective study determined that aerobic fitness is inversely related to BP and that individuals with higher aerobic fitness had lower BP (Liu et al., 2014). The researchers also compared the

effect of aerobic fitness on the age-related BP increases and found significant differences for SBP, but not for DBP. As a result, the researchers concluded that aerobic fitness positively influences the increases in SBP due to age and may help to attenuate this increase (Liu et al., 2014).

Our analysis also found that those above each cut-point had significantly higher BMI. Previous researchers have determined a positive relationship between BMI and resting BP; as BMI increases, it is likely that BP will also increase (Drøyvold et al., 2005; Dua et al., 2014). In the present study, individuals with higher BMI would have been screened out to a larger extent from participation in moderate-to-vigorous-to-maximal intensity PA particularly when more conservative BP cut-points were applied. Table 12 indicates that a lower percentage of overweight or obese individuals would have been cleared for moderate-to-vigorous-to-maximal PA participation when using more conservative BP cut-points, however, PA participation could positively benefit individuals with higher BMI by not only assisting with weight management, but with BP management or hypertension prevention.

As previously noted, when comparing the BP values of the study participants to the Canadian population data from the CHMS, the average BP values of the participants in the present study (SBP 117.4 ± 11.5 mmHg, DBP 73.3 ± 8.9 mmHg) are comparable and as a result representative of the Canadian population (SBP 113 mmHg, DBP 72 mmHg) (Statistics Canada. Health Statistics Division, 2016). The participants from this study and the participants from the CHMS had BP measurements that would place them into the normal BP category. In the same way as our findings, the CHMS also found that average resting BP increases significantly with age, with those in the highest age category (70 to 79 years; males= SBP 123 mmHg, DBP 70 mmHg, females = SBP 128 mmHg, DBP 70 mmHg) measuring with the highest BP compared to those in the lowest age category (20 to 29 years; males= SBP 107 mmHg, DBP 69 mmHg, females= SBP 101 mmHg, DBP 66 mmHg) (Statistics Canada. Health Statistics Division, 2016). While the present study did not determine BP values by age category, it was determined that those with higher BP who were above the exercise clearance BP cut-points were significantly older. This survey also determined that individuals who were overweight or obese had an increased likelihood of being hypertensive when compared to normal weight individuals (Statistics Canada. Health Statistics Division, 2016).

In the present study, the individuals who were above the BP cut-points would likely be screened out of moderate-to-vigorous-to-maximal intensity PA participation in most fitness facilities or clinical settings. However, these older individuals would likely have derived the most benefit from PA participation as BP increases with age (Pinto, 2007). Older individuals in general are less likely to participate in PA, and if they are required to undergo additional medical clearance if they are above a specific BP cut-point this could negatively impact their participation to a greater extent (Chodzko-Zajko et al., 2009). With increasing age, there is also a decrease in overall PA participation and a corresponding increase in chronic disease and negative health outcomes (Colley et al., 2011). Habitual PA as a modifiable lifestyle factor would help to manage chronic disease and improve health and quality of life. In addition, habitual PA participation is an essential intervention for improving low aerobic fitness, and managing high BP and high BMI that are characteristic of increasing age.

The logistic regression analysis determined an association between exercise clearance using BP cut-point 160/90 mmHg and the BP cut-points 144/94 mmHg and 150/100 mmHg. When using evidence-based cut-point 160/90 mmHg to determine overall exercise clearance, not being cleared when using opinion-based cut-point 144/94 mmHg and 150/100 mmHg as predictors of exercise clearance would result in almost 100% certainty of being restricted from PA participation. That is, the individuals who were above these opinion-based cut-points would have been restricted from moderate-to-vigorous-to-maximal intensity PA intensity participation almost every time. When applying these cut-points, individuals would have to undergo additional screening in order to be able to participate in moderate-to-vigorous-to- maximal intensity PA. These findings were also determined to be maintained when adjusting the model for age, sex, BMI and VO_2 max. The majority of the BP cut-points did not determine significant results for the logistic regression analysis and this could be in part due to the low number of individuals who were above each BP cut-point. Certain BP cut-points also could not be analysed using the regression analysis due to having no individuals or a low number of individuals who were above each BP cut-point. The model 2 analysis that was adjusted for the covariates age, sex, BMI and circuit time did not determine any significant results and for some BP cut-points could not be completed due to the low number of individuals above each cut-point. This model was conducted specifically on participants who completed the moderate-to-vigorous-to-maximal intensity time-based circuit comprised of functional physically demanding task exercises with no treadmill

exercise. As there was a lower number of participants who were in this exercise protocol, there was a corresponding lower number of participants who were above each BP cut-point. This low number of participants could have influenced the results of the logistic regression analysis and could be the cause of not finding significance.

If the opinion-based conservative BP cut-points continue to be used, many individuals who are above these cut-points would be restricted from participation in moderate-to-vigorous-to-maximal intensity exercise. While lower intensity exercise does still have many benefits, there are numerous benefits that can only be achieved from participation in higher PA intensities. Research by Eicher et al. (2010) challenged the belief that low intensity exercise and vigorous or high intensity exercise would have equal BP lowering effects. The researchers found that vigorous intensity exercise in fact had the greatest impact on lowering BP post exercise. The researchers also state that their findings are in line with the growing literature underscoring evidence to greater benefits from habitual vigorous activity when compared to low or moderate intensity exercise (Eicher et al., 2010). Other researchers have determined similar results and found that high-intensity interval training provided a better method of PA intervention to reduce ambulatory BP when compared to moderate intensity continuous PA (Ramirez-Jimenez, Morales-Palomo, Pallares, Mora-Rodriguez, & Ortega, 2017). This finding applied to the hypertensive group alone, while ambulatory BP found no difference among the normotensive group (Ramirez-Jimenez et al., 2017). Based on these findings, it would be beneficial for individuals with higher BP (diagnosed or undiagnosed) or a family history of hypertension to regularly participate in vigorous intensity exercise as the benefits are much greater. However, these individuals are often recommended to refrain from vigorous intensity exercise. That is, when using more conservative pre-participation screening exercise BP cut-points these individuals would be restricted from participating in the exercise that would help them the most.

The cut-point chosen for comparison in the analysis is the evidence-based cut-point of 160/90 mmHg, which corresponds to the onset of Stage II hypertension. Individuals whose BP is equal to or greater than 160/90 mmHg may require further screening from their physician before participating in moderate-to-vigorous-to-maximal intensity exercise as their BP is at a higher starting point and they may have other co-morbidities that could exacerbate their BP response to exercise. Performing higher intensity exercise for individuals with Stage II hypertension may be more challenging, as many of these individuals could be taking medications for hypertension or

co-morbidities that could affect their exercise session. As part of the treatment for Stage II, it is recommended that people who are within this category begin medication (Durstine et al., 2003). While it is acknowledged that individuals with Stage II hypertension may encounter more challenges during exercise participation, the lower (more conservative) opinion-based cut-points that are used to determine exercise clearance would also exclude individuals who are within the Stage I hypertension category (> 140 < 160/90 mmHg) from PA participation, who would otherwise benefit from participation in moderate-to-vigorous-to-maximal intensity PA.

While it remains prudent to measure pre-participation BP for individuals wanting to engage in PA participation, the opinion-based BP cut-points used by various agencies may preclude more individuals from engaging in moderate-to-vigorous-to-maximal intensity exercise when compared to the evidence-based cut-point of < 160/90 mmHg. Participation in PA has been determined to be an important method for the prevention and treatment of hypertension (Ghadieh & Saab, 2015; Padilla, Wallace, & Park, 2005; Pescatello, 2005). If these opinion-based BP cut-points continue to be used, they could create a barrier for hypertensive individuals wanting to commence a PA program or increase their PA participation when in fact participation in these programs would provide a critical avenue to reduce BP. While these cut-points would screen out mostly hypertensive individuals from higher intensity PA, individuals who are normotensive could also be screened out as well if their BP at the time of measurement was equal to or above the specific cut-point when they have no evidence of cardiovascular disease.

In Canada, the prevalence of hypertension continues to increase and as such PA participation interventions provide an important method to decrease BP and mitigate the associated health care costs (Padwal, Bienek, McAlister, & Campbell, 2016). Recommendations from the CHEP for the management and treatment of hypertension recommend PA participation to prevent and manage hypertension, particularly to decrease the likelihood of a normotensive individual progressing to the hypertensive category (Dasgupta et al., 2014).

When completing the statistical analysis of data, two hypothetical BP cut-points were added for comparison (< 160/94 mmHg and < 160/100 mmHg). It is important to re-state that when the BP of a participant was above the 160/90 cut-point, in all cases, they were further screened by a qualified exercise professional with advanced specialized training and/or a physician and all were subsequently cleared for moderate-to-vigorous-to-maximal intensity PA participation. Therefore, it was possible to also examine some additional “hypothetical” and

therefore more liberal BP cut points. As shown previously in Table 12, the majority of the opinion-based BP cut-points would screen out of moderate-to-vigorous-to-maximal intensity PA participation a higher percentage of individuals as compared to the evidence-based BP cut-point (< 160/90 mmHg). However, when comparing the evidence-based BP cut-point to the two hypothetical BP cut-points, the hypothetical cut-points had a higher percentage of individuals who would have been cleared for moderate-to-vigorous-to-maximal PA participation. When observing the data for the study population as a whole, BP cut-point < 160/100 mmHg had the highest percentage of individuals who would be cleared for moderate-to-vigorous-to-maximal intensity PA participation (99.5%), with opinion-based BP cut-point < 150/100 mmHg second (98.6%), and hypothetical BP cut-point < 160/94 mmHg third (97.8%). The evidence-based BP cut-point 160/90 mmHg had the fifth highest percentage of participants who would have been cleared for moderate-to-vigorous-to-maximal PA participation (95.6%). As a result, it may be useful to consider using a higher BP cut-point to determine pre-PA participation clearance such as < 160/94 mmHg. While hypothetical BP cut-point < 160/100 mmHg would clear more individuals for PA participation, the DBP for this cut-point is much higher and could be more concerning when prescribing vigorous-to-maximal PA to an individual. When using < 160/94 mmHg as an acute measurement for determining PA participation clearance the DBP cut-point is well within the Stage I hypertension classification, while a DBP of 100 mmHg would be at the lower end of Stage II hypertension. As DBP is the pressure during relaxation of the ventricles when the heart is filling with blood, it is more concerning the higher the DBP value (Powers & Howley, 2009). DBP is an indicator of the effectiveness of blood flow through the periphery, if DBP is higher, the heart must work harder to provide blood to the body. If an individuals' BP is elevated, the ventricle must generate more pressure to eject blood and overcome the additional resistance, what is known as afterload (Sherwood & Kell, 2010). When considering using a higher BP cut-point, this may be an important consideration and result in using < 160/94 mmHg compared to < 160/100 mmHg.

7.0 STRENGTHS, LIMITATIONS AND CONCLUSIONS

7.1 Strengths and Limitations

To our knowledge, this was the first study to compare exercise clearance rates using the various opinion-based recommended BP cut-points used for pre-participation screening for moderate-to-vigorous-to-maximal intensity PA. The strengths of this study include the large sample size of participants. This sample also included individuals of various ages, including those in middle age and participants of varying degrees of aerobic fitness and PA participation levels whose BP profile was similar to the BP profile of the Canadian population.

Another strength of this study was that all participants underwent moderate-to-vigorous-to-maximal intensity PA participation regardless of resting BP. Individuals were not restricted from the study based on their pre-exercise BP. All participants who came through the laboratory performed the test regardless of their BP reading after clearance by an exercise specialist or by a physician. Some individuals had BP readings that may have precluded them from PA participation test in a different setting. Once again, it is important to emphasize that there were no adverse events during or after the exercise sessions.

A limitation of this study is the effect of white coat hypertension on a participant's BP. While the effects were potentially minimized through the use of an automated BP monitor and an average measurement of the readings, there is still the possibility that some participants' BP was artificially high due to the fact that it was tested in a laboratory setting. This BP reading was also taken in the morning for the majority of participants which may lead to different results if it were to be tested at a different time of day.

Another limitation of this study is that there was a small number of participants who were above the BP cut-points with a much higher proportion of participants measuring below all cut-points. If the number of participants above each BP cut-point had been higher, this could have produced different results for the statistical analyses. The study population was also predominantly male with fewer female participants.

The PA questionnaire that a sub-set of participants completed consisted of self-reported PA participation information which is a limitation. When using self-reported data there is the

potential for bias as the questions are subjective and not the result of objective measurements. The questionnaire also did not include any questions regarding participants' diet.

Many of the study participants attended our laboratory as part of a physical fitness assessment for physically demanding occupations. This is a potential limitation, as many of these participants were likely engaging in training for their fitness screening for physically demanding occupations and may have had higher fitness as a result of additional training.

7.2 Conclusions

As this was the first study to compare the impact of applying different BP cut-points on clearance rates for moderate-to-vigorous-to-maximal intensity PA participation, the results from this research could help to contribute to the existing knowledge on pre-participation screening practices for exercise clearance, specifically for resting BP. This research provides a better understanding of which BP cut-point is the most appropriate to use with the general population to reduce the number of people being restricted from engaging in PA. From the results of the present study, there is further evidence to adopt the evidence-based BP cut-point of 160/90 mmHg into the pre-PA participation screening procedure and there is evidence to consider using an even higher BP cut-point (hypothetical BP cut-point < 160/94 mmHg). The DBP of 94 mmHg is within the Stage I hypertension classification. Previous research by Thomas et al. (2011) indicates that there is limited evidence to suggest an increased risk of an adverse event in those with hypertension, the researchers also determined strong evidence for the benefits of exercise in those with hypertension including Stage I hypertension. This DBP value is also well below the cautionary value that Thomas et al. (2011) indicates as greater than or equal to 110 mmHg. Based on the data from our study that engaged all participants in moderate-to-vigorous-to-maximal intensity PA regardless of BP, there does not seem to be any indication of a higher risk associated with increasing the DBP cut-point to 94 mmHg in the pre-PA participation screening procedure. The adoption of the evidence-based BP cut-point of 160/90 mmHg or the hypothetical BP cut-point of 160/94 mmHg could reduce the barrier commonly encountered when the more conservative opinion-based BP cut-points are applied. In addition, the results determined that the more conservative BP cut-points screened out a greater portion of those persons who are at risk for hypertension due to increased age, low aerobic fitness and/or high BMI, when these individuals would likely benefit the most from habitual PA participation. In practice, applying

the more conservative BP cut-points creates a barrier for many individuals to engage in moderate-to-vigorous-to-maximal PA in community centres and fitness facilities at which there are not likely to be exercise specialists or physicians to provide follow-up clearance. As well, for applicants and incumbents in emergency related physically demanding occupations (structural firefighters, wildland firefighters, paramedics, police, correctional officers, emergency nuclear personnel etc.) who are required to have their BP measured during the job application process or annual fitness evaluation, the more conservative BP cut-points used by many agencies create a significant and unnecessary operational barrier.

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9.0 APPENDICES

Appendix A: Recruitment Poster

BLOOD PRESSURE AND EXERCISE

Interested in having your BLOOD PRESSURE and AEROBIC FITNESS measured?

Participate in research in the Human Performance Laboratory in Bethune College!

We are looking for participants (including those with high blood pressure) who are not heavy exercisers between 40 to 60 years of age.

You will be required to come in for 1 visit (60-90 minutes) where you will have your resting, exercise and post-exercise blood pressure , heart rate and oxygen consumption measured during a moderate-to-vigorous-to-maximal intensity exercise session on a treadmill.

For more information, contact Elizabeth Yee:

Appendix B: Informed Consent form and Ethics Approval

Informed Consent Form

Date: November 20 2016

Study Name: The Impact of Applying Different Pre-Screening Exercise Blood Pressure Cut-Points for Physical Activity Participation Clearance

Researchers:

Researcher name: Elizabeth Yee, Masters Candidate, Graduate Program in Kinesiology and Health Science

Researcher name: Dr. Veronica Jamnik, Associate Professor, Kinesiology and Health Science, York University,

Purpose of the Research: 1) To determine the impact on exercise clearance rates of currently recommended opinion-based BP cut-points (130/80 mmHg, 140/90 mmHg, 144/94 mmHg, 150/100 mmHg) when using the recently recommended evidence-base BP cut-point of 160/90 mmHg as the referent and 2) to determine the aerobic fitness/ maximal oxygen consumption (VO2max) and (BMI) of those individuals who could be screened out of participating in moderate-to vigorous-to-maximal intensity PA based on various organization-recommended opinion-based BP cut-points.

What You Will Be Asked to Do in the Research: You will come to the Human Performance Laboratory (Rooms 120 & 126 Bethune College) one time for 60-90 minutes. You will be required to fill out the Physical Activity Readiness Questionnaire (PAR-Q+ 2016) and associated online ePARmed-X+ if necessary to pre-screen for unrestricted progressive exercise participation. After completing these tools, you will have your blood pressure measured using an automated blood pressure monitor (BpTRU machine). You will also have your height and body mass measured after which you will undergo a light-to-moderate-to-vigorous-to-maximum intensity exercise session on a treadmill. These incremental exercise intensities are similar to those you would encounter while participating in a fitness class or while walking slowly or walking purposefully or while jogging or shoveling snow or raking leaves or mowing the lawn using a push mower.

During the light-to-moderate-to-vigorous-to-maximum intensity exercise on the treadmill, you will be wearing nose plugs and a mouthpiece attached to a tube to collect their expired air, which will then be analyzed for the determination of oxygen consumption. During the exercise component, you will be directed to walk/jog/run for as long as you can, with the treadmill speed then the treadmill grade/elevation increasing every 2 minutes. Heart rate, blood pressure and subjective rating of perceived exercise will also be monitored throughout the incremental to maximal effort exercise session. The qualified exercise physiologist will encourage you to continue until you reach your VO2 max, but you are free to voluntarily choose to terminate the test at any time (VO2peak). Following completion of the treadmill component, you will go through an active cool down period on the treadmill. Your post-exercise heart rate and blood pressure will also be monitored.

Risks and Discomforts: Being physically active can have risks, especially to those who are not regularly active. The risks of an incremental-to-maximum effort aerobic fitness test include abnormal heart beat or blood pressure, muscle cramps, potential muscle strain or injury, muscle soreness persisting a few days, light headedness, fatigue and in very rare instances, heart attack. These risks are minimized through pre-screening using the PAR-Q+ form, ePARmed-X+ form and assessment by a qualified exercise physiologist. In addition, providing an adequate warm-up and cool-down period during the exercise session will decrease any risks. If at any time you wish to stop the aerobic test, you may let the testers know and the test will be stopped.

Benefits of the Research and Benefits to You: The findings of this research are expected to provide further evidence to adopt the least conservative evidence-based BP cut-point of 160/90 mmHg in the pre physical activity participation screening procedure. This inclusion will reduce the barrier commonly encountered when the more conservative opinion-based BP cut-points are applied. These findings could help to stop barriers to physical activity participation created by individuals falling above current blood pressure cut- points, when in fact physical activity would be beneficial for these persons. The benefits to you include the opportunity to learn and understand how your blood pressure and heart rate respond to varying exercise intensities and the importance of these responses to an acute bout of

exercise that consists of varying exercise intensities. You will also see how an acute bout of exercise can reduce your blood pressure. As well, you will know what your aerobic fitness status is (VO2max or VO2 peak) along with your peak exercise heart rate. VO2max or VO2peak is considered the single most reliable predictor of cardiovascular morbidity and premature cardiovascular mortality. You will learn what they could do to maintain or improve your aerobic fitness (also known as cardiovascular fitness).

Voluntary Participation: Your participation in the study is voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York University either now, or in the future.

Withdrawal from the Study: You can stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researchers, York University, or any other group associated with this project. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible.

Confidentiality: All information you supply during the research will be held in confidence and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. The data will be collected by hand and then transferred to an electronic format. Your data will be safely stored in a locked facility and only research staff will have access to this information. The data will be stored until the principal investigator retires from the university and will be archived in a locked facility at York University. Confidentiality will be provided to the fullest extent possible by law.

Questions About the Research? If you have any questions about the research in general or about your role in the study, please feel free to contact the researchers Dr. Veronica Jamnik, Associate Professor, Kinesiology and Health Science, York University or Elizabeth Yee, Masters of Science Graduate Student, or the Graduate Program in Kinesiology and Health Science, 341 Norman Bethune College, York University, Telephone: 416-736-5728, Fax: 416-736-5774, Email: kahs@yorku.ca. This research has been reviewed and approved by the Human Participants Review Sub-Committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, York Research Tower, York University (telephone 416-736-5914 or e-mail ore@yorku.ca).

Legal Rights and Signatures:

By signing this consent form I acknowledge my consent to perform a maximal aerobic fitness test consisting of exercising to maximum on a treadmill while breathing through a mouthpiece into a collecting device. I also consent to the tests being conducted by a Qualified Exercise Professional who has been trained to administer this specific assessment protocol. I acknowledge that it is my obligation to immediately inform my fitness tester of any pain, discomfort or other symptoms I experience during or after the test.

I *(fill in your name here)*, consent to participate in Applying Different Pre-Screening Exercise Blood Pressure Cut-Points Through Vigorous to Maximum Aerobic Exercise conducted by Dr. Veronica Jamnik. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature _____ **Date** _____
Participant

Signature _____ **Date** _____
Principal Investigator

YORK UNIVERSITÉ UNIVERSITY
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Memo

To: Veronica Jamnik, PhD, Kinesiology & Health Science

From: Alison M. Collins-Mrakas, Sr. Manager and Policy Advisor, Research Ethics

Issue Date: Tue Jan 31 2017

Expiry Date: Wed Jan 31 2018

RE: The Impact of Applying Different Pre-Screening Exercise Blood Pressure Cut-Points for Physical Activity Participation Clearance
Certificate #: e2017 - 048

I am writing to inform you that the Human Participants Review Sub-Committee has reviewed and approved the above project.

Should you have any questions, please feel free to contact me at: 416-736-5914 or via email at: acollins@yorku.ca.

Yours sincerely,

Alison M. Collins-Mrakas M.Sc., LLM
Sr. Manager and Policy Advisor,
Office of Research Ethics

RESEARCH ETHICS: PROCEDURES to ENSURE ONGOING COMPLIANCE

Upon receipt of an ethics approval certificate, researchers are reminded that they are required to ensure that the following measures are undertaken so as to ensure on-going compliance with Senate and TCPS ethics guidelines:

1. **RENEWALS:** Research Ethics Approval certificates are subject to annual renewal.
   a. Researchers will be reminded by ORE, in advance of certificate expiry, that the certificate must be renewed
      i. Researchers have 2 weeks to comply to a reminder notice;
      ii. If researchers do not respond within 2 weeks, a final reminder will be forwarded. Researchers have one week to respond to the final notice;
   b. **Failure to renew an ethics approval certificate or** (to notify ORE that no further research involving human participants will be undertaken) **may result in suspension of research cost fund and access to research funds may be suspended/withheld** ;

2. **AMENDMENTS:** Amendments must be reviewed and approved **PRIOR** to undertaking/making the proposed amendments to an approved ethics protocol;

3. **END OF PROJECT:** ORE must be notified when a project is complete;

4. **ADVERSE EVENTS:** Adverse events must be reported to ORE as soon as possible;

5. **AUDIT:**
   a. More than minimal risk research may be subject to an audit as per TCPS guidelines;
   b. A spot sample of minimal risk research may be subject to an audit as per TCPS guidelines.

Appendix C: Physical Activity Readiness Questionnaire (2016 & 2017)

2016 PAR-Q+

The Physical Activity Readiness Questionnaire for Everyone

The health benefits of regular physical activity are clear; more people should engage in physical activity every day of the week. Participating in physical activity is very safe for MOST people. This questionnaire will tell you whether it is necessary for you to seek further advice from your doctor OR a qualified exercise professional before becoming more physically active.

GENERAL HEALTH QUESTIONS

Please read the 7 questions below carefully and answer each one honestly: check YES or NO.	YES	NO
1) Has your doctor ever said that you have a heart condition ☐ OR high blood pressure ☐?	☐	☐
2) Do you feel pain in your chest at rest, during your daily activities of living, **OR** when you do physical activity?	☐	☐
3) Do you lose balance because of dizziness **OR** have you lost consciousness in the last 12 months? Please answer **NO** if your dizziness was associated with over-breathing (including during vigorous exercise).	☐	☐
4) Have you ever been diagnosed with another chronic medical condition (other than heart disease or high blood pressure)? **PLEASE LIST CONDITION(S) HERE:** _____	☐	☐
5) Are you currently taking prescribed medications for a chronic medical condition? **PLEASE LIST CONDITION(S) AND MEDICATIONS HERE:** _____	☐	☐
6) Do you currently have (or have had within the past 12 months) a bone, joint, or soft tissue (muscle, ligament, or tendon) problem that could be made worse by becoming more physically active? Please answer **NO** if you had a problem in the past, but it ***does not limit your current ability*** to be physically active. **PLEASE LIST CONDITION(S) HERE:** _____	☐	☐
7) Has your doctor ever said that you should only do medically supervised physical activity?	☐	☐

If you answered NO to all of the questions above, you are cleared for physical activity.
Go to Page 4 to sign the PARTICIPANT DECLARATION. You do not need to complete Pages 2 and 3.

- Start becoming much more physically active – start slowly and build up gradually.
- Follow International Physical Activity Guidelines for your age (www.who.int/dietphysicalactivity/en/).
- You may take part in a health and fitness appraisal.
- If you are over the age of 45 yr and **NOT** accustomed to regular vigorous to maximal effort exercise, consult a qualified exercise professional before engaging in this intensity of exercise.
- If you have any further questions, contact a qualified exercise professional.

If you answered YES to one or more of the questions above, COMPLETE PAGES 2 AND 3.

Delay becoming more active if:

- You have a temporary illness such as a cold or fever; it is best to wait until you feel better.
- You are pregnant - talk to your health care practitioner, your physician, a qualified exercise professional, and/or complete the ePARmed-X+ at **www.eparmedx.com** before becoming more physically active.
- Your health changes - answer the questions on Pages 2 and 3 of this document and/or talk to your doctor or a qualified exercise professional before continuing with any physical activity program.

01-01-2016

2016 PAR-Q+

FOLLOW-UP QUESTIONS ABOUT YOUR MEDICAL CONDITION(S)

1. Do you have Arthritis, Osteoporosis, or Back Problems?

If the above condition(s) is/are present, answer questions 1a-1c — If **NO** ☐ go to question 2

1a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
1b.	Do you have joint problems causing pain, a recent fracture or fracture caused by osteoporosis or cancer, displaced vertebra (e.g., spondylolisthesis), and/or spondylolysis/pars defect (a crack in the bony ring on the back of the spinal column)?	YES ☐ NO ☐
1c.	Have you had steroid injections or taken steroid tablets regularly for more than 3 months?	YES ☐ NO ☐

2. Do you currently have Cancer of any kind?

If the above condition(s) is/are present, answer questions 2a-2b — If **NO** ☐ go to question 3

2a.	Does your cancer diagnosis include any of the following types: lung/bronchogenic, multiple myeloma (cancer of plasma cells), head, and/or neck?	YES ☐ NO ☐
2b.	Are you currently receiving cancer therapy (such as chemotheraphy or radiotherapy)?	YES ☐ NO ☐

3. Do you have a Heart or Cardiovascular Condition? *This includes Coronary Artery Disease, Heart Failure, Diagnosed Abnormality of Heart Rhythm*

If the above condition(s) is/are present, answer questions 3a-3d — If **NO** ☐ go to question 4

3a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
3b.	Do you have an irregular heart beat that requires medical management? (e.g., atrial fibrillation, premature ventricular contraction)	YES ☐ NO ☐
3c.	Do you have chronic heart failure?	YES ☐ NO ☐
3d.	Do you have diagnosed coronary artery (cardiovascular) disease and have not participated in regular physical activity in the last 2 months?	YES ☐ NO ☐

4. Do you have High Blood Pressure?

If the above condition(s) is/are present, answer questions 4a-4b — If **NO** ☐ go to question 5

4a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
4b.	Do you have a resting blood pressure equal to or greater than 160/90 mmHg with or without medication? (Answer **YES** if you do not know your resting blood pressure)	YES ☐ NO ☐

5. Do you have any Metabolic Conditions? *This includes Type 1 Diabetes, Type 2 Diabetes, Pre-Diabetes*

If the above condition(s) is/are present, answer questions 5a-5e — If **NO** ☐ go to question 6

5a.	Do you often have difficulty controlling your blood sugar levels with foods, medications, or other physician-prescribed therapies?	YES ☐ NO ☐
5b.	Do you often suffer from signs and symptoms of low blood sugar (hypoglycemia) following exercise and/or during activities of daily living? Signs of hypoglycemia may include shakiness, nervousness, unusual irritability, abnormal sweating, dizziness or light-headedness, mental confusion, difficulty speaking, weakness, or sleepiness.	YES ☐ NO ☐
5c.	Do you have any signs or symptoms of diabetes complications such as heart or vascular disease and/or complications affecting your eyes, kidneys, **OR** the sensation in your toes and feet?	YES ☐ NO ☐
5d.	Do you have other metabolic conditions (such as current pregnancy-related diabetes, chronic kidney disease, or liver problems)?	YES ☐ NO ☐
5e.	Are you planning to engage in what for you is unusually high (or vigorous) intensity exercise in the near future?	YES ☐ NO ☐

2016 PAR-Q+

6. **Do you have any Mental Health Problems or Learning Difficulties?** *This includes Alzheimer's, Dementia, Depression, Anxiety Disorder, Eating Disorder, Psychotic Disorder, Intellectual Disability, Down Syndrome*

If the above condition(s) is/are present, answer questions 6a-6b — If **NO** ☐ go to question 7

6a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
6b.	Do you have Down Syndrome **AND** back problems affecting nerves or muscles?	YES ☐ NO ☐

7. **Do you have a Respiratory Disease?** *This includes Chronic Obstructive Pulmonary Disease, Asthma, Pulmonary High Blood Pressure*

If the above condition(s) is/are present, answer questions 7a-7d — If **NO** ☐ go to question 8

7a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
7b.	Has your doctor ever said your blood oxygen level is low at rest or during exercise and/or that you require supplemental oxygen therapy?	YES ☐ NO ☐
7c.	If asthmatic, do you currently have symptoms of chest tightness, wheezing, laboured breathing, consistent cough (more than 2 days/week), or have you used your rescue medication more than twice in the last week?	YES ☐ NO ☐
7d.	Has your doctor ever said you have high blood pressure in the blood vessels of your lungs?	YES ☐ NO ☐

8. **Do you have a Spinal Cord Injury?** *This includes Tetraplegia and Paraplegia*

If the above condition(s) is/are present, answer questions 8a-8c — If **NO** ☐ go to question 9

8a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
8b.	Do you commonly exhibit low resting blood pressure significant enough to cause dizziness, light-headedness, and/or fainting?	YES ☐ NO ☐
8c.	Has your physician indicated that you exhibit sudden bouts of high blood pressure (known as Autonomic Dysreflexia)?	YES ☐ NO ☐

9. **Have you had a Stroke?** *This includes Transient Ischemic Attack (TIA) or Cerebrovascular Event*

If the above condition(s) is/are present, answer questions 9a-9c — If **NO** ☐ go to question 10

9a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
9b.	Do you have any impairment in walking or mobility?	YES ☐ NO ☐
9c.	Have you experienced a stroke or impairment in nerves or muscles in the past 6 months?	YES ☐ NO ☐

10. **Do you have any other medical condition not listed above or do you have two or more medical conditions?**

If you have other medical conditions, answer questions 10a-10c — If **NO** ☐ read the Page 4 recommendations

10a.	Have you experienced a blackout, fainted, or lost consciousness as a result of a head injury within the last 12 months **OR** have you had a diagnosed concussion within the last 12 months?	YES ☐ NO ☐
10b.	Do you have a medical condition that is not listed (such as epilepsy, neurological conditions, kidney problems)?	YES ☐ NO ☐
10c.	Do you currently live with two or more medical conditions?	YES ☐ NO ☐

PLEASE LIST YOUR MEDICAL CONDITION(S) AND ANY RELATED MEDICATIONS HERE: _____

GO to Page 4 for recommendations about your current medical condition(s) and sign the PARTICIPANT DECLARATION.

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If you answered NO to all of the follow-up questions about your medical condition, you are ready to become more physically active - sign the PARTICIPANT DECLARATION below:

- It is advised that you consult a qualified exercise professional to help you develop a safe and effective physical activity plan to meet your health needs.
- You are encouraged to start slowly and build up gradually - 20 to 60 minutes of low to moderate intensity exercise, 3-5 days per week including aerobic and muscle strengthening exercises.
- As you progress, you should aim to accumulate 150 minutes or more of moderate intensity physical activity per week.
- If you are over the age of 45 yr and **NOT** accustomed to regular vigorous to maximal effort exercise, consult a qualified exercise professional before engaging in this intensity of exercise.

If you answered **YES** to **one or more of the follow-up questions** about your medical condition:

You should seek further information before becoming more physically active or engaging in a fitness appraisal. You should complete the specially designed online screening and exercise recommendations program - the **ePARmed-X+ at www.eparmedx.com** and/or visit a qualified exercise professional to work through the ePARmed-X+ and for further information.

Delay becoming more active if:

- You have a temporary illness such as a cold or fever; it is best to wait until you feel better.
- You are pregnant - talk to your health care practitioner, your physician, a qualified exercise professional, and/or complete the ePARmed-X+ **at www.eparmedx.com** before becoming more physically active.
- Your health changes - talk to your doctor or qualified exercise professional before continuing with any physical activity program.

- You are encouraged to photocopy the PAR-Q+. You must use the entire questionnaire and NO changes are permitted.
- The authors, the PAR-Q+ Collaboration, partner organizations, and their agents assume no liability for persons who undertake physical activity and/or make use of the PAR-Q+ or ePARmed-X+. If in doubt after completing the questionnaire, consult your doctor prior to physical activity.

PARTICIPANT DECLARATION

- All persons who have completed the PAR-Q+ please read and sign the declaration below.
- If you are less than the legal age required for consent or require the assent of a care provider, your parent, guardian or care provider must also sign this form.

I, the undersigned, have read, understood to my full satisfaction and completed this questionnaire. I acknowledge that this physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if my condition changes. I also acknowledge that a Trustee (such as my employer, community/fitness centre, health care provider, or other designate) may retain a copy of this form for their records. In these instances, the Trustee will be required to adhere to local, national, and international guidelines regarding the storage of personal health information ensuring that the Trustee maintains the privacy of the information and does not misuse or wrongfully disclose such information.

NAME _____ DATE _____

SIGNATURE _____ WITNESS _____

SIGNATURE OF PARENT/GUARDIAN/CARE PROVIDER _____

For more information, please contact
www.eparmedx.com
Email: eparmedx@gmail.com

Citation for PAR-Q+
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Key References
1. Jamnik VK, Warburton DER, Makarski J, McKenzie DC, Shephard RJ, Stone J, and Gledhill N. Enhancing the effectiveness of clearance for physical activity participation: background and overall process. APNM 36(S1):S3-S13, 2011.
2. Warburton DER, Gledhill N, Jamnik VK, Bredin SSD, McKenzie DC, Stone J, Charlesworth S, and Shephard RJ. Evidence-based risk assessment and recommendations for physical activity clearance; Consensus Document. APNM 36(S1):S266-s298, 2011.
3. Chisholm DM, Collis ML, Kulak LL, Davenport W, and Gruber N. Physical activity readiness. British Columbia Medical Journal. 1975;17:375-378.
4. Thomas S, Reading J, and Shephard RJ. Revision of the Physical Activity Readiness Questionnaire (PAR-Q). Canadian Journal of Sport Science 1992;17:4:338-345.

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The Physical Activity Readiness Questionnaire for Everyone

The health benefits of regular physical activity are clear; more people should engage in physical activity every day of the week. Participating in physical activity is very safe for MOST people. This questionnaire will tell you whether it is necessary for you to seek further advice from your doctor OR a qualified exercise professional before becoming more physically active.

GENERAL HEALTH QUESTIONS

Please read the 7 questions below carefully and answer each one honestly: check YES or NO.	**YES**	**NO**
1) Has your doctor ever said that you have a heart condition ☐ OR high blood pressure ☐?	☐	☐
2) Do you feel pain in your chest at rest, during your daily activities of living, **OR** when you do physical activity?	☐	☐
3) Do you lose balance because of dizziness **OR** have you lost consciousness in the last 12 months? Please answer **NO** if your dizziness was associated with over-breathing (including during vigorous exercise).	☐	☐
4) Have you ever been diagnosed with another chronic medical condition (other than heart disease or high blood pressure)? **PLEASE LIST CONDITION(S) HERE:** _____	☐	☐
5) Are you currently taking prescribed medications for a chronic medical condition? **PLEASE LIST CONDITION(S) AND MEDICATIONS HERE:** _____	☐	☐
6) Do you currently have (or have had within the past 12 months) a bone, joint, or soft tissue (muscle, ligament, or tendon) problem that could be made worse by becoming more physically active? Please answer **NO** if you had a problem in the past, but it ***does not limit your current ability*** to be physically active. **PLEASE LIST CONDITION(S) HERE:** _____	☐	☐
7) Has your doctor ever said that you should only do medically supervised physical activity?	☐	☐

If you answered NO to all of the questions above, you are cleared for physical activity.
Go to Page 4 to sign the PARTICIPANT DECLARATION. You do not need to complete Pages 2 and 3.

- Start becoming much more physically active – start slowly and build up gradually.
- Follow International Physical Activity Guidelines for your age (www.who.int/dietphysicalactivity/en/).
- You may take part in a health and fitness appraisal.
- If you are over the age of 45 yr and **NOT** accustomed to regular vigorous to maximal effort exercise, consult a qualified exercise professional before engaging in this intensity of exercise.
- If you have any further questions, contact a qualified exercise professional.

If you answered YES to one or more of the questions above, COMPLETE PAGES 2 AND 3.

Delay becoming more active if:

- You have a temporary illness such as a cold or fever; it is best to wait until you feel better.
- You are pregnant - talk to your health care practitioner, your physician, a qualified exercise professional, and/or complete the ePARmed-X+ at **www.eparmedx.com** before becoming more physically active.
- Your health changes - answer the questions on Pages 2 and 3 of this document and/or talk to your doctor or a qualified exercise professional before continuing with any physical activity program.

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FOLLOW-UP QUESTIONS ABOUT YOUR MEDICAL CONDITION(S)

1. Do you have Arthritis, Osteoporosis, or Back Problems?

If the above condition(s) is/are present, answer questions 1a-1c — If **NO** ☐ go to question 2

1a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
1b.	Do you have joint problems causing pain, a recent fracture or fracture caused by osteoporosis or cancer, displaced vertebra (e.g., spondylolisthesis), and/or spondylolysis/pars defect (a crack in the bony ring on the back of the spinal column)?	YES ☐ NO ☐
1c.	Have you had steroid injections or taken steroid tablets regularly for more than 3 months?	YES ☐ NO ☐

2. Do you currently have Cancer of any kind?

If the above condition(s) is/are present, answer questions 2a-2b — If **NO** ☐ go to question 3

2a.	Does your cancer diagnosis include any of the following types: lung/bronchogenic, multiple myeloma (cancer of plasma cells), head, and/or neck?	YES ☐ NO ☐
2b.	Are you currently receiving cancer therapy (such as chemotheraphy or radiotherapy)?	YES ☐ NO ☐

3. Do you have a Heart or Cardiovascular Condition? *This includes Coronary Artery Disease, Heart Failure, Diagnosed Abnormality of Heart Rhythm*

If the above condition(s) is/are present, answer questions 3a-3d — If **NO** ☐ go to question 4

3a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
3b.	Do you have an irregular heart beat that requires medical management? (e.g., atrial fibrillation, premature ventricular contraction)	YES ☐ NO ☐
3c.	Do you have chronic heart failure?	YES ☐ NO ☐
3d.	Do you have diagnosed coronary artery (cardiovascular) disease and have not participated in regular physical activity in the last 2 months?	YES ☐ NO ☐

4. Do you have High Blood Pressure?

If the above condition(s) is/are present, answer questions 4a-4b — If **NO** ☐ go to question 5

4a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
4b.	Do you have a resting blood pressure equal to or greater than 160/90 mmHg with or without medication? (Answer **YES** if you do not know your resting blood pressure)	YES ☐ NO ☐

5. Do you have any Metabolic Conditions? *This includes Type 1 Diabetes, Type 2 Diabetes, Pre-Diabetes*

If the above condition(s) is/are present, answer questions 5a-5e — If **NO** ☐ go to question 6

5a.	Do you often have difficulty controlling your blood sugar levels with foods, medications, or other physician-prescribed therapies?	YES ☐ NO ☐
5b.	Do you often suffer from signs and symptoms of low blood sugar (hypoglycemia) following exercise and/or during activities of daily living? Signs of hypoglycemia may include shakiness, nervousness, unusual irritability, abnormal sweating, dizziness or light-headedness, mental confusion, difficulty speaking, weakness, or sleepiness.	YES ☐ NO ☐
5c.	Do you have any signs or symptoms of diabetes complications such as heart or vascular disease and/or complications affecting your eyes, kidneys, **OR** the sensation in your toes and feet?	YES ☐ NO ☐
5d.	Do you have other metabolic conditions (such as current pregnancy-related diabetes, chronic kidney disease, or liver problems)?	YES ☐ NO ☐
5e.	Are you planning to engage in what for you is unusually high (or vigorous) intensity exercise in the near future?	YES ☐ NO ☐

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6. Do you have any Mental Health Problems or Learning Difficulties? *This includes Alzheimer's, Dementia, Depression, Anxiety Disorder, Eating Disorder, Psychotic Disorder, Intellectual Disability, Down Syndrome*

If the above condition(s) is/are present, answer questions 6a-6b — If **NO** ☐ go to question 7

6a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
6b.	Do you have Down Syndrome **AND** back problems affecting nerves or muscles?	YES ☐ NO ☐

7. Do you have a Respiratory Disease? *This includes Chronic Obstructive Pulmonary Disease, Asthma, Pulmonary High Blood Pressure*

If the above condition(s) is/are present, answer questions 7a-7d — If **NO** ☐ go to question 8

7a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
7b.	Has your doctor ever said your blood oxygen level is low at rest or during exercise and/or that you require supplemental oxygen therapy?	YES ☐ NO ☐
7c.	If asthmatic, do you currently have symptoms of chest tightness, wheezing, laboured breathing, consistent cough (more than 2 days/week), or have you used your rescue medication more than twice in the last week?	YES ☐ NO ☐
7d.	Has your doctor ever said you have high blood pressure in the blood vessels of your lungs?	YES ☐ NO ☐

8. Do you have a Spinal Cord Injury? *This includes Tetraplegia and Paraplegia*

If the above condition(s) is/are present, answer questions 8a-8c — If **NO** ☐ go to question 9

8a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
8b.	Do you commonly exhibit low resting blood pressure significant enough to cause dizziness, light-headedness, and/or fainting?	YES ☐ NO ☐
8c.	Has your physician indicated that you exhibit sudden bouts of high blood pressure (known as Autonomic Dysreflexia)?	YES ☐ NO ☐

9. Have you had a Stroke? *This includes Transient Ischemic Attack (TIA) or Cerebrovascular Event*

If the above condition(s) is/are present, answer questions 9a-9c — If **NO** ☐ go to question 10

9a.	Do you have difficulty controlling your condition with medications or other physician-prescribed therapies? (Answer **NO** if you are not currently taking medications or other treatments)	YES ☐ NO ☐
9b.	Do you have any impairment in walking or mobility?	YES ☐ NO ☐
9c.	Have you experienced a stroke or impairment in nerves or muscles in the past 6 months?	YES ☐ NO ☐

10. Do you have any other medical condition not listed above or do you have two or more medical conditions?

If you have other medical conditions, answer questions 10a-10c — If **NO** ☐ read the Page 4 recommendations

10a.	Have you experienced a blackout, fainted, or lost consciousness as a result of a head injury within the last 12 months **OR** have you had a diagnosed concussion within the last 12 months?	YES ☐ NO ☐
10b.	Do you have a medical condition that is not listed (such as epilepsy, neurological conditions, kidney problems)?	YES ☐ NO ☐
10c.	Do you currently live with two or more medical conditions?	YES ☐ NO ☐

PLEASE LIST YOUR MEDICAL CONDITION(S) AND ANY RELATED MEDICATIONS HERE: _____

_____

GO to Page 4 for recommendations about your current medical condition(s) and sign the PARTICIPANT DECLARATION.

2017 PAR-Q+

If you answered NO to all of the follow-up questions about your medical condition, you are ready to become more physically active - sign the PARTICIPANT DECLARATION below:

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- As you progress, you should aim to accumulate 150 minutes or more of moderate intensity physical activity per week.
- If you are over the age of 45 yr and **NOT** accustomed to regular vigorous to maximal effort exercise, consult a qualified exercise professional before engaging in this intensity of exercise.

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I, the undersigned, have read, understood to my full satisfaction and completed this questionnaire. I acknowledge that this physical activity clearance is valid for a maximum of 12 months from the date it is completed and becomes invalid if my condition changes. I also acknowledge that a Trustee (such as my employer, community/fitness centre, health care provider, or other designate) may retain a copy of this form for their records. In these instances, the Trustee will be required to adhere to local, national, and international guidelines regarding the storage of personal health information ensuring that the Trustee maintains the privacy of the information and does not misuse or wrongfully disclose such information.

NAME _____ DATE _____

SIGNATURE _____ WITNESS _____

SIGNATURE OF PARENT/GUARDIAN/CARE PROVIDER _____

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4. Thomas S, Reading J, and Shephard RJ. Revision of the Physical Activity Readiness Questionnaire (PAR-Q). Canadian Journal of Sport Science 1992;17:4 338-345.

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Appendix D: Individual Analyses of Participant Cohorts and Results

The individual analyses are presented first as the secondary study cohort and second as the recruited cohorts. The analysis of the secondary cohort (n= 1202) is presented as 1) participants who completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises who were not on medication (n= 1121); 2) participants who completed moderate-to-vigorous-to-maximal intensity followed by discrete functional physically demanding task exercises who were on medication (n= 3); 3) participants who completed a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises who were not on medication (n= 53); 4) participants who completed a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises who were on medication (n= 4); 5) participants who only completed the moderate-to-vigorous-to-maximal intensity treadmill exercise and were not on medication (n= 11); and 6) participants who completed who only completed the moderate-to-vigorous-to-maximal intensity treadmill exercise and were on medication (n= 10).

Secondary Data Analysis of Cohort Who Underwent Moderate-to-vigorous-to-maximal Intensity Treadmill Exercise Followed by Discrete Functional Physically Demanding Task Exercises Who Were Not on Medication

The statistical analysis of secondary data was run on the sub-set of participants who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises, who were not on any medications (n= 1121). Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table A1.

Table A1: Demographic characteristics of the secondary analysis cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.6 ± 6.1 (n= 1121)	27.4 ± 5.9 (n= 1071)	33.9 ± 7.1 (n= 50)	***p*< 0.01**
Male	27.7 ± 6.0 (n= 1015)	27.4 ± 5.8 (n= 968)	34.1 ± 7.2 (n= 47)	***p*< 0.01**
Female	26.9 ± 6.7 (n= 106)	26.8 ± 6.7 (n= 103)	31.0 ± 4.4 (n= 3)	0.28
Sex (% of population)				
Male	90.5	90.4	94.0	
Female	9.5	9.6	6.0	
Body Mass (kg)	85.1 ± 13.3	84.9 ± 13.2	89.8 ± 14.1	0.10
Male	86.6 ± 12.6	86.4 ± 12.5	91.3 ± 13.2	***p*< 0.01**
Female	70.8 ± 11.3	70.9 ± 11.4	67.4 ± 8.1	0.60
Height (cm)	179.1 ± 7.3	179.1 ± 7.3	178.1 ± 7.0	0.32
Male	180.2 ± 6.5	180.2 ± 6.5	178.5 ± 13.2	0.08
Female	168.9 ± 6.3	168.8 ± 6.3	171.3 ± 4.5	0.51
BMI (kg/m^2)	26.5 ± 3.4	26.4 ± 3.4	28.3 ± 4.0	***p*< 0.01**
Male	26.7 ± 3.4	26.6 ± 3.4	28.6 ± 3.8	***p*< 0.01**
Female	24.8 ± 3.4	24.8 ± 3.4	23.1 ± 4.2	0.39
Average Resting SBP (mmHg)	117.4 ± 11.5	116.3 ± 10.3	140.9 ± 10.9	***p*< 0.01**
Male	118.1 ± 11.4	117.0 ± 10.2	140.9 ± 11.2	***p*< 0.01**
Female	110.8 ± 9.9	109.9 ± 8.3	142.3 ± 6.8	***p*< 0.01**
Average Resting DBP (mmHg)	73.4 ± 9.0	72.4 ± 7.9	94.8 ± 5.0	***p*< 0.01**
Male	73.7 ± 9.1	72.6 ± 7.9	94.9 ± 5.1	***p*< 0.01**
Female	70.6 ± 8.1	69.9 ± 7.1	94.3 ± 2.5	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	50.4 ± 7.1	50.7 ± 7.0	44.9 ± 5.8	***p*< 0.01**
Male	51.1 ± 6.9	51.4 ± 6.8	44.8 ± 5.9	***p*< 0.01**
Female	44.3 ± 6.1	44.2 ± 6.1	45.2 ± 6.0	0.78

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of evidence-based BP cut-point < 160/90 mmHg determined that the secondary analysis cohort who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and were not using medication were predominantly male (90.5%, n= 1015), overweight using the BMI metric (27.6 ± 6.1 kg/m²) and with a normal resting BP (SBP 117.4 ± 11.5 mmHg, DBP 73.4 ± 9.0 mmHg). When comparing the overall group's rate for exercise clearance using the evidence-based BP cut-point < 160/90 mmHg significant differences were found in participants' age, BMI, SBP, DBP, and VO_2 max. The 50 participants (4.5%) who would not have been cleared for exercise were older (33.9 ± 7.1 years, $p< 0.01$), heavier (89.8 ± 14.1 kg, $p< 0.01$), had a higher BMI (28.3 ± 4.0 kg/m², $p< 0.01$), had significantly higher BP (SBP 140.9 ± 10.9 mmHg, $p< 0.01$; DBP 94.8 ± 5.0 mmHg, $p< 0.01$) and were less aerobically fit (VO_2 max= 44.9 ± 5.8 $mL \cdot kg^{-1} \cdot min^{-1}$, $p< 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were significantly older (34.1 ± 7.2 years, $p< 0.01$), had a higher body mass (91.3 ± 13.2 kg, $p< 0.01$), had a higher BMI (28.6 ± 3.8 kg/m², $p< 0.01$), higher SBP (140.9 ± 11.2 mmHg, $p< 0.01$), higher DBP (94.9 ± 5.1 mmHg, $p< 0.01$) and a lower VO_2 max (44.8 ± 5.9 $mL \cdot kg^{-1} \cdot min^{-1}$, $p< 0.01$). The female participants had significant differences only in SBP and DBP. Female participants who had a measured BP above the cut-point had significantly higher SBP (142.3 ± 6.8 mmHg, $p< 0.01$) and significantly higher DBP (94.3 ± 2.5 mmHg, $p< 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points used by agencies in determining PA participation clearance for moderate-to-vigorous-to- maximal intensity PA and fitness assessment applications was also performed. The results of this analysis are presented in Table A2a, Table A2b, Table A2c, Table A2d and Table A2e. The cut-points of < 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg are presented in different tables.

Table A2a: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	26.9 ± 5.6 (n= 970)	32.1 ± 7.1 (n= 151)	***p*< 0.01**
Male	27.0 ± 5.5 (n= 868)	32.2 ± 7.2 (n= 147)	***p*< 0.01**
Female	26.8 ± 6.7.5 (n= 102)	30.3 ± 3.9 (n= 4)	0.31
Sex (% of population)			
Male	89.4	97.4	
Female	10.6	2.6	
Body Mass (kg)	84.1 ± 12.8	91.9 ± 14.4	***p*< 0.01**
Male	85.6 ± 12.0	92.6 ± 13.9	***p*< 0.01**
Female	70.9 ± 11.5	67.5 ± 6.7	0.56
Height (cm)	179.0 ± 7.4	179.9 ± 6.9	0.15
Male	180.2 ± 6.5	179.5 ± 6.6	0.96
Female	168.9 ± 6.3	168.0 ± 6.1	0.98
BMI (kg/m^2)	26.2 ± 3.3	28.4 ± 3.8	***p*< 0.01**
Male	26.4 ± 3.3	28.5 ± 3.7	***p*< 0.01**
Female	24.8 ± 3.4	23.8 ± 3.7	0.57
Average Resting SBP (mmHg)	114.2 ± 8.1	138.1 ± 8.3	***p*< 0.01**
Male	114.7 ± 7.9	137.9 ± 8.3	***p*< 0.01**
Female	109.6 ± 7.7	142.3 ± 5.6	***p*< 0.01**
Average Resting DBP (mmHg)	71.3 ± 7.4	86.5 ± 7.7	***p*< 0.01**
Male	71.5 ± 7.4	86.3 ± 7.7	***p*< 0.01**
Female	69.7 ± 7.0	91.5 ± 6.0	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	50.9 ± 7.0	47.5 ± 6.9	***p*< 0.01**
Male	51.7 ± 6.7	47.6 ± 6.9	***p*< 0.01**
Female	44.2 ± 6.1	45.3 ± 4.9	0.72

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, body mass, BMI, SBP, DBP and VO_2 max. The 151 participants (13.5%) who would not have been cleared for exercise were older (32.1 ± 7.1 years, $p < 0.01$), heavier (91.9 ± 14.4 kg, $p < 0.01$), had a higher BMI (28.4 ± 3.8 kg/m², $p < 0.01$), had significantly higher BP (SBP 138.1 ± 8.3 mmHg, $p < 0.01$; DBP 85.6 ± 7.7 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 47.5 ± 6.9 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (32.2 ± 7.2 years, $p < 0.01$), had a higher body mass (92.6 ± 13.9 kg, $p < 0.01$), had a higher BMI (28.5 ± 3.7 kg/m², $p < 0.01$), higher SBP (137.9 ± 8.3 mmHg, $p < 0.01$), higher DBP (86.3 ± 7.7 mmHg, $p < 0.01$), and lower VO_2 max (47.6 ± 6.9 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences only in SBP and DBP. Female participants who had a measured BP above the cut-point had significantly higher SBP (142.3 ± 5.6 mmHg, $p < 0.01$) and significantly higher DBP (91.5 ± 6.0 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A2b: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 140 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.2 ± 5.8 (n= 1043)	33.1 ± 7.4 (n= 78)	***p*< 0.01**
Male	27.3 ± 5.7 (n= 941)	33.3 ± 7.5 (n= 74)	***p*< 0.01**
Female	26.8 ± 6.7 (n= 102)	30.3 ± 3.9 (n= 4)	0.31
Sex (% of population)			
Male	90.2	94.9	
Female	9.8	5.1	
Body Mass (kg)	84.6 ± 13.1	91.4 ± 14.5	***p*< 0.01**
Male	86.1 ± 12.3	92.7 ± 13.6	***p*< 0.01**
Female	70.9 ± 11.5	67.5 ± 6.7	0.56
Height (cm)	179.1 ± 7.3	179.0 ± 7.0	0.91
Male	180.2 ± 6.5	179.5 ± 6.6	0.40
Female	168.9 ± 6.3	169.0 ± 6.1	0.98
BMI (kg/m^2)	26.3 ± 3.4	28.5 ± 3.8	***p*< 0.01**
Male	26.5 ± 3.3	28.7 ± 3.7	***p*< 0.01**
Female	24.8 ± 3.4	23.8 ± 3.7	0.57
Average Resting SBP (mmHg)	115.5 ± 9.2	142.4 ± 9.3	***p*< 0.01**
Male	116.2 ± 9.1	142.4 ± 9.5	***p*< 0.01**
Female	109.6 ± 7.7	142.3 ± 5.6	***p*< 0.01**
Average Resting DBP (mmHg)	72.1 ± 7.8	90.5 ± 7.5	***p*< 0.01**
Male	72.4 ± 7.8	90.4 ± 7.6	***p*< 0.01**
Female	69.7 ± 7.0	91.5 ± 6.0	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	50.8 ± 7.0	46.1 ± 5.9	***p*< 0.01**
Male	51.5 ± 6.8	46.1 ± 6.0	***p*< 0.01**
Female	44.2 ± 6.1	45.3 ± 4.9	0.72

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, body mass, BMI, SBP, DBP and VO_2 max. The 78 participants (7.0%) who would not have been cleared for exercise were older (33.1 ± 7.4 years, $p < 0.01$), heavier (91.4 ± 14.5 kg, $p < 0.01$), had a higher BMI (28.5 ± 3.8 kg/m², $p < 0.01$), had significantly higher BP (SBP 142.4 ± 9.3 mmHg, $p < 0.01$; DBP 90.5 ± 7.5 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 46.1 ± 5.9 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (33.3 ± 7.5 years, $p < 0.01$), had a higher body mass (92.7 ± 13.6 kg, $p < 0.01$), had a higher BMI (28.7 ± 3.7 kg/m², $p < 0.01$), higher SBP (142.4 ± 9.5 mmHg, $p < 0.01$), higher DBP (90.4 ± 7.6 mmHg, $p < 0.01$), and lower VO_2 max (46.1± 6.0 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences only in SBP and DBP. Female participants who had a measured BP above the cut-point had significantly higher SBP (142.3 ± 5.6 mmHg, $p < 0.01$) and significantly higher DBP (91.5 ± 6.0 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A2c: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.3 ± 5.8 (n= 1057)	33.9 ± 7.3 (n= 64)	***p*< 0.01**
Male	27.3 ± 5.7 (n= 954)	34.0 ± 7.4 (n= 61)	***p*< 0.01**
Female	26.8 ± 6.7 (n= 103)	31.0 ± 4.4 (n= 3)	0.28
Sex (% of population)			
Male	90.3	95.3	
Female	9.7	4.7	
Body Mass (kg)	84.8 ± 13.2	90.1 ± 13.1	***p*< 0.01**
Male	86.3 ± 12.5	91.3 ± 12.3	***p*< 0.01**
Female	70.9 ± 11.4	67.4 ± 8.1	0.60
Height (cm)	179.1 ± 7.3	178.7 ± 6.8	0.66
Male	180.2 ± 6.5	179.1 ± 6.7	0.18
Female	168.8 ± 6.3	171.3 ± 4.9	0.51
BMI (kg/m^2)	26.4 ± 3.4	28.2 ± 3.7	***p*< 0.01**
Male	26.5 ± 3.4	28.5 ± 3.5	***p*< 0.01**
Female	24.8 ± 3.4	23.1 ± 4.2	0.39
Average Resting SBP (mmHg)	115.9 ± 9.6	142.6 ± 10.3	***p*< 0.01**
Male	116.5 ± 9.5	142.6 ± 10.5	***p*< 0.01**
Female	109.9 ± 8.3	142.3 ± 6.8	***p*< 0.01**
Average Resting DBP (mmHg)	72.2 ± 7.8	92.2 ± 6.9	***p*< 0.01**
Male	72.5 ± 7.8	92.1 ± 7.0	***p*< 0.01**
Female	69.9 ± 7.1	94.3 ± 2.5	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	50.7 ± 7.0	45.7 ± 5.7	***p*< 0.01**
Male	51.4 ± 6.8	45.7 ± 5.8	***p*< 0.01**
Female	44.2 ± 6.1	45.2 ± 6.0	0.78

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 144/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, body mass, BMI, SBP, DBP and VO_2 max. The 64 participants (5.7%) who would not have been cleared for exercise were older (33.9 ± 7.3 years, $p < 0.01$), heavier (90.1 ± 13.1 kg, $p < 0.01$), had a higher BMI (28.2 ± 3.7 kg/m², $p < 0.01$), had significantly higher BP (SBP 142.6 ± 10.3 mmHg, $p < 0.01$; DBP 92.2 ± 6.9 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 45.7 ± 5.7 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (34.0 ± 7.4 years, $p < 0.01$), had a higher body mass (91.3 ± 12.3 kg, $p < 0.01$), had a higher BMI (28.5 ± 3.5 kg/m², $p < 0.01$), higher SBP (142.6 ± 10.5 mmHg, $p < 0.01$), higher DBP (92.1 ± 7.0 mmHg, $p < 0.01$), and lower VO_2 max (45.7± 5.8 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences only in SBP and DBP. Female participants who had a measured BP above the cut-point had significantly higher SBP (142.3 ± 6.8 mmHg, $p < 0.01$) and significantly higher DBP (94.3 ± 2.5 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A2d: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/94 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.4 ± 5.9 (n= 1077)	33.2 ± 7.8 (n= 44)	***p*< 0.01**
Male	27.5 ± 5.8 (n= 974)	33.6 ± 8.0 (n= 41)	***p*< 0.01**
Female	26.8 ± 6.7 (n= 103)	31.0 ± 4.4 (n= 3)	0.28
Sex (% of population)			
Male	90.4	93.2	
Female	9.6	6.8	
Body Mass (kg)	84.9 ± 13.2	90.4 ± 13.5	***p*< 0.01**
Male	86.4 ± 12.5	92.1 ± 12.3	***p*< 0.01**
Female	70.9 ± 11.4	67.4 ± 8.1	0.60
Height (cm)	179.1 ± 7.3	179.9 ± 6.6	0.69
Male	180.1 ± 6.6	180.6 ± 6.3	0.44
Female	168.8 ± 6.3	171.3 ± 4.9	0.51
BMI (kg/m^2)	26.4 ± 3.4	27.9 ± 3.8	***p*< 0.01**
Male	26.6 ± 3.4	28.3 ± 3.5	***p*< 0.01**
Female	24.8 ± 3.4	23.1 ± 4.2	0.39
Average Resting SBP (mmHg)	116.2 ± 9.8	147.0 ± 8.8	***p*< 0.01**
Male	116.8 ± 9.8	147.4 ± 8.9	***p*< 0.01**
Female	109.9 ± 8.3	142.3 ± 6.8	***p*< 0.01**
Average Resting DBP (mmHg)	72.6 ± 8.2	92.6 ± 8.3	***p*< 0.01**
Male	72.9 ± 8.2	92.5 ± 8.6	***p*< 0.01**
Female	69.9 ± 7.1	94.3 ± 2.5	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	50.6 ± 7.1	46.6 ± 5.7	***p*< 0.01**
Male	51.3 ± 6.8	46.7 ± 5.7	***p*< 0.01**
Female	44.2 ± 6.1	45.2 ± 6.0	0.78

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 144/94 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, body mass, BMI, SBP, DBP and VO_2 max. The 44 participants (3.6%) who would not have been cleared for exercise were older (33.2 ± 7.8 years, $p < 0.01$), heavier (90.4 ± 13.5 kg, $p < 0.01$), had a higher BMI (27.9 ± 3.8 kg/m², $p < 0.01$), had significantly higher BP (SBP 147.0 ± 8.8 mmHg, $p < 0.01$; DBP 92.6 ± 8.3 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 46.6 ± 5.7 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (33.6 ± 8.0 years, $p < 0.01$), had a higher body mass (92.1 ± 12.3 kg, $p < 0.01$), had a higher BMI (28.3 ± 3.5 kg/m², $p < 0.01$), higher SBP (147.0 ± 8.9 mmHg, $p < 0.01$), higher DBP (92.5 ± 8.6 mmHg, $p < 0.01$), and lower VO_2 max (46.7 ± 5.7 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). The female participants had significant differences only in SBP and DBP. Female participants who had a measured BP above the cut-point had significantly higher SBP (142.3 ± 6.8 mmHg, $p < 0.01$) and significantly higher DBP (94.3 ± 2.5 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A2e: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 150/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 150 mmHg systolic and less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 150/100 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.6 ± 6.0 (n= 1104)	33.7 ± 7.8 (n= 17)	***p*< 0.01**
Male	27.6 ± 5.9 (n= 999)	33.7 ± 8.1 (n= 16)	***p*< 0.01**
Female	26.7 ± 6.7 (n= 105)	34.0 (n= 1)	N/A
Sex (% of population)			
Male	90.5	94.1	
Female	9.5	5.9	
Body Mass (kg)	85.0 ± 13.2	92.6 ± 13.6	***p*< 0.05**
Male	86.5 ± 12.5	94.6 ± 11.2	***p*< 0.05**
Female	70.9 ± 11.4	61.2	N/A
Height (cm)	179.1 ±7.3	181.0 ± 7.0	0.27
Male	180.1 ± 6.5	181.4 ± 7.1	0.45
Female	168.8 ± 6.3	175.8	N/A
BMI (kg/m^2)	26.5 ± 3.4	28.3 ± 4.1	***p*< 0.05**
Male	26.6 ± 3.4	28.8 ± 3.6	***p*< 0.05**
Female	24.8 ± 3.4	19.8	
Average Resting SBP (mmHg)	116.8 ± 10.6	153.6 ± 9.3	***p*< 0.01**
Male	117.5 ± 10.5	153.8 ± 9.6	***p*< 0.01**
Female	110.5 ± 9.1	150	N/A
Average Resting DBP (mmHg)	73.0 ± 8.6	95.7 ± 10.2	***p*< 0.01**
Male	73.3 ± 8.6	95.9 ± 10.5	***p*< 0.01**
Female	70.4 ± 7.8	92.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	50.5 ± 7.1	45.2 ± 5.4	***p*< 0.01**
Male	51.2 ± 6.8	45.2 ± 5.5	***p*< 0.01**
Female	44.2 ± 6.1	44.8	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A Only one female is would not have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 150/100 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, body mass, BMI, SBP, DBP and VO_2 max. The 17 participants (1.4%) who would not have been cleared for exercise were older (33.7 ± 7.8 years, $p < 0.01$), heavier (92.6 ± 13.6 kg, $p < 0.05$), had a higher BMI (28.3 ± 4.1 kg/m², $p < 0.05$), had significantly higher BP (SBP 153.6 ± 9.6 mmHg, $p < 0.01$; DBP 95.7 ± 10.2 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 45.2 ± 5.4 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point were also significantly older (33.7 ± 8.1 years, $p < 0.01$), had a higher body mass (94.6 ± 11.2 kg, $p < 0.05$), had a higher BMI (28.8 ± 3.6 kg/m², $p < 0.05$), higher SBP (153.8 ± 9.6 mmHg, $p < 0.01$), higher DBP (95.9 ± 10.5 mmHg, $p < 0.01$), and lower VO_2 max (45.2 ± 5.4 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. Only one female participant would not have been cleared for moderate-to-vigorous-to-maximal intensity PA participation so a bivariate analysis could not be conducted.

The results of the logistic regression analysis are presented in Table A3. A separate logistic regression was run for each individual opinion-based BP cut-point compared to the evidence-based cut-point < 160/90 mmHg. Two separate regression models were run with model 1 being adjusted for age, sex, BMI and VO_2 max, and model 2 with no adjustment for covariates.

Table A3: Logistic Regression Analysis of Secondary Analysis Cohort Who Were not on Medication and Who Participated in Moderate-to-vigorous-to-maximal Intensity Treadmill Exercise Followed by Discrete Functional Physically Demanding Task Exercises. Regression Analysis is Comparing Exercise Clearance When Using Evidence-Based Blood Pressure Cut-Point Less Than 160/90 mmHg in Comparison to Different Opinion-Based Blood Pressure Cut-Points Applied by Agencies and Organizations for Pre-Participation Screening of Applicants and Incumbents in Physically Demanding Public Safety Occupations, and Pre-Participation Screening of Physical Activity Participation in the Health, Wellness and Fitness Industry.

	Model 1 (adjusted)[1]		Model 2 (not adjusted)[2]	
	Would be Cleared for Exercise		Would be Cleared for Exercise	
	OR	*P* value	OR	*P* value
Applying Cut-Point < 130/80 mmHg	0.000	0.986	0.000	0.987
Applying Cut-Point < 140/90 mmHg	0.000	0.985	0.000	0.986
Applying Cut-Point < 144/90 mmHg	0.000	0.981	0.000	0.985
Applying Cut-Point < 144/94 mmHg	0.011	***p*< 0.01**	0.009	***p*< 0.01**
Applying Cut-Point < 150/100 mmHg	0.016	***p*< 0.01**	0.011	***p*< 0.01**

Odds ratio (OR) is expressed as odds of being cleared for exercise

[1] Model 1 adjusted for covariates of age, sex, BMI (Body mass index) and VO2 Max (Maximum volume of oxygen consumed)

[2] Model 2 not adjusted for covariates

The logistic regression analyses found significant associations for BP cut-points 144/94 mmHg and 150/100 mmHg that were maintained with adjustment for age, sex, BMI and VO_2 max. No significance was found for BP cut-point 130/80 mmHg, 140/90 mmHg and 144/90 mmHg. The analysis unadjusted for covariates revealed that when applying the evidence-based BP cut-point of 160/90mmHg as the referent to determine overall PA participation clearance, not being cleared for PA when applying BP cut-point 144/94 mmHg would results in being 99.1% less likely to be cleared for participation in moderate-to-vigorous-to-maximal intensity PA (OR= 0.009, $p< 0.01$) and this relationship was maintained with adjustments for age, sex, BMI and VO_2 max (OR= 0.011, $p< 0.01$). Similarly, when measuring above the opinion-based BP cut-point of 150/100 mmHg as compared to evidence-based BP cut-point 160/90 mmHg, individuals who were above this opinion-based BP cut-point would be 98.4% less likely to be cleared for moderate-to-vigorous-to-maximal PA participation (OR= 0.016, $p< 0.01$) and this relationship was maintained with adjustments covariates (OR= 0.011, $p< 0.01$). That is, the individuals who were above the two opinion-based cut-points would have been restricted from moderate-to-vigorous-to-maximal intensity PA participation almost 100% of the time.

Secondary Data Analysis of Cohort Who Underwent Moderate-to-Vigorous-to-Maximal Intensity Treadmill Exercise Followed by Discrete Functional Physically Demanding Task Exercises Who Were on Medication

The statistical analysis of secondary data was run on the participants who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises, and who were on medication (n= 3). Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table A4. All participants would have been for PA when using the cut-point of < 160/90 mmHg.

Table A4: Demographic characteristics of the secondary analysis cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	30.3 ± 13.1 (n= 3)	30.3 ± 13.1 (n= 3)	N/A (n= 0)	N/A
Male	36.5 ± 10.6 (n= 2)	36.5 ± 10.6 (n= 2)	N/A	N/A
Female	18.0 ** (n= 1)	18.0 ** (n= 1)	N/A	N/A
Sex (% of population)				
Male	66.7	66.7	N/A	N/A
Female	33.3	33.3	N/A	N/A
Body Mass (kg)	87.7 ± 24.0	87.7 ± 24.0	N/A	N/A
Male	96.6 ± 26.0	96.6 ± 26.0	N/A	N/A
Female	69.8	69.8	N/A	N/A
Height (cm)	173.3 ± 11.2	173.3 ± 11.2	N/A	N/A
Male	179.5 ± 4.9	179.5 ± 4.9	N/A	N/A
Female	161.0	161.0	N/A	N/A
BMI (kg/m^2)	28.8 ± 4.8	28.8 ± 4.8	N/A	N/A
Male	29.8 ± 6.4	29.8 ± 6.4	N/A	N/A
Female	26.9	26.9	N/A	N/A
Average Resting SBP (mmHg)	125.7 ± 11.9	125.7 ± 11.9	N/A	N/A
Male	130.5 ± 12.0	130.5 ± 12.0	N/A	N/A
Female	116.0	116.0	N/A	N/A
Average Resting DBP (mmHg)	80.3 ± 6.7	80.3 ± 6.7	N/A	N/A
Male	82.0 ± 8.5	82.0 ± 8.5	N/A	N/A
Female	77.0	77.0	N/A	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	41.3 ± 7.4	41.3 ± 7.4	N/A	N/A
Male	45.1 ± 5.0	45.1 ± 5.0	N/A	N/A
Female	33.8	33.8	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All participants would have been cleared, so a T-test was not performed.
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis show that the study participants on medication were predominantly male (66.7% n= 1), overweight using the BMI metric (male= 29.8 ± 6.4 kg/m², female= 26.9 kg/m²) and with a high normal or pre-hypertensive resting BP (SBP 125.7 ± 11.9 mmHg, DBP 80.3 ± 6.7 mmHg). Using the evidence-based cut-point of < 160/90 mmHg, all participants would have been cleared for exercise, therefore, no bivariate analysis was undertaken for this cut-point.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points used by agencies in determining PA participation clearance for moderate-to-vigorous-to-maximal intensity PA and fitness assessment applications was also performed. The results of this analysis are presented in Table A5 for the cut-point of < 130/80 mmHg. The opinion-based BP cut-points of < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg are not presented, as all participants would have been cleared for PA based on having a measured BP value of less than each of these cut-points.

Table A5: Bivariate analysis of secondary analysis cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	23.5 ± 7.8 (n= 2)	44.0 (n= 1)	N/A
Male	29.0 (n= 1)	44.0 (n= 1)	N/A
Female	18.0 (n= 1)	N/A (n= 0)	N/A
Sex (% of population)			
Male	50.0	100.0	
Female	50.0	0.0	
Body Mass (kg)	92.4 ± 32.0	78.2	N/A
Male	115.0	78.2	N/A
Female	69.8	N/A	N/A
Height (cm)	172.0 ± 15.6	176.0	N/A
Male	183.0	176.0	N/A
Female	161.0	N/A	N/A
BMI (kg/m^2)	30.6 ± 5.2	25.3	N/A
Male	34.3	25.3	N/A
Female	26.9	N/A	N/A
Average Resting SBP (mmHg)	119.0 ± 4.2	139.0	N/A
Male	122.0	139.0	N/A
Female	116.0	N/A	N/A
Average Resting DBP (mmHg)	76.5 ± 0.7	88.0	N/A
Male	76.0	88.0	N/A
Female	77.0	N/A	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	37.7 ± 5.5	48.6	N/A
Male	41.6	48.6	N/A
Female	33.8	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A* Only 1 participant was not cleared for PA, so a T-test was not performed

A bivariate analysis was performed for the BP cut-point of < 130/80 mmHg for the group as whole. This analysis could not be performed on groups based on sex as there was a single female participant. The analysis could also not be performed on the male group separately as only 1 male participant was not cleared for PA.

A logistic regression analysis was attempted, but could not be performed as the sample was too small and there were not enough participants in each category. All participants were also cleared for PA using the cut-points of < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg.

Secondary Data Analysis of Cohort Who Completed a Moderate-to-Vigorous-to-Maximal Intensity Circuit Comprised of Functional Physically Demanding Task Exercises Who Were not on Medication

Statistical analysis of secondary data was run on participants who underwent a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises, and who were not on any medications (n= 53). Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence-based BP cut-point of < 160/90 mmHg are presented in Table A6.

Table A6: Demographic characteristics of the secondary analysis cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	26.3 ± 5.5 (n= 53)	26.5 ± 5.5 (n=51)	23.0 ± 1.4 (n= 2)	0.38
Male	26.5 ± 5.5 (n= 51)	26.7 ± 5.5 (n= 49)	23.0 ± 1.4 (n= 2)	0.35
Female	21.0 ± 0.0 (n=2)	21.0 ± 0.0 (n=2)	N/A (n= 0)	N/A
Sex (% of population)				
Male	96.2	96.1	100.0	
Female	3.8	3.9	0.0	N/A
Body Mass (kg)	83.7 ± 11.8	83.5 ± 11.9	89.4 ± 11.4	0.50
Male	83.2 ± 11.6	82.9 ± 11.7	89.4 ± 11.4	0.45
Female	96.4 ± 11.5	96.4 ± 11.5	N/A	N/A
Height (cm)	178.2 ± 7.2	178.3 ± 7.4	175.5 ± 3.5	0.60
Male	178.7 ± 7.0	178.8 ± 7.1	175.5 ± 3.5	0.52
Female	165.5 ± 4.9	166.5 ± 4.9	N/A	N/A
BMI (kg/m^2)	26.5 ± 4.1	26.4 ± 4.1	29.0 ± 2.5	0.39
Male	26.1 ± 3.8	26.0 ± 3.8	29.0 ± 2.5	0.30
Female	34.7 ± 2.1	34.7 ± 2.1	N/A	N/A
Average Resting SBP (mmHg)	115.1 ± 9.9	114.5 ± 9.6	129.5 ± 9.2	***p*< 0.05**
Male	115.2 ± 10.0	114.6 ± 9.7	129.5 ± 9.2	***p*< 0.05**
Female	113.0 ± 9.9	113.0 ± 9.9	N/A	N/A
Average Resting DBP (mmHg)	72.0 ± 9.2	71.3 ± 8.5	91.0 ± 0.0	***p*< 0.01**
Male	72.0 ± 9.3	71.3 ± 8.7	91.0 ± 0.0	***p*< 0.01**
Female	71.5 ± 6.4	71.5 ± 6.4	N/A	N/A
Time to Complete Circuit (sec)	541.3 ± 135.1	537.9 ± 135.2	628.0 ± 141.4	0.36
Male	532.2 ± 129.2	528.2 ± 128.7	628.0 ± 141.4	0.29
Female	775.5 ± 23.3	775.5 ± 23.3	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure)
N/A All female participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of evidence-based BP cut-point < 160/90 mmHg determined that the secondary analysis cohort who underwent a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises, and who were not on any medications were predominantly male (96.2%, n= 51), overweight using the BMI metric (26.5 ± 4.1 kg/m²) and with a normal resting BP (SBP 115.1 ± 9.9 mmHg, DBP 72.0 ± 9.2 mmHg). When comparing the participants' rates for exercise clearance based on the evidence-based BP cut-point < 160/90 mmHg significant differences were found in SBP and DBP for the male participants. All female participants would have been cleared for PA participation. The 2 male participants (3.8%) who were above the BP cut-point had significantly higher SBP (129.5 ± 9.2 mmHg, $p < 0.05$) and higher DBP (91.0 ± 0.0 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. No other significant differences were found. All female participants would have been cleared for PA using the evidence-based cut-point, so a T-test was not performed on the female data.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points used by agencies in determining PA participation clearance for moderate-to-vigorous-to-maximal intensity PA and fitness assessment applications was also performed. The results of this analysis are presented in Table A7a, Table A7b, and Table A7c. The cut-points of < 130/80 mmHg, < 140/90 mmHg, and < 144/90 mmHg, are presented in different tables. All participants were found to be cleared for unrestricted PA participation when using opinion-based cut-points < 144/94 mmHg and < 150/100 mmHg. A bivariate analysis was not undertaken for these cut-points.

Table A7a: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	26.2 ± 5.3 (n= 40)	26.9 ± 6.0 (n= 13)	0.66
Male	26.4 ± 5.3 (n= 38)	26.9 ± 6.0 (n= 13)	0.78
Female	21.0 ± 0.0 (n= 2)	N/A (n= 0)	N/A
Sex (% of population)			
Male	95.0	100.0	
Female	5.0	0.0	
Body Mass (kg)	82.3 ± 12.7	87.9 ± 7.4	0.06
Male	81.6 ± 12.4	87.9 ± 7.4	0.09
Female	96.4 ± 11.5	N/A	N/A
Height (cm)	178.0 ± 7.9	178.8 ± 4.7	0.75
Male	178.6 ± 7.6	178.8 ± 4.7	0.95
Female	165.5 ± 4.9	N/A	N/A
BMI (kg/m²)	26.1 ± 4.4	27.6 ± 2.9	0.26
Male	25.6 ± 4.0	27.6 ± 2.9	0.12
Female	34.7 ± 2.1	N/A	N/A
Average Resting SBP (mmHg)	111.2 ± 7.7	127.2 ± 5.0	***p*< 0.01**
Male	111.1 ± 7.7	127.2 ± 5.0	***p*< 0.01**
Female	113.0 ± 9.9	N/A	N/A
Average Resting DBP (mmHg)	68.6 ± 7.1	82.5 ± 6.8	***p*< 0.01**
Male	68.5 ± 7.1	82.5 ± 6.8	***p*< 0.01**
Female	71.5 ± 6.4	N/A	N/A
Time to Complete Circuit (sec)	539.8 ± 134.6	546.2 ± 142.0	0.88
Male	527.3 ± 126.2	546.2 ± 142.0	0.65
Female	775.5 ± 23.3	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure)
N/A All female participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP and DBP. When comparing the participants' rates for exercise clearance based on the opinion-based BP cut-point < 130/80 mmHg significant differences were found in SBP and DBP for the male participants. All female participants would have been cleared for PA participation. The 13 participants (24.5%) who were above the BP cut-point had significantly higher SBP (127.2 ± 5.0 mmHg, $p < 0.01$) and higher DBP (82.5 ± 6.8 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. No other significant differences were found. All female participants would have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the female data.

Table A7b: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 140 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	26.5 ± 5.5 (n= 51)	23.0 ± 1.4 (n= 2)	0.38
Male	26.7 ± 5.5 (n= 49)	23.0 ± 1.4 (n= 2)	0.35
Female	21.0 ± 0.0 (n= 2)	N/A (n= 0)	N/A
Sex (% of population)			
Male	96.1	100.0	
Female	3.9	0.0	
Body Mass (kg)	83.5 ± 11.9	89.4 ± 11.4	0.50
Male	82.9 ± 11.7	89.4 ± 11.4	0.45
Female	96.4 ± 11.5	N/A	N/A
Height (cm)	178.3 ± 7.4	175.5 ± 3.5	0.60
Male	178.8 ± 7.1	175.5 ± 3.5	0.52
Female	165.5 ± 4.9	N/A	N/A
BMI (kg/m²)	26.4 ± 4.1	29.0 ± 2.5	0.39
Male	26.0 ± 3.8	29.0 ± 2.5	0.29
Female	34.7 ± 2.1	N/A	N/A
Average Resting SBP (mmHg)	114.5 ± 9.6	129.5 ± 9.2	***p*< 0.05**
Male	114.6 ± 9.7	129.5 ± 9.2	***p*< 0.05**
Female	113.0 ± 9.9	N/A	N/A
Average Resting DBP (mmHg)	71.3 ± 8.5	91.0 ± 0.0	***p*< 0.01**
Male	71.3 ± 8.7	91.0 ± 0.0	***p*< 0.01**
Female	71.5 ± 6.4	N/A	N/A
Time to Complete Circuit (sec)	537.9 ± 135.2	628.0 ± 141.4	0.36
Male	528.2 ± 128.7	628.0 ± 141.4	0.29
Female	775.5 ± 23.3	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure)
N/A All female participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP and DBP. When comparing the participants' rates for exercise clearance based on the opinion-based BP cut-point < 140/90 mmHg significant differences were found in SBP and DBP for the male participants. All female participants would have been cleared for PA participation. The 2 male participants (3.8%) who were above the BP cut-point had significantly higher SBP (129.5 ± 9.2 mmHg, $p < 0.05$) and higher DBP (91.0 ± 0.0 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. No other significant differences were found. All female participants would have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the female data.

Table A7c: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	26.5 ± 5.5 (n= 51)	23.0 ± 1.4 (n= 2)	0.38
Male	26.7 ± 5.5 (n= 49)	23.0 ± 1.4 (n= 2)	0.35
Female	21.0 ± 0.0 (n= 2)	N/A (n= 0)	N/A
Sex (% of population)			
Male	96.1	100.0	
Female	3.9	0.0	
Body Mass (kg)	83.5 ± 11.9	89.4 ± 11.4	0.50
Male	82.9 ± 11.7	89.4 ± 11.4	0.45
Female	96.4 ± 11.5	N/A	N/A
Height (cm)	178.3 ± 7.4	175.5 ± 3.5	0.60
Male	178.8 ± 7.1	175.5 ± 3.5	0.52
Female	165.5 ± 4.9	N/A	N/A
BMI (kg/m²)	26.4 ± 4.1	29.0 ± 2.5	0.39
Male	26.0 ± 3.8	29.0 ± 2.5	0.29
Female	34.7 ± 2.1	N/A	N/A
Average Resting SBP (mmHg)	114.5 ± 9.6	129.5 ± 9.2	***p*< 0.05**
Male	114.6 ± 9.7	129.5 ± 9.2	***p*< 0.05**
Female	113.0 ± 9.9	N/A	N/A
Average Resting DBP (mmHg)	71.3 ± 8.5	91.0 ± 0.0	***p*< 0.01**
Male	71.3 ± 8.7	91.0 ± 0.0	***p*< 0.01**
Female	71.5 ± 6.4	N/A	N/A
Time to Complete Circuit (sec)	537.9 ± 135.2	628.0 ± 141.4	0.36
Male	528.2 ± 128.7	628.0 ± 141.4	0.29
Female	775.5 ± 23.3	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure)
N/A All female participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 144/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP and DBP. When comparing the participants' rates for exercise clearance based on the opinion-based BP cut-point < 144/90 mmHg significant differences were found in SBP and DBP for the male participants. All female participants would have been cleared for PA participation. The 2 male participants (3.8%) who were above the BP cut-point had significantly higher SBP (129.5 ± 9.2 mmHg, $p< 0.51$) and higher DBP (91.0 ± 0.0 mmHg, $p< 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. No other significant differences were found. All female participants would have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the female data.

A logistic regression analysis was attempted, but could not be performed as the sample size was too small and there were not enough participants in each category. All participants would also have been cleared for PA using the cut-points of < 144/94 mmHg and < 150/100 mmHg.

Secondary Data Analysis of Cohort Who Completed a Moderate-to-Vigorous-to-Maximal Circuit Comprised of Functional Physically Demanding Task Exercises and Who were on Medication

The statistical analysis was run on participants who completed moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises, and who were on medication (n= 4). Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table A8. All participants would have been cleared for PA when using the cut-point of < 160/90 mmHg. All study participants were male, so the statistics are reported as the full group and not separated by sex.

Table A8: Demographic characteristics of secondary analysis cohort who were on medication and who

participated in a moderate-to-vigorous-to-maximal circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	41.25 ± 11.6 (n= 4)	41.25 ± 11.6 (n= 4)	N/A (n= 0)	N/A
Sex (% of population)				
Male	100 (n= 4)	100 (n= 4)	N/A	N/A
Female	0 (n= 0)	0 (n= 0)	N/A	N/A
Body Mass (kg)	80.5 ± 14.3	80.5 ± 14.3	N/A	N/A
Height (cm)	170.5 ± 8.0	170.5 ± 8.0	N/A	N/A
BMI (kg/m²)	27.6 ± 3.1	27.6 ± 3.1	N/A	N/A
Average Resting SBP (mmHg)	126.5 ± 14.5	126.5 ± 14.5	N/A	N/A
Average Resting DBP (mmHg)	76.3 ± 5.9	76.3 ± 5.9	N/A	N/A
Time to Complete Circuit (sec)	596.8 ± 68.5	596.8 ± 68.5	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure)
N/A All participants would have been cleared for PA, so a T-test was not performed

The results from the bivariate analysis of evidence-based BP cut-point < 160/90 mmHg determined that the secondary analysis cohort who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and who were using medication were overweight using the BMI metric (27.6 ± 3.1 kg/m²) and with a high normal or pre-hypertensive resting BP (SBP 126.5 ± 14.5 mmHg, DBP 76.3 ± 5.9 mmHg). When comparing the overall group's rate for exercise clearance using the evidence-based BP cut-point < 160/90 mmHg all participants would have been cleared for moderate-to-vigorous-to-maximal PA participation, so a T-test could not be performed on the data. There were also no female participants in this sub-set.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points was also performed on this group. The results of this analysis are presented in

Table A9a, and Table A9b for the cut-points of < 130/80 mmHg and < 140/90 mmHg respectively. The cut-points of < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg are not presented as all participants would have been cleared for PA based on having a measured BP value of less than each of these cut-points.

Table A9a: Bivariate analysis of secondary analysis cohort who were on medication who and participated in a moderate-to-vigorous-to-maximal circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	40.0 ± 5.7 (n= 2)	42.5 ± 19.1 (n= 2)	0.88
Sex (% of population)			
Male	100 (n= 4)	100 (n= 4)	
Female	0 (n= 0)	0 (n= 0)	
Body Mass (kg)	89.5 ± 16.3	71.6 ± 5.0	0.27
Height (cm)	176.5 ± 4.9	164.5 ± 4.9	0.14
BMI (kg/m²)	28.6 ± 3.6	26.5 ± 3.5	0.62
Average Resting SBP (mmHg)	115.5 ± 9.2	137.5 ± 7.8	0.12
Average Resting DBP (mmHg)	73.0 ± 7.1	79.5 ± 3.5	0.37
Time to Complete Circuit (sec)	618.0 ± 31.1	575.5 ± 101.1	0.63

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg did not determine any significant results in the sub-set of secondary analysis participants who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and who were using medication. There were also no female participants in this sub-set.

Table A9b: Bivariate analysis of secondary analysis cohort who were on medication who and participated in a moderate-to-vigorous-to-maximal circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 140 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	36.3 ± 7.5 (n= 3)	56.0 (n= 1)	N/A
Sex (% of population)			
Male	100 (n= 4)	100 (n= 4)	
Female	0 (n= 0)	0 (n= 0)	
Body Mass (kg)	82.3 ± 16.9	75.1	N/A
Height (cm)	173.7 ± 6.0	161.0	N/A
BMI (kg/m²)	27.1 ± 3.7	29.0	N/A
Average Resting SBP (mmHg)	121.0 ± 11.5	143.0	N/A
Average Resting DBP (mmHg)	74.3 ± 5.5	82.0	N/A
Time to Complete Circuit (sec)	580.0 ± 69.4	647.0	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure)
N/A Only one participant would not have been cleared for PA, so a T-test was not performed.

The results of the bivariate analysis did not determine significant results for the cut-point of < 130/80 mmHg. A bivariate analysis was not undertaken for cut-point < 140/90 mmHg as only 1 participant was above the cut-point. All participants were also cleared for PA using the remaining cut-points of < 144/94 mmHg and < 150/100 mmHg.

A logistic regression analysis was attempted, but could not be performed as the sample was too small and there were not enough participants in each category. All participants were also cleared for PA using the cut-points of < 144/94 mmHg and < 150/100 mmHg.

Secondary Data Analysis of Cohort Who Completed Moderate-to-Vigorous-to-Maximal Intensity Treadmill Exercise only Who were not on Medication

Statistical analysis was run on participants who completed moderate-to-vigorous-to-maximal intensity treadmill exercise only and who were not on medication (n= 11). Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table A10.

Table A10: Demographic characteristics of the secondary analysis cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	51.7 ± 8.3 (n= 11)	51.0 ± 8.4 (n=10)	59.0 (n= 1)	N/A
Male	48.0 ± 15.6 (n= 3)	18.0 ± 15.6 (n= 3)	N/A (n= 0)	N/A
Female	53.1 ± 4.5 (n= 8)	52.3 ± 4.2 (n= 7)	59.0 (n= 1)	N/A
Sex (% of population)				
Male	27.3	30.0	0.0	
Female	72.7	70.0	100.0	
Body Mass (kg)	85.7 ± 15.7	87.4 ± 15.5	68.8	N/A
Male	82.4 ± 10.0	82.4 ± 10.0	N/A	N/A
Female	86.9 ± 17.8	89.5 ± 17.6	68.8	N/A
Height (cm)	168.3 ± 4.7	168.1 ± 4.9	170.0	N/A
Male	171.0 ± 4.6	171.0 ± 4.6	N/A	N/A
Female	167.3 ± 4.6	166.9 ± 4.8	170.0	N/A
BMI (kg/m^2)	30.2 ± 5.0	30.7 ± 4.7	23.8	N/A
Male	28.2 ± 3.8	28.2 ± 3.8	N/A	N/A
Female	30.9 ± 5.4	31.9 ± 4.9	23.8	N/A
Average Resting SBP (mmHg)	128.4 ±16.3	126.2 ± 15.4	150.0	N/A
Male	122.3 ± 13.4	122.3 ± 13.4	N/A	N/A
Female	130.6 ± 17.5	127.9 ± 16.9	150.0	N/A
Average Resting DBP (mmHg)	78.7 ± 8.0	77.5 ± 7.3	91.0	N/A
Male	75.7 ± 7.6	75.7 ± 7.6	N/A	N/A
Female	79.9 ± 8.4	78.3 ± 7.7	91.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	24.8 ± 8.5	24.2 ± 8.7	30.3	N/A
Male	31.8 ± 13.9	31.8 ± 13.9	N/A	N/A
Female	22.1 ± 4.3	21.0 ± 2.9	30.3	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A Only one participant would not have been cleared for PA, so a T-test was not performed.

The results from the bivariate analysis show that the study participants were predominantly female (72.7%, n= 8), obese using the BMI metric (30.2 ± 5.0 kg/m²) and with a high normal or pre-hypertensive resting BP (SBP 128.4 ± 16.3 mmHg, DBP 78.7 ± 8.0 mmHg). A T-test was not performed on the data, as only one female participant was not cleared for PA when using the cut-point of < 160/90 mmHg.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points was also performed. The results of this analysis are presented in Table A11a, Table A11b, and Table A11c, Table A11d, and Table A11e. The cut-points of < 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg are presented in different tables.

Table A11a: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	48.3 ± 8.5 (n= 3)	53.0 ± 8.4 (n= 8)	0.44
Male	40.0** (n= 1)	52.0 ± 19.8 (n= 2)	N/A
Female	52.5 ± 6.4 (n= 2)	53.3 ± 4.5 (n= 6)	0.84
Sex (% of population)			
Male	33.3	25.0	
Female	66.7	75.0	
Body Mass (kg)	72.6 ± 13.3	90.6 ± 14.2	0.89
Male	73.0	86.8 ± 9.3	N/A
Female	72.1 ± 18.7	91.9 ± 16.0	0.19
Height (cm)	166.0 ± 7.9	169.1 ± 3.2	0.57
Male	175.0	169 ± 4.2	N/A
Female	161.5 ± 2.1	169.2 ± 3.3	***p*< 0.05**
BMI (kg/m^2)	26.4 ± 5.0	31.6 ± 4.4	0.12
Male	24.0	30.3 ± 1.7	N/A
Female	27.5 ± 6.5	63.3 ± 4.5	0.34
Average Resting SBP (mmHg)	109.0 ± 5.3	135.6 ± 12.2	***p*< 0.01**
Male	107.0	130.0 ± 2.8	N/A
Female	110.0 ± 7.1	137.5 ± 13.8	***p*< 0.05**
Average Resting DBP (mmHg)	68.3 ± 2.3	82.6 ± 5.2	***p*< 0.01**
Male	67.0	80.0 ± 1.4	N/A
Female	69.0 ±2.8	83.5 ± 5.8	***p*< 0.05**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	30.1 ± 15.4	22.8 ± 4.3	0.50
Male	47.9	23.8 ± 0.4	N/A
Female	21.2 ± 0.2	22.4 ± 5.0	0.75

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"
N/A Only one male participant would have been cleared for PA, so a T-test was not performed.

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP and DBP. The 8 participants (72.7%) who were above the BP cut-point had significantly higher SBP (135.6 ± 12.2 mmHg, $p < 0.01$) and higher DBP (82.6 ± 5.2 mmHg, $p < 0.01$). The female participants had significant differences in height, SBP and DBP. Female participants who had a measured BP above the cut-point were significantly taller (169.2 ± 3.3 mmHg, $p < 0.05$), had significantly higher SBP (137.5 ± 13.8 mmHg, $p < 0.05$) and significantly higher DBP (83.5 ± 5.8 mmHg, $p < 0.05$). Only one male participant would have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the data. Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A11b: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for P physical activity participation. Participants who had a resting blood pressure of less than 140 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	50.0 ± 9.1 (n= 8)	56.3 ± 3.8 (n= 3)	0.28
Male	48.0 ± 15.6 (n= 3)	N/A (n= 0)	N/A
Female	51.2 ± 4.1 (n= 5)	56.3 ± 3.8 (n= 3)	0.13
Sex (% of population)			
Male	37.5	0.0	
Female	62.5	100.0	
Body Mass (kg)	88.2 ± 17.0	79.0 ± 11.4	0.42
Male	82.4 ± 10.0	N/A	N/A
Female	91.7 ± 20.4	79.0 ± 11.4	0.37
Height (cm)	168.6 ± 5.2	167.3 ± 3.8	0.71
Male	171.0 ± 4.6	N/A	N/A
Female	167.2 ± 5.4	167.3 ± 3.8	0.97
BMI (kg/m^2)	30.9 ± 5.3	28.3 ± 4.1	0.46
Male	28.2 ± 3.8	N/A	N/A
Female	32.5 ± 5.8	28.3 ± 4.1	0.31
Average Resting SBP (mmHg)	120.8 ± 11.2	148.7 ± 6.1	***p*< 0.01**
Male	122.3 ± 13.4	N/A	N/A
Female	119.8 ± 11.2	148.7 ± 6.1	***p*< 0.01**
Average Resting DBP (mmHg)	76.3 ± 7.7	85.3 ± 4.9	***p*< 0.05**
Male	75.7 ± 7.6	N/A	N/A
Female	76.6 ± 8.7	85.3 ± 4.9	0.17
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	25.7 ± 9.2	22.4 ± 7.2	0.60
Male	31.8 ± 13.9	N/A	N/A
Female	22.0 ± 2.3	22.4 ± 7.2	0.90

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All male participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP and DBP. The 3 participants (27.3%) who were above the BP cut-point had significantly higher SBP (148.7 ± 6.1 mmHg, $p < 0.01$) and higher DBP (85.3 ± 4.9 mmHg, $p < 0.05$). There were no male participants who would not have been cleared for PA participation. The 3 participants who would not have been cleared were female, however, when completing the analysis on the group of female participants separately, only SBP was found to be significantly different with those above the BP cut-point having higher SBP (148.7 ± 6.1 mmHg, $p < 0.01$) than those below. Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. All male participants would have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the data.

Table A11c: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure blood pressure of less than 144 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	50.9 ± 8.9 (n=9)	55.5 ± 4.9 (n= 2)	0.51
Male	48.0 ± 15.6 (n= 3)	N/A (n= 0)	N/A
Female	52.3 ± 4.6 (n= 6)	55.5 ± 4.9 (n= 2)	0.44
Sex (% of population)			
Male	33.3	0.0	
Female	66.7	100.0	
Body Mass (kg)	88.5 ± 16.0	72.9 ± 5.8	0.21
Male	82.4 ± 10.0	N/A	N/A
Female	91.6 ± 18.3	72.9 ± 5.8	0.23
Height (cm)	168.7 ± 4.8	165.5 ± 4.9	0.58
Male	171.0 ± 4.6	N/A	N/A
Female	167.5 ± 4.9	166.5 ± 4.9	0.81
BMI (kg/m^2)	31.0 ± 5.0	26.4 ± 3.7	0.25
Male	28.2 ± 3.8	N/A	N/A
Female	32.4 ± 5.2	26.4 ± 3.7	0.19
Average Resting SBP (mmHg)	123.1 ± 12.6	152.0 ± 2.8	***p*< 0.05**
Male	122.3 ± 13.4	N/A	N/A
Female	123.5 ± 13.5	152.0 ± 2.8	***p*< 0.05**
Average Resting DBP (mmHg)	76.9 ± 7.5	87.0 ± 5.7	0.11
Male	75.7 ± 7.6	N/A	N/A
Female	77.5 ± 8.1	81.0 ± 5.7	0.18
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	25.1 ± 8.8	23.2 ± 10.0	0.79
Male	31.8 ± 13.9	N/A	N/A
Female	21.8 ± 2.2	23.2 ± 10.0	0.87

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All male participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 144/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP only. The 2 female participants (18.2%) who were above the BP cut-point had significantly higher SBP (152.0 ± 2.8 mmHg, $p < 0.01$). There were no male participants who would not have been cleared for PA participation. Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP between those below versus above the selected BP cut-point is to be expected. All male participants would have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the data.

Table A11d: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity

	Applying a Clearance BP Cut-Point of < 144/94 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	50.9 ± 8.9 (n=9)	55.5 ± 4.9 (n= 2)	0.51
Male	48.0 ± 15.6 (n= 3)	N/A (n= 0)	N/A
Female	52.3 ± 4.6 (n= 6)	55.5 ± 4.9 (n= 2)	0.44
Sex (% of population)			
Male	33.3	0.0	
Female	66.7	100.0	
Body Mass (kg)	88.5 ± 16.0	72.9 ± 5.8	0.21
Male	82.4 ± 10.0	N/A	N/A
Female	91.6 ± 18.3	72.9 ± 5.8	0.23
Height (cm)	168.7 ± 4.8	165.5 ± 4.9	0.58
Male	171.0 ± 4.6	N/A	N/A
Female	167.5 ± 4.9	166.5 ± 4.9	0.81
BMI (kg/m^2)	31.0 ± 5.0	26.4 ± 3.7	0.25
Male	28.2 ± 3.8	N/A	N/A
Female	32.4 ± 5.2	26.4 ± 3.7	0.19
Average Resting SBP (mmHg)	123.1 ± 12.6	152.0 ± 2.8	***p*< 0.05**
Male	122.3 ± 13.4	N/A	N/A
Female	123.5 ± 13.5	152.0 ± 2.8	***p*< 0.05**
Average Resting DBP (mmHg)	76.9 ± 7.5	87.0 ± 5.7	0.11
Male	75.7 ± 7.6	N/A	N/A
Female	77.5 ± 8.1	81.0 ± 5.7	0.18
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	25.1 ± 8.8	23.2 ± 10.0	0.79
Male	31.8 ± 13.9	N/A	N/A
Female	21.8 ± 2.2	23.2 ± 10.0	0.87

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All male participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 144/94 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP only. The 2 female participants (18.2%) who were above the BP cut-point had significantly higher SBP (152.0 ± 2.8 mmHg, $p < 0.01$). There were no male participants who would not have been cleared for PA participation. Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP between those below versus above the selected BP cut-point is to be expected. All male participants would have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the data.

Table A11e: Bivariate analysis of secondary analysis cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 150/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 150 mmHg systolic and less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity

	Applying a Clearance BP Cut-Point of < 150/100 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	50.9 ± 8.9 (n=9)	55.5 ± 4.9 (n=2)	0.51
Male	48.0 ± 15.6 (n=3)	N/A (n=0)	N/A
Female	52.3 ± 4.6 (n=6)	55.5 ± 4.9 (n=2)	0.44
Sex (% of population)			
Male	33.3	0.0	
Female	66.7	100.0	
Body Mass (kg)	88.5 ± 16.0	72.9 ± 5.8	0.21
Male	82.4 ± 10.0	N/A	N/A
Female	91.6 ± 18.3	72.9 ± 5.8	0.23
Height (cm)	168.7 ± 4.8	165.5 ± 4.9	0.58
Male	171.0 ± 4.6	N/A	N/A
Female	167.5 ± 4.9	166.5 ± 4.9	0.81
BMI (kg/m^2)	31.0 ± 5.0	26.4 ± 3.7	0.25
Male	28.2 ± 3.8	N/A	N/A
Female	32.4 ± 5.2	26.4 ± 3.7	0.19
Average Resting SBP (mmHg)	123.1 ± 12.6	152.0 ± 2.8	***p*< 0.05**
Male	122.3 ± 13.4	N/A	N/A
Female	123.5 ± 13.5	152.0 ± 2.8	***p*< 0.05**
Average Resting DBP (mmHg)	76.9 ± 7.5	87.0 ± 5.7	0.11
Male	75.7 ± 7.6	N/A	N/A
Female	77.5 ± 8.1	81.0 ± 5.7	0.18
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	25.1 ± 8.8	23.2 ± 10.0	0.79
Male	31.8 ± 13.9	N/A	N/A
Female	21.8 ± 2.2	23.2 ± 10.0	0.87

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All male participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 150/100 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP only. The 2 female participants (18.2%) who were above the BP cut-point had significantly higher SBP (152.0 ± 2.8 mmHg, $p < 0.01$). There were no male participants who would not have been cleared for PA participation. Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP between those below versus above the selected BP cut-point is to be expected. All male participants would have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the data.

A logistic regression analysis was attempted, but could not be performed as the sample was too small and there were not enough participants in each category. When adjusted for age, sex, BMI and VO_2 max, the model could not be run. The model was run when not adjusted for associated covariates and resulted in non-significance (p= 0.999) across all BP cut-points 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg.

Secondary Data Analysis of Cohort Who Completed Moderate-to-Vigorous-to-Maximal Intensity Treadmill Exercise only Who were on Medication

Statistical analysis was run on participants who completed moderate-to-vigorous-to-maximal intensity treadmill exercise alone who were on medication (n= 10). Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table A12.

Table A12: Demographic characteristics of the secondary analysis cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	49.7 ± 8.0 (n= 10)	50.2 ± 8.3 (n= 9)	45.0 (n= 1)	N/A
Male	47.0 ± 8.7 (n= 3)	47.0 ± 8.7 (n= 3)	N/A (n= 0)	N/A
Female	50.9 ± 8.1 (n= 7)	51.8 ± 8.4 (n= 6)	45.0 (n= 1)	N/A
Sex (% of population)				
Male	30.0	33.3	0.0	N/A
Female	70.0	66.7	100.0	N/A
Body Mass (kg)	88.8 ± 23.5	87.6 ± 24.6	99.7	N/A
Male	97.9 ± 30.4	97.9 ± 30.4	N/A	N/A
Female	84.9 ± 21.5	82.5 ± 22.4	99.7	N/A
Height (cm)	164.2 ± 6.2	164.8 ± 6.3	159.0	N/A
Male	167.0 ± 5.0	167.0 ± 5.0	N/A	N/A
Female	163.0 ± 6.6	163.7 ± 7.0	159.0	N/A
BMI (kg/m^2)	32.8 ± 8.1	32.1 ± 8.2	39.4	N/A
Male	35.4 ± 12.5	35.4 ± 12.5	N/A	N/A
Female	31.7 ± 6.4	30.4 ± 5.9	39.4	N/A
Average Resting SBP (mmHg)	121.1 ± 18.1	116.2 ± 10.1	165.0	N/A
Male	117.0 ± 9.5	117.0 ± 9.5	N/A	N/A
Female	122.9 ± 21.2	115.8 ± 11.2	165.0	N/A
Average Resting DBP (mmHg)	79.7 ± 9.8	77.6 ± 7.6	99.0	N/A
Male	79.3 ± 7.1	79.3 ± 7.1	N/A	N/A
Female	79.9 ± 11.3	76.7 ± 8.3	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	24.7 ± 7.4	25.5 ± 7.5	17.8	N/A
Male	28.4 ± 10.4	28.4 ± 10.4	N/A	N/A
Female	23.2 ± 6.2	24.1 ± 6.2	17.8	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All male participants would have been cleared for PA and only 1 female would not have been cleared, so a T-test was not performed on this data

The results from the bivariate analysis show that the participants were predominantly female (70.0%, n= 7), obese using the BMI metric (32.8 ± 8.1 kg/m²) and with a high normal or pre-hypertensive resting BP (SBP 121.1 ± 18.1 mmHg, DBP 79.7 ± 9.8 mmHg). When using cut-point < 160/90 mmHg to determine clearance, only 1 participant was not cleared for PA, so a T-test analysis was not performed for this cut-point. All male participants were also cleared for PA when using this evidence-based cut-point.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points was also performed. The results of this analysis are presented in Table A13a, Table A13b, Table A13c, Table A14d, and Table A14e.

Table A13a: Bivariate analysis of secondary analysis cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	48.4 ± 11.3 (n= 5)	51.0 ± 3.5 (n= 5)	0.64
Male	44.5 ± 10.6 (n= 2)	52.0 (n= 1)	N/A
Female	51.0 ± 13.1 (n= 3)	50.8 ± 4.0 (n= 4)	0.97
Sex (% of population)			
Male	40.0	20.0	
Female	60.0	80.0	
Body Mass (kg)	93.8 ± 60.1	83.9 ±16.6	0.54
Male	98.0 ± 42.9	97.8	N/A
Female	91.0 ± 29.3	80.4 ± 16.9	0.57
Height (cm)	164.8 ± 7.7	163.6 ± 5.2	0.78
Male	164.5 ± 3.5	172.0	N/A
Female	165.0 ± 10.6	161.5 ± 2.5	0.63
BMI (kg/m^2)	34.3 ± 10.2	31.3 ± 6.0	0.59
Male	36.6 ± 17.4	33.1	N/A
Female	32.8 ± 7.0	30.9 ± 6.8	0.73
Average Resting SBP (mmHg)	109.8 ± 8.5	132.4 ± 18.6	***p*< 0.05**
Male	114.5 ± 12.0	122.0	N/A
Female	106.7 ± 6.0	135.0 ± 20.4	0.07
Average Resting DBP (mmHg)	72.0 ± 4.3	87.4 ± 7.2	***p*< 0.01**
Male	75.5 ± 3.5	87.0	N/A
Female	69.7 ± 3.2	87.5 ± 8.3	***p*< 0.05**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	24.5 ± 9.8	25.0 ± 5.4	0.93
Male	26.3 ± 13.8	32.4	N/A
Female	23.3 ± 9.5	23.1 ± 4.0	0.98

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A Only one male participant would not have been cleared for PA, so a T-test was not performed.
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP and DBP. The 5 participants (50.0%) who were above the BP cut-point had significantly higher SBP (132.4 ± 18.6 mmHg, $p < 0.05$) and higher DBP (87.4 ± 7.2 mmHg, $p < 0.05$). The female participants had significant differences in DBP only. Female participants who had a measured BP above the cut-point had significantly higher DBP (87.5 ± 8.3 mmHg, $p < 0.05$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. Only one male participant would not have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the data.

Table A13b: Bivariate analysis of secondary analysis cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure blood pressure of less than 140 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	50.2 ± 8.3 (n= 9)	45.0 (n= 1)	N/A
Male	47.0 ± 8.7 (n= 3)	N/A (n= 0)	N/A
Female	51.8 ± 8.4 (n= 6)	45.0 (n= 1)	N/A
Sex (% of population)			
Male	33.3	0.0	
Female	66.7	100.0	
Body Mass (kg)	87.6 ±24.6	99.7	N/A
Male	97.9 ± 30.4	N/A	N/A
Female	82.5 ± 22.4	99.7	N/A
Height (cm)	164.8 ± 6.3	159.0	N/A
Male	167.0 ± 5.0	N/A	N/A
Female	163.7 ± 7.0	159.0	N/A
BMI (kg/m^2)	32.1 ± 8.2	39.4	N/A
Male	35.4 ± 12.5	N/A	N/A
Female	30.4 ± 5.9	39.4	N/A
Average Resting SBP (mmHg)	116.2 ± 10.1	165.0	N/A
Male	117.0 ± 9.5	N/A	N/A
Female	115.8 ± 11.2	165.0	N/A
Average Resting DBP (mmHg)	77.6 ± 7.6	99.0	N/A
Male	79.3 ± 7.1	N/A	N/A
Female	76.7 ± 8.3	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	25.5 ± 7.5	17.84	N/A
Male	28.4 ± 10.4	N/A	N/A
Female	24.1 ± 6.2	17.84	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All male participants and only one female participant would not have been cleared for physical activity, so a T-test was not performed

After conducting the bivariate analysis for BP cut-point < 140/90 mmHg, only one female participant would not have been cleared for moderate-to-vigorous-to-maximal intensity PA participation, so a T-test could not be performed. All male participants would have been cleared for PA participation.

Table A13c: Bivariate analysis of secondary analysis cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure P cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	50.2 ± 8.3 (n=9)	45.0 (n= 1)	N/A
Male	47.0 ± 8.7 (n= 3)	N/A (n= 0)	N/A
Female	51.8 ± 8.4 (n= 6)	45.0 (n= 1)	N/A
Sex (% of population)			
Male	33.3	0.0	
Female	66.7	100.0	
Body Mass (kg)	87.6 ±24.6	99.7	N/A
Male	97.9 ± 30.4	N/A	N/A
Female	82.5 ± 22.4	99.7	N/A
Height (cm)	164.8 ± 6.3	159.0	N/A
Male	167.0 ± 5.0	N/A	N/A
Female	163.7 ± 7.0	159.0	N/A
BMI (kg/m^2)	32.1 ± 8.2	39.4	N/A
Male	35.4 ± 12.5	N/A	N/A
Female	30.4 ± 5.9	39.4	N/A
Average Resting SBP (mmHg)	116.2 ± 10.1	165.0	N/A
Male	117.0 ± 9.5	N/A	N/A
Female	115.8 ± 11.2	165.0	N/A
Average Resting DBP (mmHg)	77.6 ± 7.6	99.0	N/A
Male	79.3 ± 7.1	N/A	N/A
Female	76.7 ± 8.3	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	25.5 ± 7.5	17.84	N/A
Male	28.4 ± 10.4	N/A	N/A
Female	24.1 ± 6.2	17.84	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All male participants and only one female participant would not have been cleared for physical activity, so a T-test was not performed

After conducting the bivariate analysis for BP cut-point < 144/90 mmHg, only one female participant would not have been cleared for moderate-to-vigorous-to-maximal intensity PA participation, so a T-test could not be performed. All male participants would have been cleared for PA participation.

Table A13d: Bivariate analysis of secondary analysis cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/94 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	50.2 ± 8.3 (n= 9)	45.0 (n= 1)	N/A
Male	47.0 ± 8.7 (n= 3)	N/A (n= 0)	N/A
Female	51.8 ± 8.4 (n= 6)	45.0 (n= 1)	N/A
Sex (% of population)			
Male	33.3	0.0	
Female	66.7	100.0	
Body Mass (kg)	87.6 ±24.6	99.7	N/A
Male	97.9 ± 30.4	N/A	N/A
Female	82.5 ± 22.4	99.7	N/A
Height (cm)	164.8 ± 6.3	159.0	N/A
Male	167.0 ± 5.0	N/A	N/A
Female	163.7 ± 7.0	159.0	N/A
BMI (kg/m^2)	32.1 ± 8.2	39.4	N/A
Male	35.4 ± 12.5	N/A	N/A
Female	30.4 ± 5.9	39.4	N/A
Average Resting SBP (mmHg)	116.2 ± 10.1	165.0	N/A
Male	117.0 ± 9.5	N/A	N/A
Female	115.8 ± 11.2	165.0	N/A
Average Resting DBP (mmHg)	77.6 ± 7.6	99.0	N/A
Male	79.3 ± 7.1	N/A	N/A
Female	76.7 ± 8.3	99.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	25.5 ± 7.5	17.84	N/A
Male	28.4 ± 10.4	N/A	N/A
Female	24.1 ± 6.2	17.84	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All male participants and only one female participant would not have been cleared for physical activity, so a T-test was not performed

After conducting the bivariate analysis for BP cut-point < 144/94 mmHg, only one female participant would not have been cleared for moderate-to-vigorous-to-maximal intensity PA participation, so a T-test could not be performed. All male participants would have been cleared for PA participation.

Table A13e: Bivariate analysis of secondary analysis cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 150/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure blood pressure of less than 150 mmHg systolic and less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 150/100 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	50.9 ± 8.9 (n=9)	55.5 ± 4.9 (n= 2)	0.51
Male	48.0 ± 15.6 (n= 3)	N/A (n= 0)	N/A
Female	52.3 ± 4.6 (n= 6)	55.5 ± 4.9 (n= 2)	0.44
Sex (% of population)			
Male	33.3	0.0	
Female	66.7	100.0	
Body Mass (kg)	88.5 ± 16.0	72.9 ± 5.8	0.21
Male	82.4 ± 10.0	N/A	N/A
Female	91.6 ± 18.3	72.9 ± 5.8	0.23
Height (cm)	168.7 ± 4.8	165.5 ± 4.9	0.58
Male	171.0 ± 4.6	N/A	N/A
Female	167.5 ± 4.9	166.5 ± 4.9	0.81
BMI (kg/m^2)	31.0 ± 5.0	26.4 ± 3.7	0.25
Male	28.2 ± 3.8	N/A	N/A
Female	32.4 ± 5.2	26.4 ± 3.7	0.19
Average Resting SBP (mmHg)	123.1 ± 12.6	152.0 ± 2.8	***p*< 0.05**
Male	122.3 ± 13.4	N/A	N/A
Female	123.5 ± 13.5	152.0 ± 2.8	***p*< 0.05**
Average Resting DBP (mmHg)	76.9 ± 7.5	87.0 ± 5.7	0.11
Male	75.7 ± 7.6	N/A	N/A
Female	77.5 ± 8.1	81.0 ± 5.7	0.18
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	25.1 ± 8.8	23.2 ± 10.0	0.79
Male	31.8 ± 13.9	N/A	N/A
Female	21.8 ± 2.2	23.2 ± 10.0	0.87

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All male participants would have been cleared for PA, a T-test was not performed on this data
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 150/100 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP only. The 2 female participants (18.2%) who were above the BP cut-point had significantly higher SBP (152.0 ± 2.8 mmHg, $p < 0.01$). There were no male participants who would not have been cleared for PA participation. Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP between those below versus above the selected BP cut-point is to be expected. All male participants would have been cleared for PA using the opinion-based cut-point, so a T-test was not performed on the data.

A logistic regression analysis was attempted, but could not be performed as the sample was too small and there were not enough participants in each category. When adjusted for age, sex, BMI and VO_2 max, the model could not be run. The model was run when not adjusted for associated covariates and resulted in non-significance (p= 0.999) across all BP cut-points 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg.

Recruited Participant Cohort Analysis of Data

The same statistical analysis procedure for the secondary data analysis was performed on the recruited cohort data (n= 468). The results from the recruited cohort are presented as 1) male recruited cohort who completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises (n= 364) and moderate-to-vigorous-to-maximal intensity treadmill exercise only who were not on medication (n= 1); 2) female recruited cohort who completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises (n= 37) and moderate-to-vigorous-to-maximal intensity treadmill exercise only who were not on medication (n= 8); 3) male recruited cohort who completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises (n= 2) and moderate-to-vigorous-to-maximal intensity treadmill exercise only who were on medication (n= 3); 4) male (n= 52) and female (n= 1) recruited cohort who completed a vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises who were not on medication (n= 53). There were no recruited female study participants on medication.

Male Recruited Cohort Who Underwent Moderate-to-Vigorous-to-Maximal Intensity Treadmill Exercise Followed by Discrete Functional Physically Demanding Task Exercises and Moderate-to-Vigorous-to-Maximal Intensity Treadmill Exercise Only Who Were not on Medication

The statistical analysis of data was run on the male recruited cohort who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only who were not on any medications. Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table A14.

Table A14: Demographic characteristics of the male recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	Men			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	28.0 ± 5.7 (n= 365)	27.8 ± 5.6 (n= 350)	32.4 ± 5.7 (n= 15)	***p*< 0.01**
Body Mass (kg)	86.5 ± 12.5	86.3 ± 12.3	93.0 ± 15.3	***p*< 0.05**
Height (cm)	180.2 ± 7.1	180.3 ± 7.0	179.9 ± 9.1	0.84
BMI (kg/m^2)	26.6 ± 3.2	26.5 ±3.2	28.6 ± 2.7	***p*< 0.05**
Average Resting SBP (mmHg)	117.4 ± 11.0	116.4 ± 9.9	139 ± 13.0	***p*< 0.01**
Average Resting DBP (mmHg)	72.8 ± 8.4	71.9 ± 7.3	94.0 ± 4.4	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	51.7 ± 6.4	52.0 ± 6.3	45.9 ± 5.0	***p*< 0.01**

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of evidence-based BP cut-point < 160/90 mmHg determined that the male recruited cohort who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and were not using medication were on average overweight using the BMI metric (26.6 ± 3.2 kg/m²) and with a normal resting BP (SBP 117.4 ± 11.0 mmHg, DBP 72.8 ± 8.4 mmHg). When comparing the overall group's rate for exercise clearance using the evidence-based BP cut-point < 160/90 mmHg significant differences were found in participants' age, BMI, SBP, DBP, and VO_2 max. The 15 participants (4.1%) who would not have been cleared for exercise were older (32.4 ± 5.7 years, $p < 0.01$), heavier (93.0 ± 15.3 kg, $p < 0.05$), had a higher BMI (28.6 ± 2.7 kg/m², $p < 0.05$), had significantly higher BP (SBP 139.0 ± 13.0 mmHg, $p < 0.01$; DBP 94.0 ± 4.4 mmHg, $p < 0.01$) and were less aerobically fit (VO_2 max= 45.9 ± 5.0 $mL \cdot kg^{-1} \cdot min^{-1}$, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP or DBP between those below versus above the BP cut-point is to be expected.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points used by agencies in determining PA participation clearance for moderate-to-vigorous-to-maximal intensity PA and fitness assessment applications was also performed. The results of this analysis are presented in Table A15a, Table A15b, Table A15c, Table A15d, and Table A15. The cut-points of < 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg are presented in different tables.

Table A15a: Bivariate analysis of male recruited cohort who were not on medication and who participated in

moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.6 ± 5.5 (n= 314)	30.1 ± 6.2 (n= 51)	***p*< 0.01**
Body Mass (kg)	85.6 ± 11.9	92.4 ± 14.2	***p*< 0.01**
Height (cm)	180.4 ± 7.0	179.4 ± 7.4	0.36
BMI (kg/m²)	26.3 ± 3.0	28.6 ± 3.2	***p*< 0.01**
Average Resting SBP (mmHg)	114.3 ± 7.9	136.0 ± 8.2	***p*< 0.01**
Average Resting DBP (mmHg)	71.0 ± 7.0	83.9 ± 8.3	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	52.0 ± 6.2	49.7 ± 7.0	***p*< 0.05**

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, body mass, BMI, SBP, DBP and VO_2 max. The 51 participants (14.0%) who would not have been cleared for exercise were older (30.1 ± 6.2 years, $p< 0.01$), heavier (92.4 ± 14.2 kg, $p< 0.01$), had a higher BMI (28.6 ± 3.2 kg/m², $p< 0.01$), had significantly higher BP (SBP 136.0 ± 8.2 mmHg, $p< 0.01$; DBP 83.9 ± 8.3 mmHg, $p< 0.01$) and were less aerobically fit (VO_2 max= 49.7 ± 7.0 $mL \cdot kg^{-1} \cdot min^{-1}$, $p< 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A15b: Bivariate analysis of male recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically

demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity A participation. Participants who had a resting blood pressure of less than 140 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.8 ± 5.6 (n= 344)	31.3 ± 5.8 (n= 21)	***p*< 0.01**
Body Mass (kg)	86.1 ± 12.2	93.9 ± 14.1	***p*< 0.01**
Height (cm)	180.3 ± 7.0	179.5 ± 8.0	0.61
BMI (kg/m²)	26.4 ± 3.1	29.0 ± 2.7	***p*< 0.01**
Average Resting SBP (mmHg)	116.0 ± 9.3	140.3 ±11.2	***p*< 0.01**
Average Resting DBP (mmHg)	71.7 ± 7.2	89.9 ±8.3	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	52.0 ± 6.3	47.2 ± 5.6	***p*< 0.01**

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, body mass, BMI, SBP, DBP and VO_2 max. The 21 participants (5.8%) who would not have been cleared for exercise were older (31.3 ± 5.8 years, $p< 0.01$), heavier (93.9 ± 14.1 kg, $p< 0.01$), had a higher BMI (29.0 ± 2.7 kg/m², $p< 0.01$), had significantly higher BP (SBP 140.3 ± 11.2 mmHg, $p< 0.01$; DBP 89.9 ± 8.3 mmHg, $p< 0.01$) and were less aerobically fit (VO_2 max= 47.2 ± 5.6 $mL \cdot kg^{-1} \cdot min^{-1}$, $p< 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A15c: Bivariate analysis of male recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically

demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.8 ± 5.6 (n= 348)	32.1 ± 6.1 (n= 17)	***p*< 0.01**
Body Mass (kg)	86.2 ± 12.3	93.0 ± 14.3	***p*< 0.05**
Height (cm)	180.3 ± 7.0	179.4 ± 8.7	0.60
BMI (kg/m²)	26.5 ± 3.1	28.8 ± 2.6	***p*< 0.01**
Average Resting SBP (mmHg)	116.3 ± 9.6	140.0 ± 12.5	***p*< 0.01**
Average Resting DBP (mmHg)	71.8 ± 7.3	92.9 ± 5.2	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	51.9 ± 6.3	47.0 ± 6.0	***p*< 0.01**

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 144/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, body mass, BMI, SBP, DBP and VO_2 max. The 17 participants (4.7%) who would not have been cleared for exercise were older (32.1 ± 6.1 years, $p< 0.01$), heavier (93.0 ± 14.3 kg, $p< 0.05$), had a higher BMI (28.8 ± 2.6 kg/m², $p< 0.01$), had significantly higher BP (SBP 140.0 ± 12.5 mmHg, $p< 0.01$; DBP 92.9 ± 5.2 mmHg, $p< 0.01$) and were less aerobically fit (VO_2 max= 47.0 ± 6.0 $mL \cdot kg^{-1} \cdot min^{-1}$, $p< 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A15d: Bivariate analysis of male recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole

and stratified based on exercise clearance when applying blood pressure cut-point less than 144/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity physical activity

	Applying a Clearance BP Cut-Point of < 144/94 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.8 ± 5.6 (n= 356)	32.7 ± 7.5 (n= 9)	***p*< 0.05**
Body Mass (kg)	86.4 ± 12.5	90.1 ± 13.2	0.39
Height (cm)2	180.3 ± 7.1	177.1 ± 7.0	0.18
BMI (kg/m²)	26.5 ± 3.2	28.6 ± 2.5	0.05
Average Resting SBP (mmHg)	116.6 ± 9.8	148.0 ± 10.9	***p*< 0.01**
Average Resting DBP (mmHg)	72.2 ± 7.7	94.7 ± 6.8	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	51.8 ± 6.3	47.5 ± 6.6	***p*< 0.05**

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 144/94 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, SBP, DBP and VO_2 max. The 9 participants (2.5%) who would not have been cleared for exercise were older (32.7 ± 7.5 years, $p< 0.05$), had significantly higher BP (SBP 148.0 ± 10.9 mmHg, $p< 0.01$; DBP 94.7 ± 6.8 mmHg, $p< 0.01$) and were less aerobically fit (VO_2 max= 47.5 ± 6.6 $mL \cdot kg^{-1} \cdot min^{-1}$, $p< 0.05$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A15e: Bivariate analysis of male recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 150/100 mmHg.

Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 150 mmHg systolic and less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 150/100 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	27.9 ± 5.6 (n= 362)	33.3 ± 9.3 (n= 3)	0.10
Body Mass (kg)	86.5 ± 12.5	87.4 ± 15.9	0.90
Height (cm)	180.3 ± 7.1	175.0 ± 7.5	0.20
BMI (kg/m^2)	26.6 ± 3.2	28.4 ± 3.2	0.32
Average Resting SBP (mmHg)	117.0 ± 10.3	157.0 ± 15.4	***p*< 0.01**
Average Resting DBP (mmHg)	72.6 ± 8.1	99.3 ± 6.1	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	51.8 ± 6.3	43.5 ± 6.1	***p*< 0.05**

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 150/100 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP, DBP and VO_2 max. The 3 participants (0.82%) who would not have been cleared for exercise had significantly higher BP (SBP 157.0 ± 15.4 mmHg, $p< 0.01$; DBP 99.3 ± 6.1 mmHg, $p< 0.01$) and were less aerobically fit (VO_2 max= 43.5 ± 6.1 $mL \cdot kg^{-1} \cdot min^{-1}$, $p< 0.05$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

The results of the logistic regression analysis are presented in Table A16. A separate logistic regression was run for each individual opinion-based BP cut-point compared to the evidence-based cut-point < 160/90 mmHg. Two separate regression models were run with model 1 being adjusted for age, BMI and VO_2 max, and model 2 with no adjustment for covariates.

Table A16: Logistic Regression Analysis of Male Recruited Cohort Who Were not on Medication and Who Participated in Moderate-to-vigorous-to-maximal Intensity Treadmill Exercise Followed by Discrete Functional Physically Demanding Task Exercises and Moderate-to-vigorous-to-maximal Intensity Treadmill Exercise Only. Regression Analysis is Comparing Exercise Clearance When Using Evidence-Based Blood Pressure Cut-Point Less Than 160/90 mmHg in Comparison to Different Opinion-Based Blood Pressure Cut-Points Applied by Agencies and Organizations for Pre-Participation Screening of Applicants and Incumbents in Physically Demanding Public Safety Occupations, and Pre-Participation Screening of Physical Activity Participation in the Health, Wellness and Fitness Industry.

	Model 1[1]		Model 2[2]	
	Would Be Cleared for Exercise		Would Be Cleared for Exercise	
	OR	*P* value	OR	*P* value
Applying Cut-Point < 130/80 mmHg	0.000	0.992	0.000	0.993
Applying Cut-Point < 140/90 mmHg	0.000	0.989	0.000	0.992
Applying Cut-Point < 144/90 mmHg	0.000	0.984	0.000	0.991
Applying Cut-Point < 144/94 mmHg	0.007	***p*< 0.01**	0.007	***p*< 0.01**
Applying Cut-Point < 150/100 mmHg	0.000	0.999	0.000	0.999

Odds ratio (OR) is expressed as odds of being cleared for exercise

[1] Model 1 adjusted for covariates of age, sex, BMI (Body mass index) and VO2 Max (Maximum volume of oxygen consumed)

[2] Model 2 not adjusted for covariates

The logistic regression analyses found a significant association for BP cut-point 144/94 mmHg only that was maintained when adjusting the model for age, BMI and VO_2 max. No significant associations were found for BP cut-points 130/80 mmHg, 140/90 mmHg,144/90 mmHg and 150/100 mmHg. The analysis unadjusted for covariates revealed that when applying the evidence-based BP cut-point of 160/90mmHg as the referent to determine overall PA participation clearance, not being cleared for PA when applying BP cut-point 144/94 mmHg would results in being 99.3% less likely to be cleared for participation in moderate-to-vigorous-to-maximal intensity PA (OR=0.007, $p< 0.01$) and this relationship was maintained with adjustments for age, BMI and VO_2 max (OR=0.007, $p< 0.01$). That is, individuals who were above this cut-point would have been restricted from moderate-to-vigorous-to-maximal intensity PA intensity participation almost every time.

A sub-set of participants also completed a PA questionnaire which asked participants to answer questions about participation in structured physical activity, sport participation, intensity of exercise and his or her perception of personal fitness. A Pearson product moment correlation was completed comparing the relationship between the physical activity questionnaire and participant's SBP, DBP, BMI and VO_2 max. The results are presented in Table A17.

Table A17: Pearson Product Moment Correlation Analysis of Physical Activity Questionnaire and Male Recruited Cohort's Systolic Blood Pressure, Diastolic Blood Pressure, Body Mass Index and Maximum Volume of Oxygen.

	SBP	DBP	BMI	VO_2 max	Volume of Structure PA	Intensity of PA	Volume of Resistance Training	Perceived Personal Fitness Level
SBP		0.708**	0.306**	-0.201**	0.079	0.079	0.078	0.089
DBP			0.218**	-0.244**	0.102	0.102	0.106*	0.107*
BMI				-0.548**	0.013	0.013	0.012	0.025
VO_2 max					0.092	0.092	0.117*	0.093

PA (physical activity); SBP (systolic blood pressure); DBP (diastolic blood pressure); BMI (body mass index); VO_2 max (maximum volume of oxygen)
*$p < 0.005$
**$p < 0.001$

A Pearson product moment correlation was performed on the group of male participants who completed moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and were not on medication. Significant associations were found between SBP and DBP (r= 0.708, $p < 0.001$), and BMI with both SBP and DBP respectively (r= 0.306, $p < 0.001$; r= 0.218, $p < 0.001$). As SBP increases, so does DBP. Similarly, as BMI increases so do SBP and DBP. Another relationship was found between the volume of resistance training reported and DBP (r= 0.106, $p < 0.005$), and VO_2 max (r= 0.117, $p < 0.005$). An association was also determined between a participant's perceived level of fitness and DBP (r= 0.107, $p < 0.005$),

Female Recruited Cohort Who Underwent Moderate-to-Vigorous-to-Maximal Intensity Treadmill Exercise Followed by Discrete Functional Physically Demanding Task Exercises and Moderate-to-Vigorous-to-Maximal Intensity Treadmill Exercise Only Who Were Not on Medication

Statistical analysis of data was run on the female recruited cohort who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only, and who were not on any medications. Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table A18.

Table A18: Demographic characteristics of the female recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	Women			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	32.1 ± 10.4 (n= 45)	32.4 ± 10.5 (n= 43)	25.0 ± 5.7 (n= 2)	0.33
Body Mass (kg)	71.0 ± 9.6	71.1 ± 9.7	70.1 ± 8.5	0.89
Height (cm)	168.2 ± 7.2	168.4 ± 7.3	164.0 ± 1.4	0.40
WC (cm); (n= 6)	89.6 ± 12.8	89.6 ± 12.8	N/A	N/A
Body Fat Percentage (%); (n= 6)	31.2 ± 7.2	31.2 ± 7.2	N/A	N/A
BMI (kg/m^2)	25.1 ± 2.7	25.0 ± 2.7	26.1 ± 3.6	0.58
Average Resting SBP (mmHg)	111.4 ± 10.5	110.3 ± 9.4	136.0 ± 1.1	***p*< 0.01**
Average Resting DBP (mmHg)	71.3 ± 8.9	70.1 ± 7.1	97.0 ± 1.4	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	45.3 ± 6.7	45.4 ± 6.8	44.1 ± 6.1	0.80

Data are presented as mean ± SD unless otherwise indicated.
WC (waist circumference); BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A WC and Body Fat Percentage Sub-set would have been cleared for PA
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis show that the female recruited cohort was on average overweight using the BMI metric (25.1 ± 2.7 kg/m^2), and with a normal resting BP (SBP 111.4 ± 10.5 mmHg, DBP 71.3 ± 8.9 mmHg). A sub-set of participants had their WC and body fat percentage measured and were found to have average values (WC= 89.6 ± 12.8 cm; body fat percentage= 31.2 ± 7.2%). When comparing the participant's rates for exercise clearance based on the evidence-based BP cut-point < 160/90 mmHg significant differences were found only in SBP and DBP. Participants who were above the BP cut-point had significantly higher SBP (136.0 ± 1.1 mmHg, $p< 0.01$) and higher DBP (97.0 ± 1.4 mmHg, $p< 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points used by agencies in determining PA participation clearance for moderate-to-vigorous-to-maximal intensity PA and fitness assessment applications was also performed. The results of this analysis are presented in Table A19a, Table A19b, Table A19c, Table A19d, and Table A19e. The cut-points of < 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg are presented in different tables.

Table A19a: Bivariate analysis of female recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Women		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	32.3 ± 10.6 (n= 41)	30.3 ± 8.7 (n= 4)	0.72
Body Mass (kg)	70.7 ± 9.7	74.1 ± 9.2	0.51
Height (cm)	168.0 ± 7.1	171.0 ± 8.2	0.43
WC (cm); (n= 6)	89.6 ± 12.8	N/A	N/A
Body Fat Percentage (%); (n= 6)	31.2 ± 7.2	N/A	N/A
BMI (kg/m^2)	25.0 ± 2.7	25.4 ± 2.8	0.82
Average Resting SBP (mmHg)	109.1 ± 7.7	135.0 ± 3.4	***p*< 0.01**
Average Resting DBP (mmHg)	69.3 ± 6.3	91.3 ± 6.8	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	45.4 ± 6.9	44.0 ± 3.7	0.69

Data are presented as mean ± SD unless otherwise indicated.
WC (waist circumference); BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A WC and Body Fat Percentage Sub-set would have been cleared for PA
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP, and DBP. The 4 participants (8.9%) who would not have been cleared for exercise had significantly higher BP (SBP 135.0 ± 3.4 mmHg, $p < 0.01$; DBP 91.3 ± 6.8 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A19b: Bivariate analysis of female recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 140 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Women		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	32.4 ± 10.5 (n= 43)	25.0 ± 5.7 (n= 2)	0.33
Body Mass (kg)	71.1 ± 9.7	70.1 ± 8.5	0.89
Height (cm)	168.4 ± 7.3	164.0 ± 1.4	0.40
WC (cm); (n= 6)	89.6 ± 12.8	N/A*	N/A
Body Fat Percentage (%); (n= 6)	31.2 ± 7.2	N/A*	N/A
BMI (kg/m^2)	25.0 ± 2.7	26.1 ± 3.6	0.58
Average Resting SBP (mmHg)	110.3 ± 9.4	135.0 ± 1.4	***p*< 0.01**
Average Resting DBP (mmHg)	70.1 ± 7.1	97.0 ± 1.4	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	45.4 ± 6.8	44.1 ± 6.1	0.80

Data are presented as mean ± SD unless otherwise indicated.
WC (waist circumference); BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A WC and Body Fat Percentage Sub-set would have been cleared for PA
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP, and DBP. The 4 participants (8.9%) who would not have been cleared for exercise had significantly higher BP (SBP 135.0 ± 3.4 mmHg, $p < 0.01$; DBP 91.3 ± 6.8 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A19c: Bivariate analysis of female recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Women		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	32.4 ± 10.5 (n= 43)	25.0 ± 5.7 (n= 2)	0.33
Body Mass (kg)	71.1 ± 9.7	70.1 ± 8.5	0.89
Height (cm)	168.4 ± 7.3	164.0 ± 1.4	0.40
WC (cm); (n= 6)	89.6 ± 12.8	N/A	N/A
Body Fat Percentage (%); (n= 6)	31.2 ± 7.2	N/A	N/A
BMI (kg/m^2)	25.0 ± 2.7	26.1 ± 3.6	0.58
Average Resting SBP (mmHg)	110.3 ± 9.4	135.0 ± 1.4	***p*< 0.01**
Average Resting DBP (mmHg)	70.1 ± 7.1	97.0 ± 1.4	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	45.4 ± 6.8	44.1 ± 6.1	0.80

Data are presented as mean ± SD unless otherwise indicated.
WC (waist circumference); BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A WC and Body Fat Percentage Sub-set would have been cleared for PA
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP, and DBP. The 4 participants (8.9%) who would not have been cleared for exercise had significantly higher BP (SBP 135.0 ± 3.4 mmHg, $p < 0.01$; DBP 91.3 ± 6.8 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A19d: Bivariate analysis of female recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/94 mmHg		
	Women		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	32.4 ± 10.5 (n= 43)	25.0 ± 5.7 (n= 2)	0.33
Body Mass (kg)	71.1 ± 9.7	70.1 ± 8.5	0.89
Height (cm)	168.4 ± 7.3	164.0 ± 1.4	0.40
WC (cm); (n= 6)	89.6 ± 12.8	N/A	N/A
Body Fat Percentage (%); (n= 6)	31.2 ± 7.2	N/A	N/A
BMI (kg/m^2)	25.0 ± 2.7	26.1 ± 3.6	0.58
Average Resting SBP (mmHg)	110.3 ± 9.4	135.0 ± 1.4	***p*< 0.01**
Average Resting DBP (mmHg)	70.1 ± 7.1	97.0 ± 1.4	***p*< 0.01**
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	45.4 ± 6.8	44.1 ± 6.1	0.80

Data are presented as mean ± SD unless otherwise indicated.
WC (waist circumference); BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A WC and Body Fat Percentage Sub-set would have been cleared for PA
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP, and DBP. The 4 participants (8.9%) who would not have been cleared for exercise had significantly higher BP (SBP 135.0 ± 3.4 mmHg, $p < 0.01$; DBP 91.3 ± 6.8 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected.

Table A19e: Bivariate analysis of female recruited cohort who were not on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 150/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 150 mmHg systolic and less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 150/100 mmHg		
	Women		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	32.01 ± 10.4 (n= 45)	N/A (n= 0)	N/A
Body Mass (kg)	71.0 ± 9.6	N/A	N/A
Height (cm)	168.2 ± 7.2	N/A	N/A
WC (cm); (n= 6)	89.6 ± 12.8	N/A	N/A
Body Fat Percentage (%); (n= 6)	31.2 ± 7.2	N/A	N/A
BMI (kg/m^2)	25.1 ± 2.7	N/A	N/A
Average Resting SBP (mmHg)	111.4 ± 10.5	N/A	N/A
Average Resting DBP (mmHg)	71.3 ± 8.9	N/A	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	45.3 ± 6.7	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
WC (waist circumference); BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All participants would have been cleared for PA, so a T-test was not performed

When applying BP cut-point < 150/100 mmHg, all women would have been cleared for PA participation, so a bivariate analysis was not completed for this cut-point.

A logistic regression analysis was attempted, but could not be performed as the sample was too small and there were not enough participants in each category.

A sub-set of female participants also completed a PA questionnaire which asked participants to answer questions about participation in structured physical activity, sport participation, intensity of exercise and his or her perception of personal fitness. The results are presented in Table A20.

Table A20: Pearson Product Moment Correlation Analysis of Physical Activity Questionnaire and Female Recruited Cohort's Systolic Blood Pressure, Diastolic Blood Pressure, Body Mass Index and Maximum Volume of Oxygen.

	SBP	DBP	BMI	VO_2 max	Volume of Structure PA	Intensity of PA	Volume of Resistance Training	Perceived Personal Fitness Level
SBP		0.833*	0.195	-0.196	-0.006	-0.006	-0.006	-0.006
DBP			0.264	-0.204	-0.43	0.43	0.43	0.43
BMI				-0.344*	-0.062	-0.062	-0.062	-0.062
VO_2 max					-0.206	-0.206	-0.206	-0.206

PA (physical activity); SBP (systolic blood pressure); DBP (diastolic blood pressure); BMI (body mass index); VO_2 max (maximum volume of oxygen)
*$p < 0.005$
**$p < 0.001$

After completing a Pearson product moment correlation on the female recruited cohort who completed moderate-to-vigorous-to-maximal intensity exercise, and were not on medication, significance was found only between VO_2 max and BMI, and SBP and DBP. VO_2 max and BMI were found to have a moderate negative correlation (r= -0.344, $p < 0.005$), while SBP and DBP were found to have a high positive correlation (r= 0.833, $p < 0.005$). As SBP increases, so does DBP. No significant association was found between questions on the PA questionnaire and SBP, DBP, BMI and VO_2 max

Male Recruited Cohort Who Underwent Moderate-to-Vigorous-to-Maximal Intensity Treadmill Exercise Followed by Discrete Functional Physically Demanding Task Exercises and Moderate-to-Vigorous-to-Maximal Intensity Treadmill Exercise Only Who were on Medication

The statistical analysis of secondary data was also run on the male recruited cohort who underwent moderate-to-vigorous-to-maximal intensity exercise, and were on medication. Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table A21.

Table A21: Demographic characteristics of the male recruited cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	Men			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	52.6 ± 5.5 (n= 5)	52.3 ± 6.3 (n= 4)	54.0** (n= 1)	N/A
Body Mass (kg)	99.3 ± 12.5	98.7 ± 14.4	101.6	N/A
Height (cm)	181.2 ± 7.4	180.6 ± 8.4	183.5	N/A
BMI (kg/m²)	30.4 ± 4.9	30.4 ± 5.7	30.2	N/A
Average Resting SBP (mmHg)	128.2 ± 14.9	127.0 ± 16.9	133.0	N/A
Average Resting DBP (mmHg)	79.4 ± 11.5	75.5 ± 8.6	95.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	35.1 ± 3.2	36.2 ± 2.2	30.61	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A Only one participant would not have been cleared for PA, so a T-test was not performed.

The results from the bivariate analysis show that the participants were on average obese using the BMI metric (30.4 ± 4.9 kg/m²) and with a high normal or pre-hypertensive resting BP (SBP 128.2 ± 14.9 mmHg, DBP 79.4 ± 11.5 mmHg). When using cut-point < 160/90 mmHg to determine clearance, only 1 participant would not have been cleared for PA, so a T-test analysis was not performed for this cut-point.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points used by agencies in determining PA participation clearance for moderate-to-vigorous-to-maximal intensity PA and fitness assessment applications was also performed. The results of this analysis are presented in Table A22a, Table A22b, Table A22c, Table A22d, and Table A22e. The cut-points of < 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg are presented in different tables.

Table A22a: Bivariate analysis of male recruited cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	48.5 ± 3.5 (n= 2)	55.3 ± 5.1 (n= 3)	0.21
Body Mass (kg)	102.2 ± 15.5	97.3 ± 13.4	0.73
Height (cm)	184.5 ± 12.0	179.0 ± 4.3	0.63
BMI (kg/m^2)	30.5 ± 8.5	30.3 ± 3.5	0.98
Average Resting SBP (mmHg)	114.0 ± 12.7	137.7 ± 5.0	0.05
Average Resting DBP (mmHg)	70.5 ± 7.8	85.3 ± 10.0	0.18
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	34.6 ± 0.6	35.5 ± 4.4	0.81

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg did not determine any significant results in the sub-set of male recruited participants who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and who were using medication.

Table A22b: Bivariate analysis of male recruited cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 140 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	49.3 ± 2.9 (n= 3)	57.5 ± 4.9 (n= 2)	0.10
Body Mass (kg)	104.1 ± 11.5	92.0 ± 13.6	0.36
Height (cm)	182.5 ± 9.2	179.3 ± 6.0	0.70
BMI (kg/m^2)	31.6 ± 6.3	28.5 ± 2.3	0.57
Average Resting SBP (mmHg)	121.7 ± 16.0	138.0 ± 7.1	0.28
Average Resting DBP (mmHg)	75.7 ± 10.5	85.0 ± 14.1	0.45
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	35.2 ± 1.2	35.0 ± 6.1	0.94

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg did not determine any significant results in the sub-set of male recruited participants who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and who were using medication.

Table A22c: Bivariate analysis of male recruited cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	52.3 ± 6.3 (n= 4)	54.0 (n= 1)	N/A
Body Mass (kg)	98.7 ± 14.4	183.5	N/A
Height (cm)	180.6 ± 8.4	101.6	N/A
BMI (kg/m^2)	30.4 ± 5.7	30.3	N/A
Average Resting SBP (mmHg)	127.0 ± 16.9	133.0	N/A
Average Resting DBP (mmHg)	75.5 ± 8.6	95.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	36.2 ± 2.2	30.6	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A Only one participant would not have been cleared for PA, so a T-test was not performed

When applying BP cut-point < 144/90 mmHg, only one male recruited participant who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and who were using medication would not have been cleared for PA participation, so a bivariate analysis was not conducted for this cut-point.

Table A22d: Bivariate analysis of male recruited cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity physical activity.

	Applying a Clearance BP Cut-Point of < 144/94 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	52.3 ± 6.3 (n= 4)	54.0 (n= 1)	N/A
Body Mass (kg)	98.7 ± 14.4	183.5	N/A
Height (cm)2	180.6 ± 8.4	101.6	N/A
BMI (kg/m²)	30.4 ± 5.7	30.3	N/A
Average Resting SBP (mmHg)	127.0 ± 16.9	133.0	N/A
Average Resting DBP (mmHg)	75.5 ± 8.6	95.0	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	36.2 ± 2.2	30.6	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A Only one participant would not have been cleared for PA, so a T-test was not performed

When applying BP cut-point < 144/90 mmHg, only one male recruited participant who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and who were using medication would not have been cleared for PA participation, so a bivariate analysis was not conducted for this cut-point.

Table A22e: Bivariate analysis of male recruited cohort who were on medication and who participated in moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and moderate-to-vigorous-to-maximal intensity treadmill exercise only as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 150/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 150 mmHg systolic and less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 150/100 mmHg		
	Men		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value
Age (years)	52.6 ± 5.5 (n= 5)	N/A (n= 0)	N/A
Body Mass (kg)	99.3 ± 12.5	N/A	N/A
Height (cm)	181.2 ± 7.4	N/A	N/A
BMI (kg/m^2)	30.4 ± 4.9	N/A	N/A
Average Resting SBP (mmHg)	128.2 ± 14.9	N/A	N/A
Average Resting DBP (mmHg)	79.4 ± 11.5	N/A	N/A
VO_2 max ($mL \cdot kg^{-1} \cdot min^{-1}$)	35.1 ± 3.2	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All participants would have been cleared for PA, so a T-test was not performed

When applying BP cut-point < 150/100 mmHg, all male recruited participant who underwent moderate-to-vigorous-to-maximal intensity treadmill exercise followed by discrete functional physically demanding task exercises and who were using medication would have been cleared for PA participation, so a bivariate analysis was not conducted for this cut-point.

A logistic regression analysis was attempted, but could not be performed as the sample was too small and there were not enough participants in each category.

Male and Female Recruited Cohort Who Underwent a Moderate-to-Vigorous-to-Maximal Intensity Circuit Comprised of Functional Physically Demanding Task Exercises Who Were Not on Medication

The male and female recruited cohort who underwent a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises and who were not on medication were combined for statistical analysis as there was 1 female participant. Descriptive statistics of this sub-set of participants as a whole and based on exercise clearance using the evidence based BP cut-point of < 160/90 mmHg are presented in Table A23.

Table A23: Demographic characteristics of the male and female recruited cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure blood pressure cut-point less than 160/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 160 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 160/90 mmHg			
	All	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	25.7 ± 5.3 (n= 53)	25.2 ± 4.7 (n= 51)	39.0 ± 1.4 (n= 2)	***p*< 0.01**
Male	25.8 ± 5.3 (n= 52)	25.2 ± 4.7 (n= 50)	39.0 ± 1.4 (n= 2)	***p*< 0.01**
Female	21.0** (n= 1)	21.0 (n= 1)	N/A (n= 0)	N/A
Sex (% of population)				
Male	98.1	98.0	100.0	
Female	1.9	2.0	0.0	
Body Mass (kg)	83.0 ± 13.5	82.7 ± 13.3	90.3 ± 25.1	0.45
Male	83.2 ± 13.6	82.9 ± 13.3	90.3 ± 25.1	0.46
Female	72.3	72.3	N/A	N/A
Height (cm)	177.5 ± 6.7	177.4 ± 6.7	178.5 ± 7.8	0.82
Male	177.5 ± 6.7	177.5 ± 6.8	178.5 ± 7.8	0.84
Female	174.0	174.0	N/A	N/A
BMI (kg/m²)	26.3 ± 3.8	26.3 ± 3.8	28.1 ± 5.4	0.52
Male	26.4 ± 3.9	26.3 ± 3.8	28.1 ± 5.4	0.53
Female	23.9	23.9	N/A	N/A
Average Resting SBP (mmHg)	119.0 ± 11.2	117.7 ± 9.0	153.0 ± 5.7	***p*< 0.01**
Male	118.9 ± 11.2	117.5 ± 9.0	153.0 ± 5.7	***p*< 0.01**
Female	127.0	127.0	N/A	N/A
Average Resting DBP (mmHg)	75.4 ± 8.7	74.6 ± 7.8	95.5 ± 0.7	***p*< 0.01**
Male	75.3 ± 8.7	74.4 ± 7.8	95.5 ± 0.7	***p*< 0.01**
Female	84.0	84.0	N/A	N/A
Time to Complete Circuit (sec)	421.1 ± 71.9	419.5 ± 72.5	459.5 ± 55.9	0.45
Male	417.5 ± 67.7	415.8 ± 68.1	459.5 ± 55.9	0.38
Female	607.0	607.0	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All female participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of evidence-based BP cut-point < 160/90 mmHg determined that the recruited cohort who underwent a moderate-to-vigorous-to-maximal intensity time-based circuit comprised of functional physically demanding task exercises and were not using medication were predominantly male (98.1%, n= 1.9), overweight using the BMI metric (26.3 ± 3.8 kg/m²) and with a normal resting BP (SBP 119.0 ± 11.2 mmHg, DBP 75.4 ± 8.7 mmHg). When comparing the overall group's rate for exercise clearance using the evidence-based BP cut-point < 160/90 mmHg significant differences were found in participants' SBP and DBP. The 2 participants (3.8%) who would not have been cleared for exercise had significantly higher BP (SBP 153.0 ± 5.7 mmHg, $p < 0.01$; DBP 95.5 ± 0.7 mmHg, $p < 0.01$). When comparing exercise clearance of male participants who would have been cleared versus would not have been cleared for exercise, the male participants who were above the cut-point had significantly higher SBP (153.0 ± 5.7 mmHg, $p < 0.01$) and higher DBP (95.5 ± 0.7 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. All female participants (n= 1) would have been cleared for PA participation, so a T-test was not performed on this data.

A bivariate analysis comparing individuals above and below the different opinion-based BP cut-points used by agencies in determining PA participation clearance for moderate-to-vigorous-to-maximal intensity PA and fitness assessment applications was also performed. The results of this analysis are presented in Table A24a, Table A24b, Table A24c, Table A24d and Table A24e. The cut-points of < 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg are presented in different tables.

Table A24a: Bivariate analysis of the male and female recruited cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 130/80 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 130 mmHg systolic and less than 80 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 130/80 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	25.2 ± 4.8 (n= 46)	28.7 ± 7.8 (n= 7)	0.29
Male	25.3 ± 4.8 (n= 45)	28.7 ± 7.8 (n= 0)	0.30
Female	21.0 (n= 1)	N/A (n= 0)	N/A
Sex (% of population)			
Male	97.8	100.0	
Female	2.2	0.0	
Body Mass (kg)	82.6 ± 13.6	85.8 ± 14.1	0.56
Male	82.8 ± 13.6	85.8 ± 14.1	0.59
Female	72.3	N/A	N/A
Height (cm)	177.6 ± 6.9	176.4 ± 5.1	0.67
Male	177.7 ± 7.0	176.4 ± 5.1	0.65
Female	174.0	N/A	N/A
BMI (kg/m²)	26.2 ± 3.9	27.4 ± 3.3	0.41
Male	26.2 ± 3.9	27.4 ± 3.3	0.43
Female	23.9	N/A	N/A
Average Resting SBP (mmHg)	115.8 ± 7.4	140.0 ± 9.4	***p*< 0.01**
Male	115.6 ± 7.2	140.0 ± 9.4	***p*< 0.01**
Female	127.0	N/A	N/A
Average Resting DBP (mmHg)	73.7 ± 78.6	86.6 ± 7.1	***p*< 0.01**
Male	73.5 ± 7.5	86.6 ± 7.1	***p*< 0.01**
Female	84.0	N/A	N/A
Time to Complete Circuit (sec)	412.8 ±72.8	475.0 ± 34.6	***p*< 0.05**
Male	408.5 ± 67.4	475.0 ± 34.6	***p*< 0.05**
Female	607.0	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All female participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 130/80 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for SBP, DBP and circuit completion time. The 7 participants (13.2%) who would not have been cleared for exercise had significantly higher BP (SBP 140.0 ± 9.4 mmHg, $p < 0.01$; DBP 86.6 ± 7.1 mmHg, $p < 0.01$) and took longer to complete the circuit (475.0 ± 34.6 sec, $p < 0.05$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. All female participants (n= 1) would have been cleared for PA participation, so a T-test was not performed on this data.

Table A24b: Bivariate analysis of the male and female recruited cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 140/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 140 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 140/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	25.2 ± 4.7 (n= 51)	39.0 ± 1.4 (n= 2)	***p*< 0.01**
Male	25.2 ± 4.7 (n= 50)	39.0 ± 1.4 (n= 2)	***p*< 0.01**
Female	21.0 (n= 1)	N/A (n= 0)	N/A
Sex (% of population)			
Male	98.0	100.0	
Female	2.0	0.0	
Body Mass (kg)	82.7 ± 13.3	90.3 ± 25.1	0.45
Male	82.9 ± 13.3	90.3 ± 25.1	0.46
Female	72.3	N/A	N/A
Height (cm)	177.4 ± 6.7	178.5 ± 7.8	0.82
Male	177.5 ± 6.8	178.5 ± 7.8	0.84
Female	174.0	N/A	N/A
BMI (kg/m^2)	26.3 ± 3.8	28.1 ± 5.4	0.52
Male	26.3 ± 3.8	28.1 ± 5.4	0.53
Female	23.9	N/A	N/A
Average Resting SBP (mmHg)	117.7 ± 9.0	153.0 ± 5.7	***p*< 0.01**
Male	117.5 ± 9.0	153.0 ± 5.7	***p*< 0.01**
Female	127.0	N/A	N/A
Average Resting DBP (mmHg)	74.6 ± 7.8	95.5 ± 0.7	***p*< 0.01**
Male	74.4 ± 7.8	95.5 ± 0.7	***p*< 0.01**
Female	84.0	N/A	N/A
Time to Complete Circuit (sec)	419.5 ± 72.5	459.5 ± 55.9	0.45
Male	415.8 ± 68.1	459.5 ± 55.9	0.38
Female	607.0	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All female participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 140/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, SBP, and DBP. The 2 male participants (3.8%) who would not have been cleared for exercise were older (39.0 ± 1.4 years, $p < 0.01$), and had significantly higher BP (SBP 153.0 ± 5.7 mmHg, $p < 0.01$; DBP 95.5 ± 0.7 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. All female participants (n= 1) would have been cleared for PA participation, so a T-test was not performed on this data.

Table A24c: Bivariate analysis of the male and female recruited cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/90 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 90 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/90 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	25.2 ± 4.7 (n= 51)	39.0 ± 1.4 (n= 2)	***p*< 0.01**
Male	25.2 ± 4.7 (n= 50)	39.0 ± 1.4 (n= 2)	***p*< 0.01**
Female	21.0 (n= 1)	N/A (n= 0)	N/A
Sex (% of population)			
Male	98.0	100.0	
Female	2.0	0.0	
Body Mass (kg)	82.7 ± 13.3	90.3 ± 25.1	0.45
Male	82.9 ± 13.3	90.3 ± 25.1	0.46
Female	72.3	N/A	N/A
Height (cm)	177.4 ± 6.7	178.5 ± 7.8	0.82
Male	177.5 ± 6.8	178.5 ± 7.8	0.84
Female	174.0	N/A	N/A
BMI (kg/m²)	26.3 ± 3.8	28.1 ± 5.4	0.52
Male	26.3 ± 3.8	28.1 ± 5.4	0.53
Female	23.9	N/A	N/A
Average Resting SBP (mmHg)	117.7 ± 9.0	153.0 ± 5.7	***p*< 0.01**
Male	117.5 ± 9.0	153.0 ± 5.7	***p*< 0.01**
Female	127.0	N/A	N/A
Average Resting DBP (mmHg)	74.6 ± 7.8	95.5 ± 0.7	***p*< 0.01**
Male	74.4 ± 7.8	95.5 ± 0.7	***p*< 0.01**
Female	84.0	N/A	N/A
Time to Complete Circuit (sec)	419.5 ± 72.5	459.5 ± 55.9	0.45
Male	415.8 ± 68.1	459.5 ± 55.9	0.38
Female	607.0	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All female participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 144/90 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, SBP, and DBP. The 2 male participants (3.8%) who would not have been cleared for exercise were older (39.0 ± 1.4 years, $p < 0.01$), and had significantly higher BP (SBP 153.0 ± 5.7 mmHg, $p < 0.01$; DBP 95.5 ± 0.7 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. All female participants (n= 1) would have been cleared for PA participation, so a T-test was not performed on this data.

Table A24d: Bivariate analysis of the male and female recruited cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 144/94 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 144 mmHg systolic and less than 94 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 144/94 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	25.2 ± 4.7 (n= 51)	39.0 ± 1.4 (n= 2)	***p*< 0.01**
Male	25.2 ± 4.7 (n= 50)	39.0 ± 1.4 (n= 2)	***p*< 0.01**
Female	21.0 (n= 1)	N/A (n= 0)	N/A
Sex (% of population)			
Male	98.0	100.0	
Female	2.0	0.0	
Body Mass (kg)	82.7 ± 13.3	90.3 ± 25.1	0.45
Male	82.9 ± 13.3	90.3 ± 25.1	0.46
Female	72.3	N/A	N/A
Height (cm)	177.4 ± 6.7	178.5 ± 7.8	0.82
Male	177.5 ± 6.8	178.5 ± 7.8	0.84
Female	174.0	N/A	N/A
BMI (kg/m²)	26.3 ± 3.8	28.1 ± 5.4	0.52
Male	26.3 ± 3.8	28.1 ± 5.4	0.53
Female	23.9	N/A	N/A
Average Resting SBP (mmHg)	117.7 ± 9.0	153.0 ± 5.7	***p*< 0.01**
Male	117.5 ± 9.0	153.0 ± 5.7	***p*< 0.01**
Female	127.0	N/A	N/A
Average Resting DBP (mmHg)	74.6 ± 7.8	95.5 ± 0.7	***p*< 0.01**
Male	74.4 ± 7.8	95.5 ± 0.7	***p*< 0.01**
Female	84.0	N/A	N/A
Time to Complete Circuit (sec)	419.5 ± 72.5	459.5 ± 55.9	0.45
Male	415.8 ± 68.1	459.5 ± 55.9	0.38
Female	607.0	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All female participants would have been cleared for PA, so a T-test was not performed
* T-test performed on groups "Would Have Been Cleared" versus "Would Not Have Been Cleared"

The results from the bivariate analysis of opinion-based BP cut-point < 144/94 mmHg determined significant differences between those individuals who would have been cleared for moderate-to-vigorous-to-maximal intensity PA participation compared to those who would not have been cleared for age, SBP, and DBP. The 2 male participants (3.8%) who would not have been cleared for exercise were older (39.0 ± 1.4 years, $p < 0.01$), and had significantly higher BP (SBP 153.0 ± 5.7 mmHg, $p < 0.01$; DBP 95.5 ± 0.7 mmHg, $p < 0.01$). Since resting BP is being used to determine the clearance for PA participation, significant differences in SBP and DBP between those below versus above the selected BP cut-point is to be expected. All female participants (n= 1) would have been cleared for PA participation, so a T-test was not performed on this data.

Table A24e: Bivariate analysis of the male and female recruited cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises as a whole and stratified based on exercise clearance when applying blood pressure cut-point less than 150/100 mmHg. Analysis performed on participants stratified into would have been cleared and would not have been cleared for physical activity participation. Participants who had a resting blood pressure of less than 150 mmHg systolic and less than 100 mmHg diastolic were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of < 150/100 mmHg		
	Would Have Been Cleared	Would Not Have Been Cleared	*P* value*
Age (years)	25.4 ± 5.1 (n= 52)	38.0 (n= 1)	N/A
Male	25.5 ± 5.1 (n= 51)	38.0 (n= 1)	N/A
Female	21.0 (n= 1)	N/A (n= 0)	N/A
Sex (% of population)			
Male	98.1	100.0	
Female	1.9	0.0	
Body Mass (kg)	82.5 ± 13.2	108.0	N/A
Male	82.7 ± 13.3	108.0	N/A
Female	72.3	N/A	N/A
Height (cm)	177.3 ± 6.7	184.0	N/A
Male	177.4 ± 6.7	184.0	N/A
Female	174.0	N/A	N/A
BMI (kg/m^2)	26.2 ± 3.8	31.9	N/A
Male	26.3 ± 3.8	31.9	N/A
Female	23.9	N/A	N/A
Average Resting SBP (mmHg)	118.3 ± 9.9	157.0	N/A
Male	118.1 ± 10.0	157.0	N/A
Female	127.0	N/A	N/A
Average Resting DBP (mmHg)	75.0 ± 8.3	95.0	N/A
Male	74.9 ± 8.3	95.0	N/A
Female	84.0	N/A	N/A
Time to Complete Circuit (sec)	419.6 ± 71.8	499.0	N/A
Male	415.9 ± 67.4	499.0	N/A
Female	607.0	N/A	N/A

Data are presented as mean ± SD unless otherwise indicated.
BMI (body mass index); BP (blood pressure); DBP (diastolic blood pressure); PA (physical activity); SBP (systolic blood pressure); VO_2 max (maximum volume of oxygen)
N/A All female participants would have been cleared for PA and only one male participant would not have been cleared, so a T-test was not performed

When applying BP cut-point < 150/100 mmHg, only one recruited participant who underwent moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises and who were not using medication would not have been cleared for PA participation, so a bivariate analysis was not conducted for this cut-point.

The results of the logistic regression analysis are presented in Table A25. A logistic regression was run only for BP cut-point 130/80 mmHg. BP cut-points <140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg did not have the necessary sample size to run the logistic regression analysis.

Table A25: Logistic Regression Analysis of male and female recruited cohort who were not on medication and who participated in a moderate-to-vigorous-to-maximal intensity circuit comprised of functional physically demanding task exercises. Regression Analysis is Comparing Exercise Clearance When Using Evidence-Based Blood Pressure Cut-Point Less Than 160/90 mmHg in Comparison to Different Opinion-Based Blood Pressure Cut-Points Applied by Agencies and Organizations for Pre-Participation Screening of Applicants and Incumbents in Physically Demanding Public Safety Occupations, and Pre-Participation Screening of Physical Activity Participation in the Health, Wellness and Fitness Industry.

	Model 1 (adjusted)[1]		Model 2 (not adjusted)[2]	
	Would Be Cleared for Exercise		Would Be Cleared for Exercise	
	OR	*P* value	OR	*P* value
Applying Cut-point < 130/80	0.000	0.996	0.000	0.997

Odds ratio (OR) is expressed as odds of being cleared for exercise

[1] Model 1 adjusted for covariates of age, sex, and BMI (Body mass index))

[2] Model 2 not adjusted for covariates

A logistic regression analysis was performed for BP cut-point < 130/80 mmHg, however, it was found not to be significant. An analysis was also attempted for cut-points < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg, but could not be performed as the sample was too small and there were not enough participants in each category.

Summary of Secondary Analysis Cohort and Summary of Recruited Cohort

After performing statistical analysis of data on the secondary analysis cohort and the recruited cohort, the breakdown of study participants in each of the opinion-based BP cut-points of 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg, compared to the evidence-based BP cut-point of < 160/90 mmHg is shown in Table A26a and Table A26b. A summary of the secondary analysis cohort and the recruited cohort based on hypertension classifications can be found in Table A27a and Table A27b

Table A26a: Summary Table Showing the Breakdown of Secondary Analysis Cohort by Sex and Body Mass Index Category Based on Applying Evidence-Based Blood Pressure Clearance Cut-Point < 160/90 mmHg Compared to Opinion-Based Blood Pressure Clearance Cut-Points < 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg, and < 150/100 mmHg. Participants who had a resting blood pressure of less than the systolic cut-point and less than the diastolic cut-point were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of:											
	< 160/90 mmHg		< 130/80 mmHg		< 140/90 mmHg		< 144/90 mmHg		< 144/94 mmHg		< 150/100 mmHg	
	Would Have Been Cleared (n= 1148)	Would Not Have Been Cleared (n= 54)	Would Have Been Cleared (n= 1023)	Would Not Have Been Cleared (n= 180)	Would Have Been Cleared (n= 1117)	Would Not Have Been Cleared (n= 85)	Would Have Been Cleared (n= 1133)	Would Not Have Been Cleared (n= 69)	Would Have Been Cleared (n= 1155)	Would Not Have Been Cleared (n= 47)	Would Have Been Cleared (n= 1182)	Would Not Have Been Cleared (n= 20)
Sex (number of participants)												
Male	1029	49	912	166	1001	77	1015	63	1037	41	1062	16
Female	119	5	110	14	116	8	118	6	118	6	120	4
BMI Category (kg/m²)												
Underweight (< 18.5)	4	0	4	0	4	0	4	0	4	0	4	0
Normal (≥ 18.5 < 25.0)	390	12	370	31	386	15	387	14	391	10	396	5
Overweight (≥ 25.0 < 30.0)	586	21	515	93	567	40	574	33	583	24	599	8
Obese I (≥ 30.0 < 35.0)	146	19	119	46	138	27	145	20	154	11	159	6
Obese II (≥ 35.0 < 40.0)	16	2	8	10	15	3	16	2	16	2	17	1
Obese III (≥ 40.0)	6	0	6	0	6	78	6	0	6	0	6	0

Total study population n= 1202
BMI (body mass index); BP (blood pressure)

Table A26b: Summary Table Showing the Breakdown of Experimental Cohort by Sex and Body Mass Index Category Based on Applying Evidence-Based Blood Pressure Clearance Cut-Point < 160/90 mmHg Compared to Opinion-Based Blood Pressure Clearance Cut-Points < 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg, and < 150/100 mmHg. Participants who had a resting blood pressure of less than the systolic cut-point and less than the diastolic cut-point were considered cleared for moderate-to-vigorous-to-maximal intensity physical activity.

	Applying a Clearance BP Cut-Point of:											
	< 160/90 mmHg		< 130/80 mmHg		< 140/90 mmHg		< 144/90 mmHg		< 144/94 mmHg		< 150/100 mmHg	
	Would Have Been Cleared (n= 448)	Would Not Have Been Cleared (n= 20)	Would Have Been Cleared (n= 403)	Would Not Have Been Cleared (n= 65)	Would Have Been Cleared (n= 441)	Would Not Have Been Cleared (n= 27)	Would Have Been Cleared (n= 446)	Would Not Have Been Cleared (n= 22)	Would Have Been Cleared (n= 454)	Would Not Have Been Cleared (n= 14)	Would Have Been Cleared (n= 464)	Would Not Have Been Cleared (n= 4)
Sex (number of participants)												
Male	404	18	361	61	397	25	402	20	410	12	418	4
Female	44	2	42	4	44	2	44	2	44	2	46	0
BMI Category (kg/m^2)												
Underweight (< 18.5)	1	0	1	0	1	0	1	0	1	0	1	0
Normal (≥ 18.5 < 25.0)	167	3	159	11	167	3	167	3	168	2	170	0
Overweight (≥ 25.0 < 30.0)	223	10	200	33	220	14	222	11	226	7	231	2
Obese I (≥ 30.0 < 35.0)	49	7	37	19	46	10	48	8	51	5	54	2
Obese II (≥ 35.0 < 40.0)	8	0	6	2	7	0	8	0	8	0	8	0
Obese III (≥ 40.0)	0	0	0	0	0	0	0	0	0	0	0	0

Total study population n= 468
BMI (body mass index); BP (blood pressure)

Table A27a: Summary Table Showing the Breakdown of Secondary Analysis Cohort by Sex and Body Mass Index Category Based on Hypertension Classification: Normal, Pre-Hypertensive, Stage I Hypertension and Stage II Hypertension. Participants can be Classified Within Each Hypertension Classification if Either His or Her Systolic Blood Pressure or Diastolic Blood Pressure are within the Classification Cut-Points, Both Systolic and Diastolic Blood Pressure Do Not Need to be Within the Cut-Point Category.

	Hypertension Classification:							
	< 120/80 mmHg		≥ 120/80 < 140/90 mmHg		≥ 140/90 < 160/100 mmHg		≥ 160/100 mmHg	
	Below Cut-Point (n= 696)	Above Cut-Point (n= 506)	Below Cut-Point (n= 781)	Above Cut-Point (n= 421)	Below Cut-Point (n= 1126)	Above Cut-Point (n= 76)	Below Cut-Point (n= 1194)	Above Cut-Point (n= 8)
Sex (number of participants)								
Male	602	476	679	399	1009	69	1070	8
Female	94	30	102	22	117	7	124	0
BMI Category (kg/m^2)								
Underweight (< 18.5)	4	0	4	0	4	0	4	0
Normal (≥ 18.5 < 25.0)	283	18	298	103	388	13	399	2
Overweight (≥ 25.0 < 30.0)	331	276	371	236	570	37	604	3
Obese I (≥ 30.0 < 35.0)	70	95	97	68	141	24	162	3
Obese II (≥ 35.0 < 40.0)	4	14	7	11	16	2	18	0
Obese III (≥ 40.0)	4	2	4	2	6	0	6	0

Total study population n= 1202
BMI (body mass index)

Table A27b: Summary Table Showing the Breakdown of Experimental Cohort by Sex and Body Mass Index Category Based on Hypertension Classification: Normal, Pre-Hypertensive, Stage I Hypertension and Stage II Hypertension. Participants can be Classified Within Each Hypertension Classification if Either His or Her Systolic Blood Pressure and Diastolic Blood Pressure are within the Classification Cut-Points, Both Systolic and Blood Pressure Diastolic Do Not Need to be Within the Cut-Point Category.

	Hypertension Classification:							
	< 120/80 mmHg		≥ 120/80 < 140/90 mmHg		≥ 140/90 < 160/100 mmHg		≥ 160/100 mmHg	
	Below Cut-Point (n= 286)	Above Cut-Point (n= 182)	Below Cut-Point (n= 313)	Above Cut-Point (n= 155)	Below Cut-Point (n= 444)	Above Cut-Point (n= 24)	Below Cut-Point (n= 465)	Above Cut-Point (n= 3)
Sex (number of participants)								
Male	250	172	275	147	400	22	419	3
Female	36	10	38	8	44	2	46	0
BMI Category (kg/m²)								
Underweight (< 18.5)	1	0	1	0	1	0	1	0
Normal (≥ 18.5 < 25.0)	124	46	127	43	167	3	170	0
Overweight (≥ 25.0 < 30.0)	133	100	147	86	221	12	231	2
Obese I (≥ 30.0 < 35.0)	25	31	35	21	47	9	55	1
Obese II (≥ 35.0 < 40.0)	3	5	3	5	8	0	8	0
Obese III (≥ 40.0)	0	0	0	0	0	0	0	0

Total study population n= 468
BMI (body mass index)

When observing the data in Table A26a and Table A26b, it is evident that when applied the more conservative opinion-based BP cut-points of < 130/80 mmHg, < 140/90 mmHg, and < 144/90 mmHg screen out more individuals from participating in moderate-to-vigorous-to-maximal intensity PA as compared to evidence-based BP cut-point < 160/90 mmHg. There were more male participants in this study and as such a higher number of men who would not have been cleared for PA participation can be observed across all categories.

When applying evidence-based BP cut-point < 160/90 mmHg for exercise clearance, the majority of individuals screened out of participating in moderate-to-vigorous-to-maximal intensity PA are within the overweight and obese I BMI categories. Similarly, opinion-based BP cut-points < 130/80 mmHg, < 140/90 mmHg, < 144/90 mmHg, < 144/94 mmHg and < 150/100 mmHg had more individuals within BMI overweight and obese I categories who were screened out of participating in moderate-to-vigorous-to-maximal intensity PA.

The secondary analysis cohort and experimental cohort are also summarized based on hypertension classification as previously shown in Table A27a and Table A27b. When observing the data, it can be found that a higher number of individuals within the overweight and obese I BMI categories had measured SBP and/or DBP that was equal to or above (or within) each classification category cut-point when compared to other BMI categories. A higher percentage of men also would be classified as above each cut-point than women, however, the study population has a higher population of men so this is to be expected.

Appendix E: Physical Activity Questionnaire and Data Collection Sheets

Physical Activity Questionnaire

Name: _____

To help us determine your treadmill loading sequence, please answer the following questions about your habits:

Over a typical seven-day period (one week), how many times do you engage in structured whole body physical activity or an exercise session that is sufficiently prolonged and intense to cause sweating and a rapid heartbeat (e.g. jogging, swimming, cycling, spinning classes, etc)?

- ☐ At least three times
- ☐ Normally once or twice
- ☐ Rarely or never

When you engage in structured physical activity or an exercise session, do you have the impression that you:

- ☐ Make a vigorous effort (e.g. jogging)
- ☐ Make a moderate effort (e.g. brisk walking)
- ☐ Make a light effort (e.g. standing, light house work, shopping, light gardening)

Over a typical seven-day period (one week), how many times do you engage in structured resistance training, use free weights, or weight machines?

- ☐ At least three times
- ☐ Normally once or twice
- ☐ Rarely or never

Over a typical seven-day period (one week), how many times do you engage in circuit training involving body weight or callisthenic exercise (CrossFit type training)?

- ☐ At least three times
- ☐ Normally once or twice
- ☐ Rarely or never

Over a typical seven-day period (one week), how many times do you engage structured group exercise classes such as yoga, boxexercise, etc, or play an organized sport (hockey, tennis, etc)?

- ☐ At least three times
- ☐ Normally once or twice
- ☐ Rarely or never

Over a typical seven-day period (one week), how many times do play a sport (e.g. hockey, soccer, etc)?

- ☐ At least three times
- ☐ Normally once or twice
- ☐ Rarely or never

In a general fashion, would you say that your current physical fitness is:

- ☐ Very Good
- ☐ Good
- ☐ Average
- ☐ Poor
- ☐ Very Poor

Select the habits from the following list that apply to you:

- ☐ You engage in Active Transport on a daily basis where you walk or cycle to your job, school, shopping, social events, take stairs wherever possible, etc.
- ☐ You engage in Daily Activities of Living such as house cleaning, mowing the lawn, cooking, doing laundry, ironing, light gardening for more than 2 hours a day at least 3 times each week
- ☐ You have an active job where you are standing, walking for most of your work shift
- ☐ You drive everywhere, use elevators and escalators regularly
- ☐ You have a sedentary occupation where you sit for the majority of your work day for more than 2 hours at a time

Data Collection Sheet

Name: _____ Date: _____

Age: _____ Height: _____ Weight: _____

Waist Circumference: _____ Tanita: _____

Blood Pressure

BP Avg _____SBP _____DBP _____HR

BP1			**BP2**			**BP3**			**BP4**			**BP5**		
SBP	DBP	HR	SBP	DBP	HR	SBP	DBP	HR	SBP	DBP	HR	SBP	DBP	HR

Date: _____ Age: _____ (Barometric Pressure = 760 mmHg)

Name: _____ Weight (kg): _____ Height (cm): _____

Workload	Tissot t °C	STPD Factor	Initial Stick cm	Final Stick cm	Time of Sample Collection sec	FEO_2%	$FECO_2$%	HR bpm	V_E $L \cdot min^{-1}$ STPD	VO_2 $L \cdot min^{-1}$ STPD	VO_2 $mL \cdot kg^{-1} \cdot min^{-1}$ STPD	RPE