Summary

Group	Tests												
	Lower Body Power				Upper Body Power	Speed	Agility	Aerobic Testing	Anaerobic	Lab			
	Squat Jump	Counter Movement	Drop Jump	Horizontal Jump	Seated Med Ball Toss	40 M Sprint	5 - 10 - 5	Leger 20 M	RHEIT	Anthro	Inc (MAP)	CP 2.5	Wingate
U 17	X	X	X	X	X	X	X	X	X	X			
U 18	X	X	X	X	X	X	X	X	X	X			
U 20	X	X	X	X	X				X	X	X	X	X

Necessary Equipment/ Facilities

Equipment required

- 4 kg (~ 8 lb) medicine ball
- measuring tape or marked track
- timing gates
- cone markers
- flat and clear surface of at least 60 meters
- 2m x 2m level floor
- Opto Jump Testing system

Lower Body Power

Vertical Jump Testing

The sport of hockey is an action/reaction sport requiring the ability to stop and start quickly. The ability to get to full speed as fast as possible requires explosive power. The more explosive an athlete is the quicker they can get to full speed. Tests of explosive power from both the static and dynamic motion reflect the ability to produce force quickly, which is important in skating. Statically from a stopped position or dynamic from stopping and starting very quickly. The drop jump looks at a combination of muscle force from the elasticity and reflex mechanisms of the lower bodies muscles. It represents the power required to overcome the effects of gravity and to generate power in the opposite direction through imposed stretch loads, much like stopping and starting in hockey. The three tests for explosive power are:

1 - Squat jump with no countermovement (Squat)
Procedure:

- Perform a squat to 90 deg of knee flexion and hand on hips.
- Pause 2-second at bottom position
- Perform 1 maximal vertical jump with no movement before the jump.
- This is repeated 3 times.
- Flight time and jump height will be recorded for the highest jump

2 - Countermovement Jump (CM)
Procedure:

- Start with hands on hips
- Athlete begins from a standing position
- Athlete then moves down as fast as they can to 90 deg of knee flexion
- Athletethen maximally jumps.
- There is no pause at 90 deg of knee flexion.
- Repeated 3 times
- Flight time and jump height will be recorded for the highest jump.

3 - Drop jump from 42cm box (Drop)
Procedure:

- Start with hands on hips
- athlete steps off a 42cm box
- drops to 90 deg of knee flexion then maximally jumps
- Repeat 3 times.
- Flight time and jump height will be recorded for the highest jump.

Horizontal Jump

Procedure:

- Athlete stands behind a line marked on the ground
- Feet slightly apart.
- A two foot take-off and landing is used,
    - Swinging of the arms permittied
    - Bending of the knees to provide forward drive permitted
- The subject attempts to jump as far as possible
- Landing on both feet without falling backwards
- Repeat 3 times
- The greatest jump distance will be recorded.

Facility required – 2m x 2m level floor
Equipment required – Tape Measure, Opto Jump Testing System, three foot Dowel

Upper Body Power

Seated Medicine Ball Throw

This test is also called the medicine ball chest pass. The following information describes the procedures as used for the NHL pre-draft testing combine.
This test measures upper body (arm) strength and explosive power. By keeping the back in contact with the wall the strength of the arms only are tested.

Procedure:

- Athlete sits on the floor with his legs fully extended
- Feet 24 inches (~60 cm) apart
- Back against a wall
- Hand Position
    - Ball is held with the hands on the side
    - Slightly behind the center
    - Back of ball against the centre of the chest
    - The forearms are positioned parallel to the ground.
- Athlete throws the medicine ball vigorously as far straight forward as possible
- Must maintain the back against the wall
- Distance from the wall to where the ball lands is recorded
- Measurement is recorded to the nearest centimeter
- Best result of three throws is used

Equipment required - 4 kg (~ 8 lb) medicine ball, wall, tape measure

Speed

40 Meter Sprint

The aim of 40 meter sprint test is to determine acceleration and speed. One of the biggest advantages that one can have over an opponent is quick acceleration. The ability to quickly go from coasting to full speed will help an athlete win "foot" races, out-skate opponents, get more loose pucks and get more opportunities to shoot and score. Speed is a very important factor and acceleration is a huge part of speed.

Procedure:

- Test involves running a single maximum sprint over 40 meters
- The time is recorded
- A thorough warm up should be given
- Including some practice starts and accelerations
- Start from a stationary position, with one foot in front of the other
- The front foot must be on the starting line
- The runner should be stationary prior to starting
- The person timing should stand at the finish line with one arm held high
- Call 'ready' followed by a sweep down their arm quickly to start the subject
- (do not call out 'go' due to the time delay in the subject hearing the call).
- Three trials are allowed
- The best time is recorded to the nearest two decimal places.

Equipment required - measuring tape or marked track, timing gates, cone markers, flat and clear surface of at least 60 meters.

Agility

5 – 10 – 5 Agility Shuttle

Hockey is a sport that requires great agility. Agility is defines as moving through a range of motion (mobility) as fast as possible without losing body control (balance). The more agile an athlete is the more they can create deception a full speed (e.g. deking). This agility test evaluates the ability to stop, start and think quickly all at the same time, which is critically important in all aspects of hockey.
This test measures your change-of-direction speed, highlighting your ability to maintain control of your body through rapid changes of speed and direction.

Procedure:

- Athlete begins in a neutral 'athletic' stance
- Weight evenly distributed over body's midline

- Feet straddling start line
- Forward hand touching the cone marking the center, or start, line.
- Athlete will hold this stance for three seconds prior to starting their movement
- On athlete's start the athlete sprints to either end-line 5 yards away
- Athlete touchs their hand down to the line, NOT the cone marking end-line.
- Athlete will complete another trial reversing their direction
- Run to the opposite end-line 10 yards away and touch that line with their hand
- Athlete will complete the test by reversing their direction again
- Sprinting through the start/finish line extending from the middle cone.

Equipment required - measuring tape or marked track, timing gates, cone markers, flat and clear surface of at least 30 meters.

Aerobic Testing

Leger Boucher 20M Shuttle

The Leger Boucher 20m Shuttle is a non-invasive, indirect maximal multistage test of aerobic fitness. Aerobic fitness is measured from the maximum rate that oxygen can be extracted from the atmosphere and transported to and used by the body's tissues (VO2 max). It is expressed in ml/kg/min. The shuttle running course consists of running back and forth in a gymnasium or on a running track, on a 20 m course at an initial speed of 8.5 km/h. The running speed is controlled by audio signals that allow the speed to be increased by 0.5 km/h each minute. At every sound signal, participants must reach the 20 m line, pivot, and get to the other line by the next audio signal. The test is terminated when a subject fails to reach within 1 m of the endline two times in succession. Performance on the 20m Shuttle Run will be evaluated as recommended by the Australian Sports Commission (1998). Scores are a product of the level and the number of successful shuttles completed for that level, which is reported to be a more refined scale for estimation of $VO_{2\ max.}$ which is predicted from the maximal running speed (r=0.84). Heart Rate will be recorded immediately after and 1 min post completion of test.

For hockey, it is very important to have a minimal level of aerobic fitness to build a platform in which explosive power, muscular strength and anaerobic power can maximized. Generally speaking, athletes with high aerobic capacities have the ability to sustain high intense exercise and recover from repeated bouts of high intense exercise. This reflects your ability to recover and play at a higher intensity during back-to-back shifts, periods, games, and overtime. Also, athletes with adequate levels of aerobic fitness generally recover faster from sicknesses, from periods of travel, and sleep better.

Equipment required - measuring tape or marked track, timing gates, cone markers, flat and clear surface of at least 30 meters.

Anaerobic Testing

Repeated High Intensity Endurance Test (RHIET)

The RHIET is a test of anaerobic endurance, which reflects the ability to repeatedly produce high speeds/high intensity work under extreme fatigue conditions. The test should be conducted on a non-slip surface in order to provide good traction for the athletes. A corridor or track of 60m lengths provides for a 40m-test track and 20m in deceleration zones. Measure a distance of 40m with pylons placed at 0m and 40m. Timing lights are place at 5m and 35 m respectively.
The RHIET measures the athlete's speed (5-35m + 35-5m) and ability to maintain that speed for six intervals or drop off (6^{th} interval- 1^{st} interval). This is important to hockey in the ability to get to pucks first, breakaways, fore-checking, back checking, back to back shifts, and maintaining speed throughout a long shift and competition.

Procedure:

- Warm up of 5 – 10 minutes, which should include some short 20-25m all out sprinting.
- A 3 – 5 minute rest interval should separate the warm-up from the test.
- The test involves a 40m sprint (0m – 40m) followed by a stop (turn) with a return to the start line (40m – 0m). The subject must touch the end line with one foot before returning to the start.
- The Timing lights measure each interval – first begins as the athlete crosses the 5m line and at the 35m line, second begins as the athlete crosses the 35m line and as the athlete crosses the 5m line.
- A total of 6 "all out" timed repeats are performed at 30 second intervals, each interval beginning at time 0, 30sec, 1min, 1:30, 2:00 and 2:30. Therefore if the athlete takes 10 seconds to complete they would have 20 seconds of rest, if it takes 20 seconds to complete then 10 seconds rest.
- Tester will give athlete a 5 second count down before each interval.
- Time is recorded for each interval from 5m to 35m and 35m to 5m.

Equipment required - measuring tape or marked track, timing gates, cone markers, flat and clear surface of at least 60 meters.

Lab Testing

Incremental Lactate Test (to MAP)

This test is a maximal test. Athlete will cycle on a Sensormedics cycle ergometer starting at 55W and 90 rpm. The workload will be increased 25 W every 2 min. Blood lactate (Lactate Pro) will be measured at the end of each workload, up to a blood lactate > than 6 mmol. At which point the workload will continue to be increased 25W every minute up to maximal effort (fatigue). Maximal aerobic power (MAP) is considered the last workload the athlete finishes without a 15 rpm drop. Heart rate will be continuously monitored and recorded at the end of each interval. There would be a recording of HR and Blood Lactate for each workload up to ~6.0mmol and then just a HR until MAP is reached.

The Incremental Lactate test looks at your body's ability to tolerate increases in workload (resistance/power output). This test gives us the ability to individualize training with heart rates and workloads used for specific training and monitoring. Athlete's ability to sustain a greater workload (resistance) before 3.0mmol [Bla] is an important indicator for hockey. Fine motor tasks at great speeds (workload) are performed with greater accuracy if the body has the ability to tolerate fatigue. This allows athletes to shoot or pass with greater precision and for longer periods of time during shifts, periods, and games.

Critical Power 2.5

Critical Power test represents your ability to sustain high intense work for ~2-2.5 minutes. An important component to hockey and training is your ability to sustain a high intensity for longer periods of time. This is critical during back-to-back shifts, long shifts, at the end of periods and games.

This maximal test will have the athlete cycle on a Sensormedics cycle ergometer between 80 - 90 rpm at a specific resistance based off the their body weight. Time starts when the set resistance is on the ergometer and the test will be finished when a decrease of 15 rpm occurs. Total time will be recorded. Peak HR at the end of the test, 1'post and a 2' post HR will be recorded.

30 sec Wingate Tests

The Wingate test is a test to examine anaerobic power and capacity. The ability to produce power and sustain that power is very important in hockey. Getting to lose pucks and requires the subject to pedal a mechanically braked bicycle ergometer for 30 seconds, at an "all out" pace.

Peak anaerobic power represents the highest mechanical power generated during any 5 second interval of the test.

Anaerobic capacity or Mean Power in the Wingate test is the total amount of work accomplished over a 30-second bout.

Anthropometery

Height and Weight

Skinfolds - A measurement of a double layer of subcutaneous fat and skin will be measured with skinfold calipers at various body sites which may include: cheek, chin, chest, triceps, subscapular, midaxilla, ribs, suprailium, suprailiac, iliocristale, iliac crest, abdomen, suprapatellar, thigh, proximal calf, mid calf, medial calf, rear thigh, forearm lataeralis, forearm volaris, biceps. These measures may be used in determining body fat, muscle mass, segmental volumes, and CPAFLA health rating.

Girths - Measurements of circumference will be determined using a tape measure at various sites on the body which may include: neck, chest, waist, hips, subgluteal, thigh, knee, calf, ankle, acromion, upper arm, elbow, forearm, and wrist. These measures may be used to calculate muscle mass, segmental volumes, and CPAFLA health rating.

Lengths - Measurements of the lengths of the limb segments of the body will be taken to calculate segmental volumes. The segments are: proximal upper arm, distal upper arm, proximal forearm, distal forearm, proximal thigh, distal thigh, proximal calf, distal calf.