LTAD Competition Review

ROWING
CANADA
AVIRON

LTAD Competition Review Contributors

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Executive Summary

The Coach Education and Development Committee (CEDC) was asked to review the current system of rowing competitions in Canada and recommend changes necessary for it to support and be consistent with RCA's Long Term Athlete Development Plan. The recommendations reflect what we think the best competition system would look like, taking into account fixed constraints such as climate, geography, the academic schedule and the FISA calendar, but unfettered by tradition and history.

The recommendations for the "competition system" address race types, boat classes, progression (both within a regatta and between regattas) and the annual competition schedule. Recommendations are made for each stage in LTAD (from Learning to Train to Active for Life) as well as for the system as a whole. We also explain how these recommendations would apply to "late entry" athletes.

Changes to a system take time. Some of the recommendations, such as introducing skill competitions, can be implemented fairly easily and quickly, without additional resources. Others, such as use of divisions, will require further discussion to work out and agree on the details. Some recommendations, particularly re-aligning the competition calendar, will mean significant changes to the current system. We appreciate that change involves risk and can be disquieting. To get to the next level, athletes must be willing to change their technique or training, which often means going outside their comfort zone and taking calculated risks. To develop the best possible competition system, all of us involved in rowing in Canada must be willing to change, to go outside our comfort zones and to take some risks. RCA can play an important leadership role.

Key Recommendations

• **Race types should support and reflect the objectives for each LTAD stage.** Introduce skill and timed skilled competitions for L2T and early T2T; focus on long distance races (>2500m) and short sprint races (<100m) for T2T; introduce short sprint races (100m, 500m, and 1000m) as well as 2000m races for L2C.

• **Use a progression system within regattas and between regattas that will support high-quality, "meaningful" competition for all stages and all competitors, across Canada.** Develop a division system (for T2T, L2C, developing T2C, A4L) where for each event, competitors of comparable speed would be grouped together (using a time trial) to race in divisional finals. Establish a qualification system for National regattas and ensure the system includes regattas at each level in a hierarchy (local, regional/provincial, national) and allows rowers to progress from one level to the next, without gaps, based on speed.

• **Re-align the competition calendar:** 1) to allow coaches in all regions of the country to properly periodize training, 2) to take full advantage of the seasons available for on-the-water training and 3) to create a system where rowers are preparing for the same types of races at the same season, regardless of where they live. The annual cycle would start in January with long distance training and preparation for Spring long distance races, shift to 2000m racing with the main 2000m regattas in mid-late summer and continue with 2000m racing into the Fall, culminating in a Fall National Championships. December would be the transition period from the end of one cycle to the start of the next.

• This re-aligned calendar would allow top domestic rowers to race Canada's top international rowers at a National Rowing Championships in the Fall, at the culmination of the annual cycle.

• **At the L2C stage, invest in programs that provide high-quality racing and development experiences for a larger group of developing athletes.** Re-allocate resources that are currently spent sending athletes to the Junior World Championships to instead send more athletes to a strong North American race series and to support talent identification/development camps. This should build a larger pool of developing athletes who are capable of making the step to the National Team. Make better use of resources from Canada Games to support developing athletes throughout the 4 year Canada Games cycle (e.g., training camps, inter-provincial and North American races).

• **At the L2T and T2T stages, limit events to sculling boat classes (1x, 2x, 4x).** Rowing in small boats promotes technical development and allows coaches to individualize training to accommodate different rates of physical development. Spending too much time in sweep boats, especially when athletes are growing, can promote muscle imbalances that are hard to correct.

• **Put in place a plan for implementing the recommendations.** Such a plan would lay out the details of what needs to be done, when and by whom. For example, the recommendations will require changes to rules of racing, umpire training, coach education, re-allocation of resources and the support of provincial organizations, regatta organizing committees and local clubs across Canada.

Introduction

Competition is a central part of the rowing experience for athletes at all stages of development. It provides athletes with an opportunity to push themselves and gauge their improvement and it provides the motivation to work for further improvement. And competition is fun.

A competition system that aligns with and reinforces the objectives and outcomes of each developmental stage is fundamental to Long-Term Athlete Development (LTAD). Because coaches and athletes want to win, competition often drives training, dictating the types, volumes and timing of training. We all know examples of novice rowers who are rushed through their early technical development in order to "be ready" for early season races or example of junior rowers doing high intensities and volumes of training in a short season in order to prepare for an important regatta. This is not always in the best interests of an athlete's long term development. The competition system should align with the developmental stages, reflecting and reinforcing their objectives and supporting the appropriate training and recovery. It must provide competitions that are appropriate for athletes in each stage of development form L2T to T2W to A4L, and from regional to international levels.

The appropriate level of competition and the progression from one level to another is also critical to an athlete's long term preparation. To contribute to development and to be fun, competition must be "meaningful". For spectators this means a competition where the outcome cannot be predicted in advance – where there is an element of uncertainty and excitement. For athletes, it means a competition that challenges them, giving them the opportunity to push themselves and test their abilities. Usually, but not always, this implies that they have a chance of winning. (Athletes can also enjoy and benefit from competitions where they can test their abilities against superior crews, even though they have no chance of winning. Instead of winning, they set other goals to test and push themselves, such as being within a certain number of seconds of the lead boat.) Typically, races where boats are so spread out that they are essentially "racing on their own" are neither fun nor worthwhile for anyone in the race. There is no challenge and little is learned. The competition system should be structured to allow all athletes to compete in "meaningful" races that support their physical, tactical, technical and mental development.

For many National Sport Organizations, the competition structure has evolved over many years based on many factors. The structure and timing of many competitions are based more on tradition than on sport science and an understanding of athlete development. The LTAD project has provided NSO's with an opportunity to study their sport system and to re-align all aspects of competition into a coherent system that supports long-term athlete development. By adjusting the competition system so that it supports LTAD, we expect that more rowers will be better prepared to perform well, whether at regional, provincial, national or international competitions.

Terms of Reference

The committee was asked to do the following:

• Evaluate the current system of competitions and regattas to identify gaps and inconsistencies with the RCA Long Term Athlete Development Plan.

• Gather normative data and other qualitative information to assist in making recommendations that are based on research as opposed to intuition.

• Make recommendations for change relating to timing of events, age categories, types of events within regattas and systems of progression within the competition structure for National, Provincial, Regional and Local Regattas.

In making our recommendations, we decided to think about what an ideal competition system might look like: how could we design a competition system that aligned with and supported LTAD while taking into account constraints imposed by factors beyond our control such as climate (and differences in climate), geography, academic calendar, and FISA calendar? The current system has a strong basis in tradition and history but that tradition and history should not limit our thinking about how to design a system that works for athletes.

Sources

The committee drew upon the following sources in developing its recommendations:

• principles of LTAD, as outlined in Canadian Sport for Life and RCA's LTAD Plan for Rowing: an overview;

• expertise and experience of a variety of experts both within and outside the rowing community;

• descriptive data from Canada Games Council, FISA, Sport Canada and a survey of National Team rowers (retired and current).

Report Outline

In this report, we outline our key recommendations for a competition system that would support and align with LTAD.

The report includes the following:

1. Principles of LTAD that relate to competition
2. Issues and constraints
3. Competition System
3.1. Race types
3.2. Progression systems
3.3. Stage by stage LTAD competition structure
3.4. Late entry athletes
3.5. Annual competition calendar
4. Summary of key recommendations and their rationale

1. Principles of LTAD

RCA's Long Term Athlete Development Plan: an overview summarizes the principles of LTAD and outlines what should take place at each stage of development. Of the 10 key factors that form the foundation of LTAD, the following are particularly relevant to the competition system in rowing.

1) Developmental age: we all follow the same stages of development, but the timing, rate and magnitude of development differ amongst individuals, particularly during late childhood and adolescence. The LTAD plan is based on knowledge of growth and development.

2) Trainability: Although all physiological systems are always trainable, there are critical periods in development when the body is particularly responsive to specific types of training. Doing the right types and amounts of training at the right stages is critical to LTAD. This also implies that the ratio of training to competition will be different for different stages. For example, during the T2T stage, training should take precedence over competition, in order to allow for optimal training of the aerobic and strength capacities, whereas in the T2C stage it is important for athletes to experience a variety of competitive experiences and perform well at high-level regattas. The competition system must accommodate all needs from L2T to A4L.

3) Periodization: Periodization provides the framework for organizing training, racing and recovery into a logical, scientifically-based schedule. The goal of periodization is to achieve optimum performance at the required times. The competition structure (in particular the timing and frequency of competitions) should be based on proper periodization to allow optimal training, competition and recovery programs.

The LTAD plan also defines the objectives and key outcomes for each LTAD stage.

2. Issues in the Current RCA Competition System

In reviewing the current regatta system in Canada, we identified a number of issues and constraints:

• Climatic and seasonal differences between regions.

• Geography – long distances.

• Aligning the domestic and international regatta schedules.

• Aligning the school (high school and university) racing season with the rest of the domestic competition schedule, as well as considering the academic pressures faced by students during certain times of the year.

• Ensuring that the domestic regatta structure provides a solid, clear development pathway for potential high performance rowers.

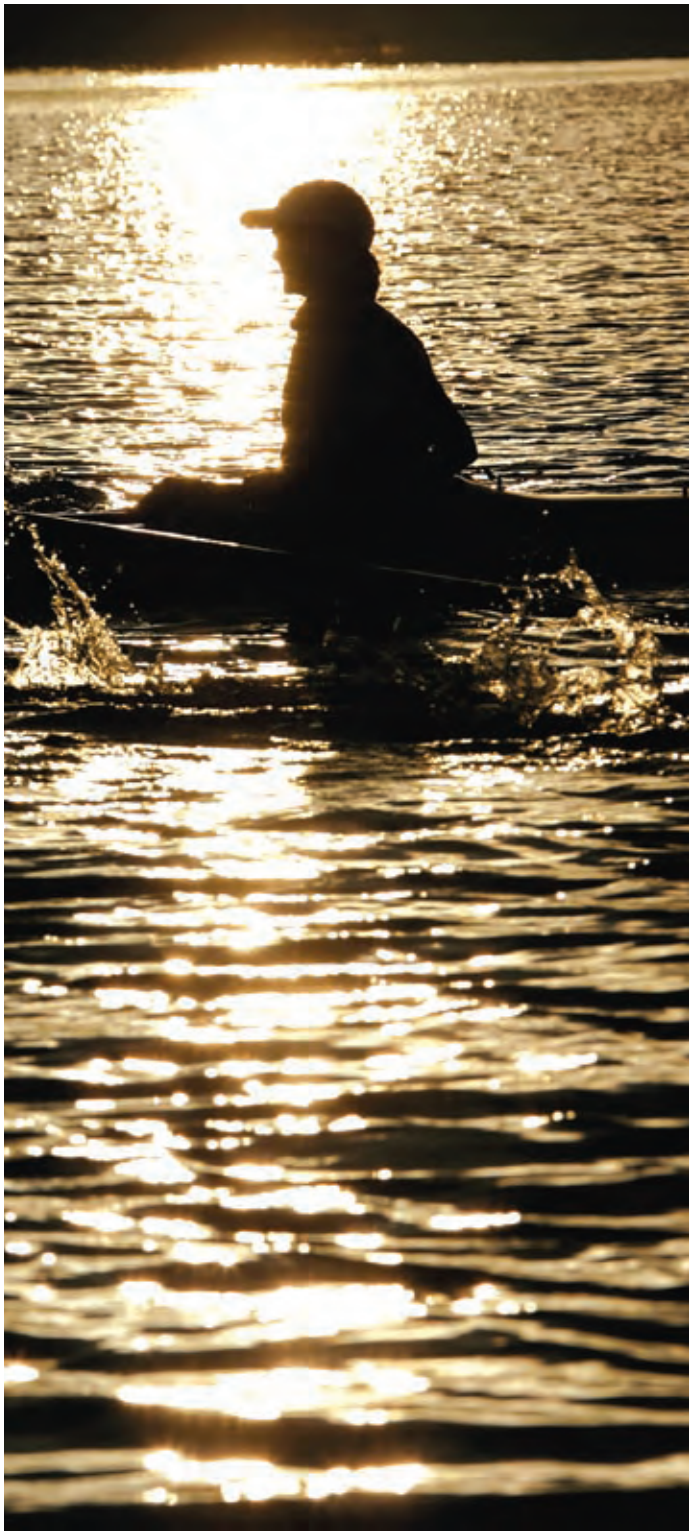
• Multi-sport games (Ontario Summer Games, Western Canada Summer Games, Canada Summer Games etc) inject resources into provincial programs and provide a development opportunity for developing athletes.

• The present system of progression within regattas does not necessarily provide a meaningful and rewarding competition experience for athletes.

• There are few opportunities for developing athletes to race National Team rowers, to gauge their boat moving ability and to take advantage of National Team rowers as role models.

• Many races have a very large gap between competitors, which is discouraging for those who are behind and fails to challenge those who are in front. Races are not "meaningful".

• The timing and types of competition make it difficult for coaches to develop a program that is properly periodized.



3. Competition System for Rowing

Race types, boat classes, progression within a regatta, progression between regattas and the annual competition schedule together constitute the "Competition System" for rowing. Below we outline our recommendations for race types and a progression system, define key recommendation for each LTAD stage and then show how these recommendations fit into an overall annual competition calendar that supports LTAD. These stage-by-stage recommendations apply to rowers who start rowing at the L2T or T2T stage. In Section 3.4 we show how they can be adapted for "late entry" rowers.

3.1 Race Types

The LTAD Plan defines specific objectives and outcomes for each development stage. It is logical that the types of race at each stage test these particular abilities, to allow athletes and coaches to gauge improvement and to motivate and adjust training. Below, we define a series of race types and the stage at which each should be introduced, based on the specific objectives and outcomes at each stage. Rowers may continue to compete in different race types throughout their development, although each stage will have a primary race type or focus. For example, athletes in the T2C stage will be focussing on 2000m racing, but can continue to compete in long distance ra :es and sprint races. They could even compete in skill competitions for fun and variety.

Race Type	Definition	Starting Stage
Skill Competition	To test the rower's boatmanship and rowing skills, including boat maneuvers. It could include an obstacle course, slalom rowing, starting and stopping etc.	Learning to Train Training to Train
Timed Skill Competition	To test the rower's boatmanship and rowing skills, as well their physical abilities (strength, endurance, speed)	Learning to Train – late stage Training to Train – early stage
Long Distance Races	To test aerobic endurance and technical abilities. Races should be > 2500m, with standard race distances of 4 km and 6 km.	Training to Train
Sprint Races	To test the anaerobic alactic system (100m), anaerobic lactic system (500m, 1000m), anaerobic/aerobic system (2000m)	Training to train (100m) Learning to Compete (500m, 1000m, 2000m)

3.2 Progression Systems

There are two types of progression: 1) progression from heat to finals within a regatta and 2) progression from regattas at one level to regattas at the next level (e.g., from regional to provincial to national). In both cases, the progression system should be designed to allow meaningful competition, where competitors are prepared for the level of racing and race against boats of comparable speed. The purpose of a progression system is:

• To create high quality, exciting races for spectators and competitors.

• To have close, "meaningful" races for athletes where they are challenged by their competitors (i.e. minimal gaps between placings)

• To promote advancement to higher divisions throughout the season based on improved speed.

1) Divisions Within a Regatta
In a regatta, for events where there are more than 6 entries, a time trial (not heats) would be held to place each boat into the appropriate division (i.e., with boats of similar speed). For events with divisions, there would be both "divisional winners" (fastest boat in each division) and a "regatta/event champion" (the fastest boat in the top division).

2) Progression to a National Championship
In many sports, athletes or teams must qualify to attend regional, provincial and national competitions. This is to ensure that competitors are "ready" for and will benefit from the level of competition. It sets up the conditions for a high quality, meaningful competition for all athletes and an interesting event for spectators.

A qualification system should be developed for rowers attending national championship regattas (Canadian Henley, NCR). Qualification could be based on results in identified qualifying regattas, with wild card spots awarded based on established criteria.

The regatta system should include regattas at each level in a hierarchy (local, regional/provincial, national), so that athletes in all parts of the country have the chance to race at regattas that are suitable to their level and stage and to progress to higher levels of racing.

There will need to be more discussion to work out the details and rules, in order to make divisions manageable for local organizing committees and to ensure fairness to all crews.

3.3 Stage-by-Stage Competition Structure

The following charts (1 per stage) state the main objectives and outcomes (from Long Term Athlete Development: an overview) and then provide key recommendations for the competition structure for that stage. Since athletes develop within a stage, not just from one stage to another, their competition experience should also progress within each stage (for example, an athlete at an early stage of L2C may do mostly sprint and long distances races, but by the end of the stage they will be doing more 2000m races). We have indicated this progression for each stage. Where it is relevant, we also include the rationale that underlies the recommendations. These stages apply to athletes who start rowing at an "optimal age" (L2T stage), but can be adapted for "late entry" rowers (see section 3.4).

Adaptive rowers have been included in this discussion recognizing that the competition structure for adaptive rowers should be similar to that for able-bodied rowers, but tailored to the nature of the disability.

Learning to Train

Age Female: 8-11 Male: 9-12

Stage Objective	Learn overall sport skills; build water sense and basic boat handling skills
Competition Objectives	Skill development and fun
Race Type(s)	• Skill and Timed Skill Competitions • Progression: Skill ‡ Timed Skill Competition
Entrant Level	• Integrated into training sessions; Demonstration – club event • Later stage: possible local races (between local clubs)
Progression Within Regatta	n/a
Number of Race Starts (including heats/qualifying time trials)	n/a
Frequency Of Races	• Competition during training • At end of learning program
Boat Type	• 1x, 2x, (2- only infrequently) • No bigger boats (see comments)
Events	1x, 2x, (2- only infrequently) Weight class: No

Events Per Day	Not really applicable – limited by time involvement for rowers and parents
Adaptive	Adaptive athletes can be integrated into competitions with able-bodied rowers, with the tasks tailored according to the nature of the disability (where necessary).
Additional Comments	• Encourage participation in other sports • Rowing season: 8-10 weeks • Examples: push off the dock independently, turn the boat, stand up in the boat, full speed to stop) • Slalom course • Scavenger hunt • Sponge tag • Obstacle course • Could be integrated into existing regattas • Rowers could progress to timed skills once they are competent performing the technical skills. • Distances must be kept short enough that physiological abilities are not important (especially no anaerobic-lactic requirements) • Introduce a system of skill levels with testing and badges (e.g. like swimming) • Quads (for safety reasons: cold water, wind, waves) • Limit boat types to 1x,2x (or 4x) - bigger boats are cumbersome to carry, not maneuverable enough on the water and restrict learning opportunities.

Training to Train

Age Female: 11-15 Male: 12-16 (depending on PHV)

Stage Objective	• Build general endurance • Develop speed and strength • Learn to scull
Competition Objectives	• Skill improvement • Endurance • Racing skills
Race Type(s)	• Timed Skill Competitions • Sprint races up to 100m • Long distance races (4km, 6km) • Progression: Timed Skill Competition ‡ Long distance races • Also: Ergometer races (100 m and 6 km)
Entrant Level	• Club • Local • Regional • In late stage: Provincial after qualification in regional regattas
Progression Within Regatta	• Long distance races – head style • Short sprints: o Time trial ‡ Division finals o Early stage - head style ‡ late stage - match races
Number of Race Starts (including heats/qualifying time trials)	• Timed Skill Competitions: n/a • Sprint races up to 100m: 10/season • Long distance races: 5/season
Frequency Of Races	• Competition during training • 1-2 local and interclub regattas • 2-3 away regattas • Max: One every two weeks
Boat Type	• 1x, 2x, 4x, (2- only infrequently and only for skill development)
Events	1x, 2x, 4x, (2- only infrequently and only for skill competition) Weight class: No
Events Per Day	• Skill event: 2/day • Long distance: 1/day • Sprint: 3/day
Adaptive	Adaptive athletes can be integrated into competitions with able-bodied rowers, with the tasks tailored according to the nature of the disability (where necessary).
Additional Comments	• Encourage ergometer competition • Rowing season: 8-10 weeks • Avoid bigger boats - they are cumbersome to carry, not maneuverable enough on the water and restrict learning opportunities. • Slalom course • Scavenger hunt • Sponge tag • Obstacles course • Possible competition: Stage Tour (10km – rest – 8km – rest – 5km) Training takes precedence over racing • Could be integrated into existing regattas • Introduce "standardized" distances • Provide challenging opportunities for early developers (e.g. design some skill tests that are not easy to do for early developer – based on coordination, timing etc.) • Provide opportunities for success for late developers (e.g. design some skill tests that favor late developers)

Learning to Compete

Age Female:15-19+ Male: 16-19+

Stage Objective	• Refine and consolidate sculling skills • Learn to sweep, with emphasis on small boats • Develop sport specific endurance, strength, speed and skills for 2000m racing
Competition Objectives	• Improve sport specific endurance • Variety of racing experiences • Racing skills • Ranking of performances
Race Type(s)	• Sprint races (all distances: 100m, 500m, 1000m, 2000m) • Long distance races (4km, 6km) • Progression: Combination of short sprints and long distance races ‡ 2000m races • Also: Ergometer races (specifically 6km and 2km)
Entrant Level	• Club ‡ National • Qualification for next level (incl. ergometer races)
Progression Within Regatta	• Long distance races – head style • Sprints: Time trial ‡ Division finals • Winner in each division; Champion at each regatta • Details need to be further developed (e.g. "honest effort rule"; ranking from one regatta to an other; handling large entries; qualification for National Championships using results from Provincial Championships, use of 'wild cards')
Number of Race Starts (including heats/qualifying time trials)	• Sprint races: 15/season • Long distance races: 10/season
Frequency Of Races	• External: 2 per month (one regional, one local) • Internal: max 1-2 per week in racing groups and 1 time trial
Boat Type	• All boat classes
Events	• All boat classes • Require athletes to race in different events at one regatta to progress in event levels: one port, one starboard, one scull event (e.g. in order to enter provincial regatta, rower needs to show that they raced all sides/sculling) Weight class: No
Events Per Day	• Early stage: 3 per day sprints; 1 per day long distance • Late stage: 2 per day (2000m) • For adaptive rowers, this may vary based on the disability. Ensure that there is sufficient recovery to avoid overuse injuries.
Adaptive	Adaptive athletes can be integrated into competitions with able-bodied rowers, with the tasks tailored according to the nature of the disability (where necessary). Athletes participating in the "arms only" category may require shorter distances.
Additional Comments	• Identify coxswains • In development regattas, encourage rowers to switch seats and sides • Consider the impact of travel time on training • Start ranking within RCA • Recognize improvement in addition to absolute performance • Limit recognition to important achievements (e.g. no recognition for "participation") • Divisional racing to guarantee meaningful competition • No international racing (e.g. no team for Junior World Championships)

Training to Compete

Age Female and Male: 19 - 22 +/-

Stage Objective	• Further develop and refine endurance • Strength and speed skills for 2000m racing • Further develop and refine racing skills
Competition Objectives	• 2000 meter racing
Race Type(s)	• Sprint & 2000m • Long distance racing. • Ergometer competitions at both 6K and 2K. • Specialization in sweep side and /or sculling begins in this stage.
Entrant Level	• Regional, provincial, national and international competitions. • Racing is organized into two streams: development and high performance. • The development stream would include regional regattas, Canada Games, provincial championships, Henley and the NCR. • The high performance stream would include all of the above as well as the U23 World Championships and Can Am races.
Progression Within Regatta	• Time trial and divisional structure should continue for rowers in the development stream. • Rowers in the high performance stream should race within the FISA format, when possible.
Number of Race Starts (including heats/qualifying time trials)	Over 20 starts.
Frequency Of Races	• Maximum 1 regatta event every two weeks.
Boat Type	• Small boat focus in the Spring, small and larger boats in the Summer months, then an evolution toward smaller boats again for the NCR.
Events	• FISA events with some priority placed on Olympic events. Many rowers will be introduced to selection races at selection camps for Canada Games, university and U23 teams. Weight class: Yes
Events Per Day	• Maximum of 2 events per day (which may mean up to 4 races/ day with heats).
Adaptive	Adaptive athletes should be integrated with able-bodied athletes, with same tasks and expectations. Tasks and training load should be tailored to the disability, where necessary. Proper classification is critical at this stage.
Additional Comments	• Establish an annual program of regional camps for U21 rowers, to continue and extend the support for U21 rowers that occurs during Canada Games years. • At Canadian Henley Regatta, add a Championship 2- race for each gender to provide more racing opportunities for U23 rowers returning from July U23 World Championships. This would allow more rowers to compete for their home clubs. • Provide long distance racing in the early Spring months with progression toward 2000 m racing in Summer and Fall. • Pursue Can-Am racing opportunities for U23 National Team members. • High Performance rowers locate to training centres only during the summer season, to respect the school year and to maintain the connection between HP rowers and their home clubs.

Training to Win

Age Female and Male: 23+

Stage Objective	• Refine technique and racing skills so athletes are as fast as they can be
Competition Objectives	• Podium performances - winning medals at World Championships and Olympic Games.
Race Type(s)	• Long distance events in the early months of the annual cycle (January to Spring) • FISA events with a priority on Olympic events. • Erg competitions will follow the same plan.
Entrant Level	• Domestic events when appropriate but most racing will occur within selection and the World Cup / World Championship / Olympic cycle and ending annually with the NCR. • Take advantage of race opportunities provided by other competitive events, such as non-Olympic events. • Sr. A team candidates, especially early stage or late entry rowers, would also have opportunities to race at the World University Championships, the Commonwealth Rowing Championships and Pan Am Games in relevant years.
Progression Within Regatta	• FISA format
Number of Race Starts (including heats/qualifying time trials)	• Roughly 20 • Each coach will individualize plan to suit crew

Frequency Of Races	• Roughly monthly but highly individualized to crew plan
Boat Type	• Specialized annually.
Events	• FISA events. Weight class: Yes
Events Per Day	• 1 event per day.
Adaptive	Same opportunities are needed at international regattas for adaptive rowers.
Additional Comments	• Refine the annual cycle to support this competition cycle - •the annual cycle would begin in early January with long distance and identification racing, develop toward Summer racing, followed by Fall 2000m racing. • Transition phase between annual cycles would be in December each year. • National Rowing Championships is a "train-through" event. • Pursue Can-Am racing opportunities for U23 National Team members.

Training to Win 2

Athletes who have been at the Train to Win stage for one or more quadrennial cycles.

Stage Objective	• To continue to enjoy racing • To maintain and where possible, improve technical, physical, racing and ancillary capacities
Competition Objectives	• Podium performances - winning medals at World Championships and Olympic Games.
Race Type(s)	• Long distance events in the early months of the annual cycle (January to spring) then FISA events with a priority on Olympic events. • Erg competitions will follow the same plan.
Entrant Level	• Domestic events when appropriate but most racing will occur within selection and the World Cup / World Championship / Olympic cycle and ending annually with the NCR.
Progression Within Regatta	• FISA format
Number of Race Starts (including heats/qualifying time trials)	• Roughly 20 • Each coach will individualize plan to suit crew
Frequency Of Races	• Roughly monthly but highly individualized to crew plan
Boat Type	• Specialized annually.
Events	• FISA events. Weight class: Yes
Events Per Day	• Ideally 1 event per day
Adaptive	Same opportunities are needed at international regattas for adaptive rowers. Individualized competition opportunities based on athlete's /crew's needs.
Additional Comments	• Competitions should be a key component of an athlete retention plan. How much competition is enough? • Consider changes in training volume to reflect "diminishing returns" at this stage. • Careful management and pacing is needed within the quadrennial cycle to retain athletes and ensure that their performance continues to improve. • National Championships is a "train-through" event.

Active For Life

Age at which athlete makes the transition from competitive sport to life-long physical activity (A4L can include more than Masters, though it usually refers to Masters)

Stage Objective	• Continue to be physically active in rowing and/or other sports. • Continue to be involved in the rowing community, as an athlete or in other capacities. • Prevent injury. Maintain/improve strength and aerobic endurance.
Competition Objectives	• Individualized.
Race Type(s)	• All race types depending on the training level and objectives of the individual rower. • Ergometer races • Seasonal racing (long distance, skill, 2000m, 1000 m)
Entrant Level	• Intra club, interclub • Regional • Provincial • National • World Masters
Progression Within Regatta	Divisional as per other stages
Number of Race Starts (including heats/qualifying time trials)	Up to 10
Frequency Of Races	• Every 2 weeks
Boat Type	• FISA boat classes
Events	• FISA events and age categories. Weight class: No
Events Per Day	2/day at 1000 meters
Adaptive	Adaptive athletes can be integrated into competitions with able-bodied rowers, with the tasks and training loads tailored according to the nature of the disability (where necessary).
Additional Comments	•There are a number of types of "Active for Life" rowers: retired National Team rower, retired intermediate/club rower, A4L rower, A4L (late entry) rower or the no racing rower. The level at which they compete should suit the type of "Active for Life" rower they are. • Masters rowers can participate in a variety of events as long as they prepare and train properly. • For both training and racing, the Masters rower requires more recovery time.

3.4 Late Entry Athletes

Many rowers start rowing relatively late, often in University. In fact, Canada has been quite successful at recruiting and developing "late entry" athletes. (About 45% of National Team athletes responded that they started rowing at 18 or older.) Late entry athletes will not fit neatly into a single development stage: their technical, physiological, social, cognitive and psychological capacities likely will be at different stages of development, depending on their previous athletic background. For example, some late entry athletes may have missed optimal windows of trainability that occurred before they started rowing. Or, if they competed in other sports during these windows, they may have the physiological capacities of a L2C athlete, but the technical ability of a L2T athlete. Coaches will need to assess late entry rowers to identify gaps in their capacities, determine the type of preparation necessary, and decide the type of competition that is appropriate for their rowing readiness. The Table below shows the preparation of different capacities (e.g., physical, mental, technical) at different stages of development. Coaches and athletes can use this Table to guide their assessment of gaps and recommend remedial work.

Here is an example of a late entry individual who started rowing in a university rowing program.

> Jill, 19, has decided that she would like to try rowing at university. She participated in a number of sports in high school and recently trained and competed at a high level in speed skating. She is 1.85m tall and has a good athletic background with a well-developed aerobic system. She is very familiar with training and competition norms as they pertain to speed skating and it is likely that these can be easily transferred to rowing. Based on her age, Jill would be in the early T2C stage, but she is missing certain capacities and skills from earlier stages. These gaps in Jill's development (up to T2C) are highlighted in the following table.

Stages of Development, by Capacity

	L2T	T2T	L2C	T2C	T2W
Physical Preparation	Developing Fundamentals	Speed Window 2, Strength, Stamina	Developing sport specific endurance, strength, speed,	Refining sport specific endurance, strength and speed.	Optimizing sport specific endurance, strength and speed
Mental Preparation	Confidence in a variety of sculling boats	Disciplined approach to training	Learning the concentration skills and how to approach racing from a psychological perspective	Individualizing psychological preparations necessary to race well.	Refining all psychological skills necessary to be a champion
Technical Preparation	Boatmanship & sculling maneuvers	Rowing maneuvers done with a timed element demonstrating strong proficiency.	Steering & bowing; 1X, 2X, 4X and 2- Row technically well in variety of competitive situations	Specializing in boat and side.	Refining technical skills for event.
Race Types	Skills & Timed Skills	Timed Skills Long Distance Sprints	Long Distance Sprints	Long Distance Sprints	Long Distance Sprints
Race level	Intra/Interclub	Inter Club & Regional	Regional Provincial National	Provincial National	National International

The red line indicates the fact that an athlete can be functioning within a number of stages at the same time. Late entry athletes can move through stages at different speeds based on previous athletic and competitive experiences.

3.5 Annual Competition Calendar

We recommend adjusting the annual competition calendar so that training and racing better align with each other, with climatic constraints and with the international competition calendar. The year would start in January and finish in December (a natural transition period), with ergometer racing in the Winter/early Spring, long distance racing in the Spring and 2000m racing in the Summer and Fall. This would have the following benefits.

• Rowers could make full use of the on-water season from March to the end of October (for most of the country). Rowers would start the season with long distance training and racing, with an emphasis on improving technique and aerobic capacity (rather than training for sprint racing too early in the season).

• Rowers across the country would be preparing for the same race distances at the same time during the year, culminating in 2000m racing at Royal Canadian Henley (for club athletes) and World Championships (for National Team athletes).

• Avoid high intensity and volume of training for May/June (for T2T and L2C) when many Junior (and university athletes have not had long on the water and have heavier academic pressures.

• Take advantage of what is a natural transition phase (December) because of inclement conditions, holidays and academic pressures.

• Encourage T2T and L2C athletes to continue training during the Summer and Fall. (In some parts of the country there is a big drop in participation and training during the Summer).

• A National Rowing Championships in the Fall allows higher level rowers to test their speed against the top athletes, at the culmination of their annual training and preparation (i.e., at the end of the annual competition cycle).

Annual Competition Calendar

	L2T	T2T	L2C	T2C Development & HP Stream	T2W	T2W2	A4L
Jan		Complementary sports					
Feb		Complementary sports Local erg races (6km & 100m)	Provincial erg 6km	Provincial erg 6km	Provincial erg 6km Domestic long distance races	Provincial erg 6km Domestic LD	erg
March		Complementary sports Local erg (6km & 100 m)	National erg 6km Provincial erg 2km	National erg 6km Provincial erg 2km	National erg 6km Provincial erg 2km Domestic long distance races	National Erg 6km Provincial Erg 2km Domestic LD races	erg
April		Inter Club (for those who can get on the water early)	National erg 2km Regional long distance races	National erg 2km	National erg 2km International long distance races	National erg 2km	Long distance races
May	Intra club	Inter Club	Regional long distance races	Regional long distance races Regional Talent Id camps in Yrs 1, 3 after Canada Games	Can AM Series (Long distance races) World Cup and/or Selection	World Cup and/or Selection	Long distance races
June	Intra club	Regional		Selection	World Cup and/or Selection	World Cup and/or Selection	Regional Sprint Races
July	Intra/Inter Club	Provincial	Provincial	Provincial World University Championships U23 Worlds	World Cup World University Championships Pan Ams & Commonwealth Championships	World Cup	Regional Sprint Races Provincial
August	Intra/Inter Club	Provincial	Henley Canada Games	Henley	Worlds/Olympics	World/ Olympics	Henley Cdn Masters
Sept		Complementary sports & weekend rowing	Regional 2000m	Regional 2000m			FISA masters
Oct		Complementary sports	Junior/High School National Championships	Regional 2000m	Can AM Series 2k races		
Nov				CURC NCR	CURC NCR	NCR	
Dec				Transition phase			

Major Features of the Annual Competition Calendar

• Season starts in January. Erg races are the competition focus in the early season, with 6 km provincial and national races in February/March and 2km races (provincial and national) in March/April.

• Long distance racing would take place in the Spring and would include regional, talent identification or international long distance races depending on the LTAD stage of the athlete.

• Athletes (T2T, L2C, T2C stages) could participate in club racing during the summer. Athletes returning from U23 World Championships would be allowed and encouraged to compete for their clubs at the Royal Canadian Henley in the Championship events.

• Rowing would extend into the Fall, with an emphasis on 2000 meter racing. The Fall calendar would include both a Junior/High School Championship (mid-October) and the RCA National Championship Regatta (in conjunction with CURC) in early November.

• A Can AM series would be initiated for developing High Performance athletes. It would include long distance races in the Spring and 2000 m races in the Fall.

• Talent identification camps for U21 athletes would be held in Years 1 and 3 of the Canada Games cycle (CG in Year 4) to capture those athletes who would get missed in a four-year cycle. This initiative would provide more development and competition experiences for U21 athletes, as well as identify talent.

• The annual calendar emphasizes intra- and inter-club competitions for athletes in the L2T stage, where the athletes are learning the basic boat-moving and boat-handling skills.

• Periodized annual training, competition and recovery programs examples will be provided for the L2T, L2C and T2C in the coaching education workshops.

Weather Concerns for Fall Rowing
Average October Temperatures at Rowing Centres In Canada

This chart shows that, across Canada, the weather is suitable for rowing in October.

	Victoria	Kelowna	Calgary	Edmonton	Regina	Winnipeg	Thunder Bay	Toronto	Ottawa	Montreal	Fredericton	Halifax	St. John
Oct.	10	7	6	6	5	6	5	10	8	8	8	9	7

(From Weather Network, statistics)

Regional On-Water Times

A review of regional on-water times considered the average date on which crews begin to row in the spring and the average date on which crews can no longer row in the fall. Not surprisingly, there is considerable disparity. Table 1 compares the estimated average number of days on the water by region. It should be read with the understanding that the information is anecdotal from regional representatives.

Table 1

Region	Days on water	Notes
BC (Van / Van. Island)	365	Short interruptions can occur in winter.
BC Interior	280	
Southern Ontario	230	With some variation east To west.
Nova Scotia	230	
Quebec	200	
Prairies	180	
Northern Ontario	180	
NB / Nfld / PEI	170	

Table 2

Region	% days before CSSRA	% days before Henley
BC (Van / Van. Island)	41	60
BC Interior	32	57
Southern Ontario	26	57
Nova Scotia	26	57
Quebec	22.5	57.5
Prairies	25	55.5
Northern Ontario	25	55.5
NB / Nfld / PEI	18	56

Many of our key competitions occur in the period between May and August. Table 2 outlines the % of the on-water days that clubs in each region have to prepare for 2 key domestic events: the CSSRA championships and Henley.

While the total number of on-water days is a function of climate and while location does confer advantages, it is clear that regional disparities are emphasized by competitions that occur earlier in the year.

4. Summary of Key Recommendations for Change

1) Rowers in the Learning to Train stage should start by participating in Skill competitions and progress to Timed Skill competitions.

Rationale:
This is the period of optimal trainability for skills. Children at this age benefit from a focus on skill development but get relatively little benefit from aerobic or strength training. In addition, many novice rowers lack the boat maneuvering skills required for racing effectively and safely. Skill competitions will encourage coaches to focus training on building a solid foundation of skills for later training and racing, as well as motivating athletes to improve their skills.

2) In the Training to Train stage, athletes should start by participating in timed skill competitions and progress to sprint races (100m) and long distance races (4km, 6km), at the appropriate time in the season and in their development.

Rationale:
This is the period of optimal trainability for speed and stamina (aerobic capacity). Races at this stage should emphasize these capacities to encourage appropriate training. In addition, training should take precedence over racing: preparing for 2000m racing can detract from building aerobic capacity during this critical phase in development.

3) In the Training to Train stage, regatta events should be limited to small boats (1X, 2X, 4X).

Rationale:
Rowing in small boats promotes technical development and allows coaches to individualize training to accommodate athletes with different rates of development. Big boats limit learning opportunities and can be cumbersome to carry and to maneuver on the water. Pairs can be rowed in practice (infrequently) but only for an introduction to sweep rowing.

4) In the Training to Train stage, regattas should be limited to club and regional regattas initially, progressing to a provincial regatta after qualifying through regional competitive events.

Rationale:
Athletes in the Training to Train stage are encouraged to participate in complementary sports and, as stated earlier, racing should support, but not interfere with, training. Preparing for a National Championship may discourage athletes from participating in other sports and may result in an overemphasis on high intensity, anaerobic training which is inappropriate at this stage

5) In the T2T, L2C, and T2C stages boats should be grouped into divisional finals based on boat speed (determined in a time trial).

Rationale:
Using divisional finals based on speed addresses the disparity that can arise between a) early and late maturing athletes and b) between early and late entry athletes. Athletes that are the same age chronologically may be several years apart in terms of their "developmental age". Grouping athletes by boat speed rather than age means that late developers and smaller athletes will have a better chance of getting good, competitive racing. It also eliminates the need for lightweight events for juniors (and avoids the problems inherent in juniors making weight). Similarly, late entry athletes will have an opportunity for good, competitive racing during the period when their technical skills may limit their boat speed.

6) At the Learning to Compete stage, Rowing Canada Aviron should target a wide pool of developing athletes, investing in the CanAmMex series, talent identification/development camps, and making better use of Canada Games resources. RCA should use these initiatives, rather than the Junior World Championships, to develop rowers for the National Team.

Rationale:
Competing at the Junior World Championships benefits a relatively small number of athletes (14% of the National Team athletes surveyed competed at the Junior World Championships). While the experience is valuable for those athletes, it is expensive, with the benefits concentrated on a narrow pool of athletes, and may be biased in favour of early maturing athletes. It is risky to narrow the pool of athletes too early, when differences in speed may simply reflect differences in maturation rate. You run the risk of discouraging and restricting development opportunities for late-maturing athletes who may be future high performance athletes. Instead of focussing limited resources on a few athletes at what is still an early stage in development, RCA could invest in providing more high quality race experiences to more junior athletes within Canada or North America. In addition, preparing for the World Championships may lead to volumes and types of training that are not optimal for this stage and not consistent its objectives. (Preparing and competing for a World Championships is consistent with the next stage – T2C).

Considerable resources are put into Canada Summer Games through provincial sport organizations. Compared to other sports, RCA is not using the Canada Games (and its resources) effectively as a training ground for the "next generation" of National Team members. Making better use of these resources would free up both human and financial resources for the U23 squad where RCA sees a much larger return on the investment.

We are not suggesting that RCA stop supporting junior athletes. Rather, we are suggesting that that support be shifted to programs that benefit a larger pool of developing athletes and that are more consistent with the training objectives of the L2C stage.

7) Royal Canadian Henley should add Championship 2 – race for each gender to accommodate high performance athletes in the Training to Compete stage.

Rationale:
Many clubs put resources into developing athletes for the National Team. These athletes can be valuable role models for developing club athletes, contributing to a strong, competitive club system. Yet National Team athletes rarely have the opportunity to represent their clubs at domestic regattas. By adding a Championship pair event at Royal Canadian Henley, National Team athletes returning from the U23 World Championships will have an opportunity to race at Henley and represent their home club at a prestigious domestic regatta.

8) There should be a High School/Junior Championship regatta held in the Fall.

Rationale:
Rowers in most of Canada do not get onto the water until April/May. This gives them only a very short period to prepare for a championships in June. Aerobic training may suffer at the expense of preparing for a sprint race. In addition, a June championship conflicts with a stressful academic period, when students are preparing for final exams.

Appendix 1

RCA Race Distance Chart – LTAD

This chart provides race distances, the energy system being trained and it identifies the stage when it should be introduced based on the optimal windows of trainability (LTAD plan for rowing, p. 10 & 11).

Race Distance	Energy System	Starting Stage
100 metres	Anaerobic Alactic	Training to Train
500 metres	Anaerobic Lactic	Learning to Compete
1000 metres	Anaerobic Lactic	Learning to Compete
2000 metres	Anaerobic lactic/ Aerobic	Learning to Compete
4000 metres	Aerobic	Training to Train
6000 metres	Aerobic	Training to Train

Appendix 2

Summary of the data and information gathered as part of the review process

Descriptive data were gathered from Canada Games Council, Sport Canada, FISA and National Team rowers (retired and current).

Athlete Survey - National Team Rowers (retired & current)

The survey was emailed to rowers carded in 2007 and to rowers who won medals at either the Olympic Games or the Senior World Championships between 1992 and 2006 (inclusive). Of the 120 rowers contacted, 75 athletes (63%) completed the survey.

The purpose of the survey was to get an initial picture of the competition history of "successful" Canadian rowers, to see if any patterns emerge (some of which might warrant further investigation) and to provide a starting point for describing the development pathway of Canadian rowers. The survey design is descriptive only: it does not allow for inferences about cause and effect. (For example, we cannot say for sure that the apparent increase in the % of carded rowers who are Canada Games Alumni is a result of the change from U19 to U21. The increase coincides with the change in age, but other factors also may have contributed.) We must also be cautious in extrapolating the results to future athletes. Despite these limitations, the data do start to provide us with a picture where none existed before.

Ages and Stages

There appears to be no bias in favour of athletes born in the first third of the year. In fact, more of the respondents were born in the final third of the year than in either the first and second third. This was true for all respondents and for medallists only.

Almost all (72/75) athletes participated and competed in other sports before or as well as rowing, with many participating in a variety (3 or more) of sports. About 13% competed at the National or International level in another sport, 22% at the Provincial level and 36% at the Regional level.

General Competition History

About half of the athletes rowed for their High School. Two-thirds (68%) rowed at a Canadian University, while one third (27%) rowed at a US university, 5% did not row for any university. For medalists, 78% rowed at a Canadian university and 18% at a US university. The apparent difference may be at least in part because more rowers get US scholarships now than in the past. Nevertheless, it does suggest that attending a US university is not essential to international success.

None of the athletes felt that they over-competed in university. Most (71%) felt they competed the right amount although some (21%) felt there was not enough competition.

Most athletes listed several other regattas when asked if there were any other regattas that contributed to their development. They included regattas at all levels (local to international) and both head races and 2000m races. Many athletes also added comments on the value of their competitive experiences.

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Specific Competition History

Junior Worlds
Few athletes (14%) competed at the Junior World Championships but most respondents and all Jr. medalists rated it as a valuable or very valuable experience.

U23 Worlds
42% of respondents (28% of medalists) participated in the U23 World Championships. Most rated it as a very valuable experience. (Note that while the U23 World Championships have existed in some form for about 30 years, it has only been a FISA World Championship event since 2004.)

Canada Games
25% of athletes competed in the Canada Games. While many consider it valuable, fewer consider it very valuable compared with U23, Junior Worlds or CSSRA.

Pan American Games
28% of athletes (22% of medallists) competed in the Pan Am Games. While the participation rate is similar to that for Canada Games and U23 and more than for Junior Worlds, in general, athletes considered the Pan Ams less valuable.

CanAmMex
Only 6 respondents had competed in Canamex.

Domestic Regattas
Of the other regattas listed, most athletes competed in Canadian Henley (94% of medallists, 88% of all athletes)

and National Championships/Canada Cup (86%). Many competed in Provincial Championships (65% of medalists, 55% of all athletes), Canadian University Championships (about 50%) and CSSRA (45% and 41%). Most athletes ranked Canadian Henley and CSSRA as very valuable or valuable. Fewer athletes considered the National Championships/Canada Cup very valuable. The Provincial Championships were considered less valuable than other regattas.

Canada Games Data

These data were obtained from the Canada Games Council.

• The % of carded rowers who are CG Alumni appears to increase in the years following 1993 (when the age was U21) compared to the years before (when the age was U19).

• Both the % of Canada Games rowers who end up being carded and the % who make the National Team appear to be higher for those who competed in CG in 1993 and later (U21) compared to those who competed before 1993 (U19).

• Why do a higher % of CG rowers from BC end up carded or on the National Team, compared to Ontario, given that they have similar depth and number of rowers?

• Compared with other sports, fewer carded rowers are CG Alumni and it appears that a higher % of rowers miss CG because they are too old (the "Missing Generation"). (Although the difference appears less in the years following the change in age to U21, it is still there). From 1983-2003, across all sports 39% of carded athletes were CG Alumni. For Rowing, 18% were CG Alumni from 1983-2003; 24% from 1995-2003.

Considerable resources are invested in getting athletes to the Canada Games. Provincial governments provide development dollars for athletes and coaches. Is Rowing Canada benefiting from this investment? It would appear from the Canada Games data, that RCA is not getting the same benefit, in terms of athlete development, as other sports.

FISA Data

Strong inferences should not be made based on the FISA data as the sample size is very small, from a very narrow pool of athletes, and of unknown reliability. Nevertheless, it is interesting to note that:

• Fewer than half (7/19) report competing in the Jr. Worlds

• More than half (13/19) report competing at the U23 Worlds.

• 14 competed at either Jr Worlds or U23, 3 competed at both, 2 competed at neither.

• There is a wide range in the development pattern (e.g., ages at which they started rowing, first competed at the Sr. A Worlds, first won a medal etc.).

• On average, the top rowers first win a medal at only their second World Championships (range 0-4 years). On average, they compete at the international level (Jr, U23, SrA) for 2.6 years (range 0-6 years) before winning a medal at the Senior A World Championships.

• Because of the small sample size, it is hard to say whether those who competed at the Jr Worlds won their first medal at the Sr. Worlds sooner (at a younger age or after fewer years). There is no obvious pattern.

Success at the Sr A World Championships is typically preceded by experience at either the Jr. World Championships or the U23 Worlds Championship; less typically do athletes compete in both. More athletes competed at the U23 Worlds than at the Jr. Worlds.

Carding Data

These data were obtained from Sport Canada and cover athletes who competed in the 1992 Olympic Games and all athletes carded after the 1992 Games.

• Based on these data, rowers are first carded when they are about 23. They are last carded when they are about 27. Olympic rowers are carded for longer (typically until 29).

• Based on these data, rowers are carded for about 4 years, with Olympic rowers carded for longer (just over 5 years). These averages may underestimate the real picture as they do not include athletes who are still carded in 2007 and I suspect that the typical length of a rower's career is longer now than in the past.

• Note that these averages include athletes in T2C, as well as T2W and T2W2 stages. Some of the T2C athletes would not have made it to the higher stages in development. This is a broader pool than that of the Athlete Survey (medalists and currently carded athletes).

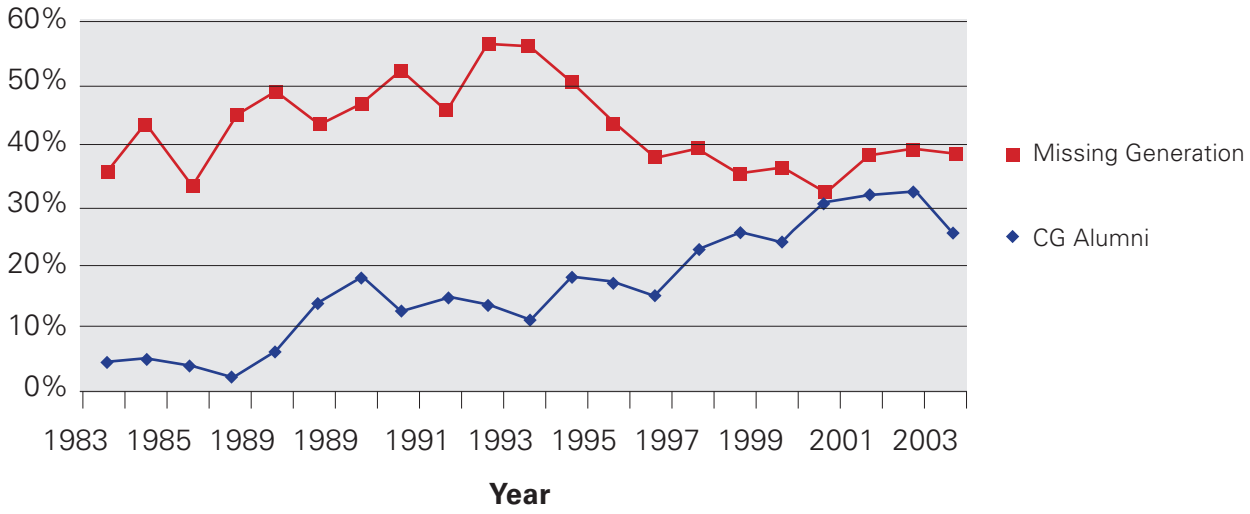
• In order to determine the number of athletes at each stage of development (L2T, T2T, L2C, T2C, T2W/T2W2) and the attrition rate between stages, we would need reliable and consistent RCA registration data from more years.

Tables and figures

Canada Games

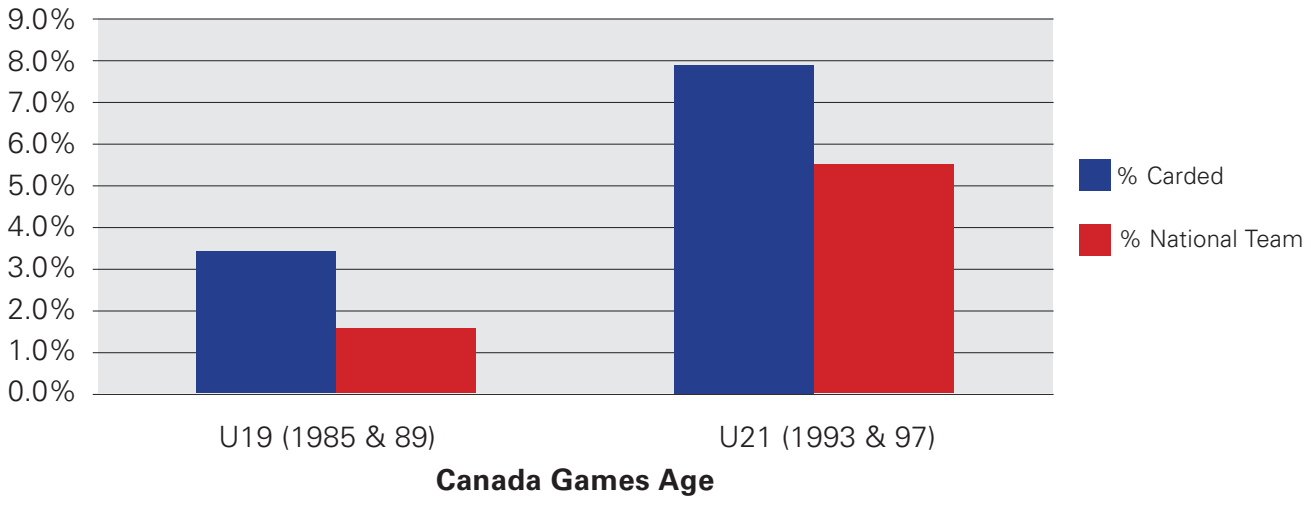
1. What % of carded rowers competed in Canada Games? How did this change when the age was changed from U19 to U21 in 1993?

% Of Card Rowers Who Are Canada Games Alumni



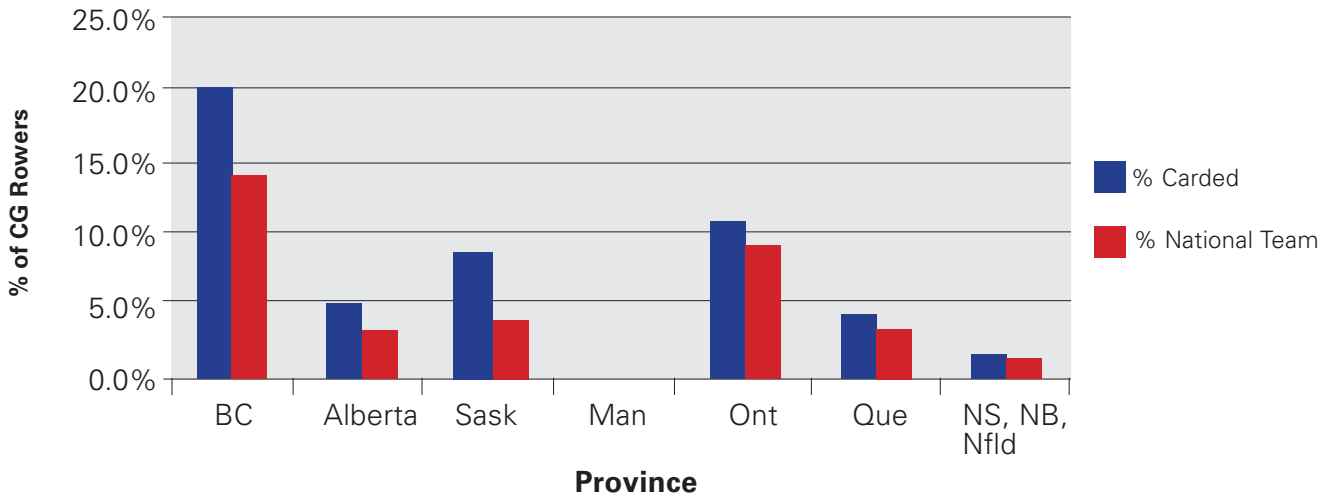
2. What % of Canada Games rowers went on to be carded or make the National Team when the age was U19 compared to U21?

Success of Canada Games Alumni U19 and U21



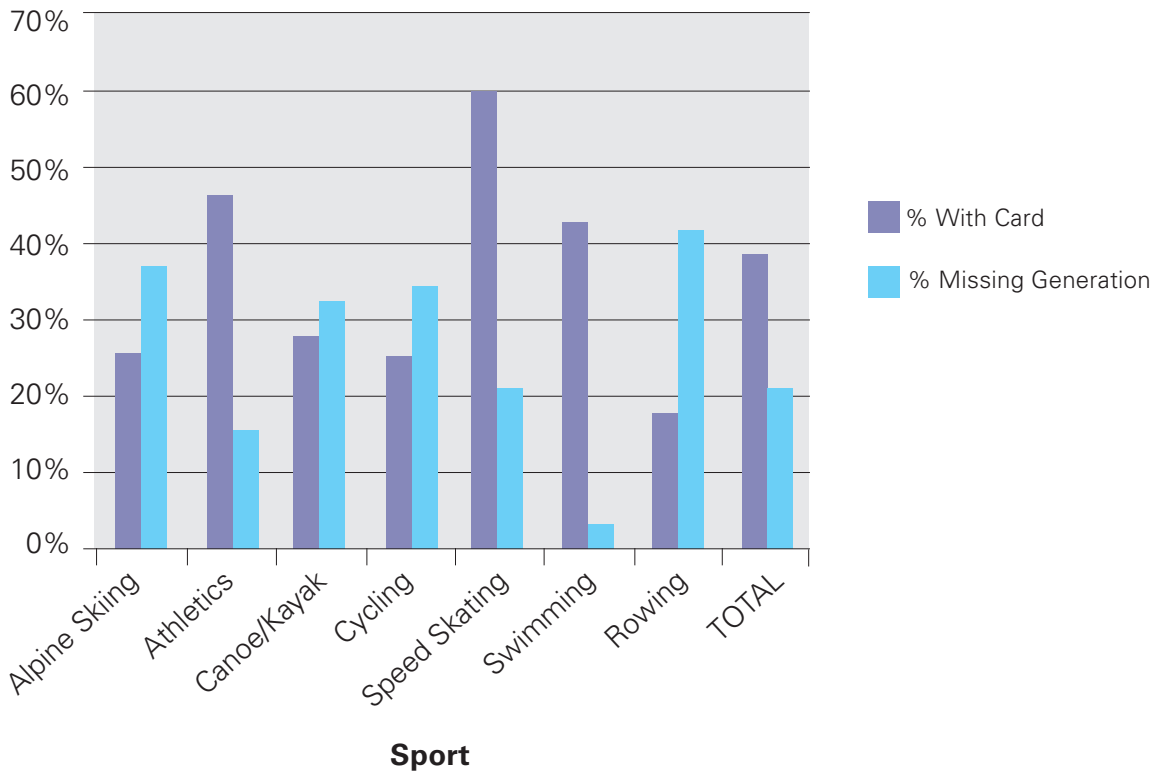
3. For each Province, what % of Canada Games rowers went on to be carded or make the National Team?

Success of Canada Games Rowers



4. What % of carded rowers are CG Alumni and what % miss CG because they are too old ("Missing Generation") compared with selected other sports and total (all sports)?

% of Carded Athletes who are Canada Games Alumni and Missing Generation



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• Both the % of Canada Games rowers who end up being carded and the % who make the National Team appear to be higher for those who competed in CG in 1993 and later (U21) compared to those who competed before 1993 (U19).

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• Compared with other sports, fewer carded rowers are CG Alumni and it appears that a higher % of rowers miss CG because they are too old (the "Missing Generation"). (Although the difference appears less in the years following the change in age to U21, is it still there). From 1983-2003, across all sports 39% of carded athletes were CG Alumni. For Rowing, 18% were CG Alumni from 1983-2003; 24% from 1995-2003.

Sport Canada Carding Information

Carding History of Retired Rowers

	Age first carded	Age last carded*	# yrs carded
All Olympic rowers* (1992-2004)	23.03	29.27	6.25
Retired Olympic rowers (1992-2004)	23.24	29.00	5.76
All retired rowers (1992-2007)	23.48	27.29	3.81

*Age last carded is not necessarily the same as retirement age.

• Based on these data, rowers are first carded when they are about 23. They are last carded when they are about 27. Olympic rowers are carded for longer (typically until 29).

• Based on these dvata, rowers are carded for about 4 years, with Olympic rowers carded for longer (just over 5 years). I suspect that these averages underestimate the real picture as they do not include athletes who are still carded in 2007 and I suspect that the typical length of a rower's career is longer now than in the past.

• Note that these averages include athletes in T2C, T2W and T2W2 stages. Some of these athletes would not have made it to the higher stages in development. This is a broader pool than that of the Athlete Survey (medallists and currently carded athletes).

• In order to determine the number of athletes at each stage of development (L2T, T2T, L2C, T2C, T2W/T2W2) and the attrition rate between stages, we would need reliable and consistent RCA registration data from more years.

FISA Data

History of Top 10 Male and Top 9 Female Rowers (2006)

	Jr World	U/23	Both	Age			# yrs before first WCh medal		Career to 2006 (yrs)
				Started rowing	1st WCh.	1st WCh medal	rowing	Internat'l racing	
MEN	3/10	8/10	2/10						
Average	n/a	n/a	n/a	12.75	21.0	22.0	9.13	2.60	10.6
Range	n/a	n/a	n/a	10-17	18-23	19-24	5-13	0-6	6-16
WOMEN	4/9	5/9	1/9						
Average	n/a	n/a	n/a	15.17	21.11	22.11	8.00	2.44	6.56
Range	n/a	n/a	n/a	13-18	19-24	19-25	6-11	0-6	1-15
ALL	7/19	13/19	3/19						
Average	n/a	n/a	n/a	13.79	21.05	22.05	8.69	2.53	8.68
Range	n/a	n/a	n/a	10-18	18-24	19-25	5-13	0-6	1-16

We can't make any inferences based on the FISA data as the sample size is very small, from a very narrow pool of athletes, and of unknown reliability. Nevertheless, it is interesting to note that:

• Fewer than half (7/19) report competing in the Jr. Worlds .

• More than half (13/19) report competing at the U23 Worlds.

• 14 competed at either Jr Worlds or U23, 3 competed at both, 2 competed at neither.

• There is a wide range in the development pattern (e.g., ages at which they started rowing, first competed at the Sr. A Worlds, first won a medal etc.).

• On average, the top rowers first win a medal at only their second World Championships (range 0-4 years). On average, they compete at the international level (Jr, U23, SrA) for 2.6 years (range 0-6 years) before winning a medal at the Senior A World Championships.

• Because of the small sample size, it is hard to say whether those who competed at the Jr Worlds won their first medal at the Sr. Worlds sooner (at a younger age or after fewer years). There is no obvious pattern.

Later success at the Sr A World Championships is typically preceded by experience at either the Jr. World Championships or the U23 Worlds Championship. Less typically do athletes compete in both. More athletes competed at the U23 Worlds than at the Jr. Worlds.

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