



BOWLING'S



COMPETITION REVIEW



Canada



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INTRODUCTION

Bowling continues to be one of Canada's foremost participation sports, with over two million Canadians reporting that they have bowled at least one time. Many of these people perceive bowling as a strictly recreational activity, bowling just a few times in a year. However, the tradition of league/competitive bowling remains a popular choice for thousands of Canadians. Over the years, the number of (less frequent) social/recreational bowlers in Canada has increased dramatically, while the number of (more frequent) competitive bowlers has declined. The most recent data indicates a league bowling to recreational bowling ratio of 55:45, whereas this number was approximately 70:30 during the 1980s. The Bowling Federation of Canada (BFC) is a partnership of the major stakeholder groups pertaining to bowling in Canada, with equal representation from the bowling centre proprietors (Bowl Canada), the Canadian 5 Pin Bowlers' Association (C5PBA) and the Canadian Tenpin Federation

(CTF). All three stakeholder groups are motivated to stop the decline in competitive bowling. This goes hand in hand with the Long Term Athlete Development Plan for Bowling (LTAD), which was unveiled by the BFC in 2010. LTAD is an element of Canadian Sport for Life (CS4L), which is a Made in Canada approach to athlete development that is based on developing the physical, technical, emotional, and cognitive development of sport participants. (LTAD Plan for Bowling, BFC 2010)

With the cooperation of all stakeholders, including bowlers, coaches, parents, and the various associations, we have the opportunity to change bowling for the better. Not only can we reverse the negative trend of competitive bowling, but we can also help to preserve the bowlers that are currently engaged in recreational and competitive play. By ensuring that our competition structure adequately meets the needs of bowlers at each of the LTAD stages, we stand to make our

game more enjoyable by helping bowlers and coaches achieve greater levels of success in our sport. In addition, the sport of bowling is very fortunate in that all ages and abilities are able to participate, which stands to benefit the Canadian population in terms of physical literacy. More specifically, since all Canadians are encouraged to participate in at least 60 minutes of physical activity a number of times a week, bowling exists as a fun, active option that can help people attain this goal. Bowling can also help younger Canadians learn fundamental movement skills that can help in many areas of one's life.

This document links the major concepts of Long Term Athlete Development to the Competition Structure of bowling. The result for athletes who choose the excellence/competitive pathway is a clear roadmap for how one can achieve the pinnacle in their sport, which is the National Championships in 5 Pin, and International Competition for 10 Pin.

WHY A COMPETITION REVIEW IS NEEDED

The sport of bowling in Canada has traditionally focused on coaching and progression based solely on age. This is inconsistent with the LTAD framework which emphasizes the fact that an athlete's proficiency level must also be taken into account. The reasons for this are many, but certainly the two most important reasons are to enhance the athlete's skill level and enjoyment level. More often than not, an athlete who is able to participate in a sport with an adequate level of competence will enjoy participating in that sport to a greater degree, and will remain active in that sport longer.

In the LTAD framework, an athlete progresses through the various stages, starting with the learning process (FUNDamentals and Learn to Bowl) before advancing to the subsequent stages of training, various levels of competition (if desired), and ultimately lifelong enjoyment. The Bowling Federation of Canada (BFC) and its members are motivated to identify these inconsistencies and work to recommend changes so that a bowlers' enjoyment level increases, as does their time spent in the sport. A review of the bowling competitions offered in Canada is the next step in assisting the BFC to align their various programs with LTAD.

There is some concern in bowling that young bowlers are encouraged to compete from too early an age. Referring to the LTAD framework, this can lead to early burnout, both physically and mentally. In addition, the national youth bowling competitions are simply adult competition models that are imposed on youth bowlers. Sadly, some youth national competitions are even more gruelling than the adult competitions.

The other significant inconsistency is the lack of periodization amongst top-level bowlers. A change to a focus on the timing of competitions would go a long way to increasing Canada's standing at international competitions. Canada has some of the top periodization experts in the world, so ignoring this important aspect of competitions would indeed be a shame.

Comparing a current snapshot of competitive bowlers to a snapshot twenty years ago, it is evident that there are far fewer participants in bowling competitions at all levels. This is a major concern for all BFC partners. A thorough Competition Review is a necessary step to addressing these concerns and recommending steps to help reverse this trend.

MANDATE AND PROCESS

At a February, 2012 meeting of bowling industry stakeholders, attendees had the opportunity to familiarize themselves with the LTAD implementation process. Attendees at this meeting represented Bowl Canada (proprietors), the Canadian 5 Pin Bowlers' Association (C5PBA) and the Canadian Tenpin Federation (CTF).

In 2013, the Board of Directors of the BFC requested that a committee review the competition structure of bowling in Canada through the lens of LTAD. This Competition Review Committee first convened in February, 2013. This group defined their project as 'creation of a competition structure developmentally appropriate for bowling in Canada, aligned with the LTAD Plan for Bowling'. An additional meeting in October, 2013 enabled the Competition Review Committee to once again address some of the gaps in the competition systems of bowling in Canada. The result of these meetings is this document - the Competition Review and Recommendations.

Istvan Balyi's pioneering research on competition and training periodization indicates that competition, while healthy and sometimes necessary at certain LTAD stages, can be damaging if attempted too early. In addition, competition and training schedules must be properly planned so as to enhance engagement in the sport. As such, a face-to-face meeting with Balyi helped to shed some light on how bowling competitions in Canada can be better suited to the various LTAD stages. This meeting took place in January, 2014, and Balyi closely examined the competition structure of bowling in Canada, including zone, provincial, national and international competitions of all three groups (Bowl Canada, C5PBA, CTF), as well as training schedules.

WHY DO WE NEED A COMPETITION REVIEW ?

- Traditionally, progression in the sport is based on age rather than ability
- LTAD Principles indicate that bowlers at different stages need to be doing the right things at the right time in order to perform to their full potential
- time is not taken to work on fundamental movement skills, so bowlers advance without having achieved the necessary Agility, Balance and Coordination levels critical to becoming a successful bowler: a widespread focus on fundamental bowling and movement skills will help to reduce the incidence of blowouts at competitions, thus ensuring that competitions are meaningful for those involved
- internal research has demonstrated that there is a need to focus on bowlers' ability to make spares - spare conversion ratios was considered to be too low (see [Appendix A and Appendix B](#))
- we need to consider the massive travel distances that exist in our competitions, which lead to competitions being cost prohibitive for both bowlers and provincial & national associations: for younger bowlers, we must determine to what extent they should be travelling to attend competitions
- BFC needs to consider the length of the bowling season, as applied to each stage. if the season is too short, there will not be enough time to prepare for competitions, and if too long, it may inhibit skill development
- Bowling has an opportunity, based on the universal demographic appeal (i.e. older adults, Baby Boomers). These people tend to gravitate towards social activities, of which bowling is one, with the added benefit of maintaining physical literacy, as well as the thrill of competition, should they choose this pathway.
- all stakeholder groups want to work toward the retention of bowlers
- length of the season must be appropriate for all stages
- when considering younger bowlers, we must focus on the number of competitions and the length of the season. More specifically, too many competitions is considered counterproductive.
- quantitative data suggests that performance gaps are prevalent (eg. [Spare Conversion](#))
- the adult competition model is applied to youth bowlers, which inhibits skill development: for example, youth bowlers at a national championship bowl more games (24 games) than adults at the Open Championship (21 games)

COMPETITION REVIEW DEFINITIONS

i. DEVELOPMENTALLY APPROPRIATE

Bowlers should participate in competitions that are suitable to their stage and age. Competitions should be structured in a way so as to emphasize and reinforce the performance of stage-specific skills identified in the BFC's LTAD framework. The adult game (Train to Win) should not be the same for the beginning bowler (Learn to Bowl).

ii. MEANINGFUL COMPETITION

In this context, meaningful is about bowlers being in competitions that are 'close'. Tiering, progression systems, or qualifying standards may be put in place to ensure that the athlete gets a meaningful competitive experience. In this way, all competitors, regardless of where they finish, learn something on how they can improve their game for the next time. In bowling, a competition is said to be meaningful if the score is within 25% of the winner's score.

iii. CLEAR ATHLETE DEVELOPMENT PATHWAY

Bowlers, coaches, and parents will be provided with a roadmap that outlines the skills and scores needed to be competitive at various levels of competition. Further, this pathway will show types of tournaments and when a bowler should begin to travel, and how far they may have to travel, to find the right level of competition for their skill level. Some examples include: short, eight week leagues that introduce fundamental movement skills and physical literacy and/or kids playing from the arrows (thus shortening the length of the lane).



COMPETITION REVIEW PROCESS

1. Identification of stage appropriate principles for bowlers (i.e. data mining)
2. Gap analysis of bowler performances based on proficiencies identified in BFC's LTAD Framework.
3. Examination of the Competition calendar based on the principles of periodization
4. Analyzed and defined what meaningful competition means in bowling
5. Identification of preliminary recommendations

IDEAL COMPETITION STRUCTURE

In the process of Competition Review and Restructuring, it is important to take the time to align competitions with the LTAD framework. This includes, but is not limited to, a thorough analysis of stage-specific objectives, competition calendar, length of season, number of major and minor competitions and other periodization factors (training, recovery, sleep, etc.).



MAJOR / MINOR COMPETITIONS (BY STAGE)

Youth

STAGE 6 - Train to Win - International - 10 Pin Only

MAJOR COMPETITIONS

- 1) Junior Worlds (U21)
- 2) PABCON (U20)

MINOR COMPETITIONS

- 1) CTF Youth Nationals
- 2) YBC Nationals
- 3) Bowl Canada Cup (age 19+)
- 4) Canadian Team Trials

TRAIN THROUGH COMPETITIONS

- 1) League (28-32 Train Through competitions)
- 2) CTF Youth Provincials
- 3) YBC Provincials
- 4) Bowl Canada Cup Provincials (19+)

STAGE 5 -Train to Win - National (10 Pin)

MAJOR COMPETITIONS

- 1) CTF Youth Nationals
- 2) YBC Nationals
- 3) Bowl Canada Cup (age 19+)
- 4) Canadian Team Trials

MINOR COMPETITIONS

- 1) CTF Youth Provincials
- 2) YBC Provincials
- 3) Bowl Canada Cup Provincials (age 19+)

TRAIN THROUGH COMPETITIONS

- 1) Local Scratch tournaments (Youth and/or adult)
- 2) Local Handicap tournaments (Youth and/or adult)
- 3) League (28-32 competitions)

STAGE 5 -Train to Win - National (5 Pin)

MAJOR COMPETITIONS

- 1) Youth Challenge Nationals
- 2) YBC Nationals
- 3) Bowl Canada Cup Nationals (age 19+)

MINOR COMPETITIONS

- 1) Youth Challenge Provincials
- 2) YBC Provincials
- 3) Bowl Canada Cup Provincials (age 19+)
- 4) High-Low Doubles Provincials

TRAIN THROUGH COMPETITIONS

- 1) Local Scratch Tournaments
- 2) Local Pins Over Average Tournaments
- 3) League (28-32 competitions)

STAGE 4 - Train to Compete - 10 Pin

MAJOR COMPETITIONS

- 1) CTF Youth Provincials
- 2) YBC Provincials
- 3) Bowl Canada Cup Provincials
- 4) Local Scratch tournaments

MINOR COMPETITIONS

- 1) Local Handicap Tournaments
- 2) Bowl Canada Cup - House Cup

TRAIN THROUGH COMPETITIONS

- 1) Bowl Canada Cup - League Round
- 2) League (28-32 competitions)

STAGE 4 - Train to Compete - 5 Pin

MAJOR COMPETITIONS

- 1) Youth Challenge Provincials
- 2) YBC Provincials
- 3) Bowl Canada Cup Provincials
- 4) Local Scratch Tournaments

MINOR COMPETITIONS

- 1) Local Pins Over Average Tournaments
- 2) Bowl Canada Cup - House Cup

TRAIN THROUGH COMPETITIONS

- 1) Bowl Canada Cup - League Round
- 2) League (28-32 competitions)

Youth - Continued

STAGE 3 - Train to Perform - 10 pin

MAJOR COMPETITIONS

- 1) CTF Regional
- 2) YBC Zones
- 3) Regional Scratch and/or Handicap Tournaments

MINOR COMPETITIONS

- 1) Local scratch and/or handicap tournaments

TRAIN THROUGH COMPETITIONS

- 1) League (28-32 competitions)

STAGE 3 - Train to Perform - 5 pin

MAJOR COMPETITIONS

- 1) YBC Zones
- 2) Provincial Pins Over Average Tournament(s)
- 3) Regional Scratch and/or Pins Over Average events

MINOR COMPETITIONS

- 1) Local Scratch and/or Pins Over Average Tournaments

TRAIN THROUGH COMPETITIONS

- 1) League (28-32 competitions)

(Istvan Balyi refers to this as 'Building the Bowlers', noting that 'this is where you make or break an athlete', sport specialization begins here)

STAGE 2 - Learn to Bowl

MAJOR COMPETITIONS

- 1) League (8-, 10-, 28-week progressions recommended):
e.g. 8 for 8, 10 for 10, 12 for 12 programs
- 2) YBC house rounds
- 3) In-house Tournaments (e.g. Family Twosome, I Beat My Coach, Hi-Lo Doubles)

Participation in complementary sports is important at this stage

STAGE 1 - FUNDamentals

MAJOR COMPETITIONS

- 1) Short-Season Leagues
: e.g. 8 for 8, 10 for 10, 12 for 12 programs
- 2) Fun in-house skills competitions

Encourage complementary sports & activities

MAJOR / MINOR COMPETITIONS (BY STAGE)

Adult

STAGE 6 - Train to Win - International - 10 Pin Only

MAJOR COMPETITIONS

- 1) Pan Am Games
- 2) Commonwealth Games
- 3) PABCON (Men's & Women's alternate)
- 4) Qubica/AMF Bowling World Cup
- 5) Worlds (Men's & Women's alternate)

MINOR COMPETITIONS

- 1) Canadian Nationals
- 2) Qubica/AMF Bowling World Cup Nationals
- 3) Canadian Mixed

TRAIN THROUGH COMPETITIONS

- 1) Bowl Canada Cup Nationals
- 2) Bowling World Cup Provincials
- 3) CTF Provincials
- 4) Provincial Association Scratch Tournaments
- 5) League (28-32 Train Through competitions)

STAGE 5 - Train to Win - National - 10 Pin

MAJOR COMPETITIONS

- 1) Bowl Canada Cup Nationals
- 2) National Mixed
- 3) CTF Nationals

MINOR COMPETITIONS

- 1) Bowl Canada Cup Provincials
- 2) Provincial Assn Championships (e.g. BCTF Provincials)

TRAIN THROUGH COMPETITIONS

- 1) League (~ 32 competitions)
- 2) Bowl Canada Cup - House Cup
- 3) Bowl Canada Cup - League Round
- 4) Local Assn Scratch Tournaments

STAGE 5 - Train to Win - National - 5 Pin

MAJOR COMPETITIONS

- 1) C5 Open Nationals
- 2) Tournament Masters Nationals
- 3) Bowl Canada Cup Nationals

MINOR COMPETITIONS

- 1) Tournament Masters Provincials
- 2) Provincial Open
- 3) C5PBA Inter-Provincial Tournament
- 4) Out-of-Province Scratch events (tournaments attracting national-calibre bowlers... e.g. Scottsdale Classic, TPC Edmonton, etc.)

TRAIN THROUGH COMPETITIONS

- 1) League (~32 Competitions)
- 2) Bowl Canada Cup Provincials
- 3) Bowl Canada Cup - House Cup
- 4) Local Scratch Tournaments
- 5) Regional Open Qualifier



Adult - Continued

STAGE 4 - Train to Compete - 10 Pin

MAJOR COMPETITIONS

- 1) Bowl Canada Cup Nationals
- 2) National Mixed
- 3) Local Scratch Tournaments

MINOR COMPETITIONS

- 1) Provincial Assn Championships
- 2) Local Association Tournaments
- 3) Bowl Canada Cup Provincials

TRAIN THROUGH COMPETITIONS

- 1) League (~32 Competitions)
- 2) Bowl Canada Cup - House Cup
- 3) Bowl Canada Cup - League Round

STAGE 4 - Train to Compete - 5 Pin

MAJOR COMPETITIONS

- 1) Bowl Canada Cup Nationals
- 2) Provincial Open
- 3) Tournament Masters Provincials
- 4) National-calibre Independent scratch tournaments

MINOR COMPETITIONS

- 1) Bowl Canada Cup Provincials
- 2) Local Scratch tournaments

TRAIN THROUGH COMPETITIONS

- 1) League (~32 competitions)
- 2) Bowl Canada Cup - House Cup
- 3) Bowl Canada Cup - League Round
- 4) House Tournaments (scratch & POA)

STAGE 3 - Train to Perform - 10 Pin

MAJOR COMPETITIONS

- 1) Provincial Association Championships
- 2) Bowl Canada Cup Provincials

MINOR COMPETITIONS

- 1) Association Tournaments
- 2) Bowl Canada Cup - House Cup

TRAIN THROUGH COMPETITIONS

- 1) League (~32 competitions)

STAGE 3 - Train to Perform - 5 Pin

MAJOR COMPETITIONS

- 1) Bowl Canada Cup Provincials
- 2) Local Scratch & POA Tournaments
- 3) C5PBA Inter-Provincial Tournament

MINOR COMPETITIONS

- 1) Bowl Canada Cup - House Cup
- 2) House Tournaments (scratch & POA)

TRAIN THROUGH COMPETITIONS

- 1) League (~32 competitions)

(Istvan Balyi refers to this as 'Building the Bowlers', noting that 'this is where you make or break an athlete', sport specialization begins here)



Adult - Continued

STAGE 2 - Learn to Bowl

MAJOR COMPETITIONS

- 1) League (8-, 16-, 32-week progressions recommended):
e.g. 8 for 8, 10 for 10, 12 for 12 programs
- 2) Bowl Canada Cup - House Cup

Participation in complementary sports is important at this stage

STAGE 1 - FUNdamentals

MAJOR COMPETITIONS

- 1) Short-Season Leagues:
e.g. 8 for 8, 10 for 10, 12 for 12 programs
- 2) Bowl Canada Cup - League Round

Encourage complementary sports & activities



Stage

Competition Structure

Season

1 FUNdamentals

Fun-In House Skill Events
Multi-sport participation
Physical Literacy & Bowling Literacy

Short Leagues
8 weeks
10 weeks
12 weeks

2 Learn to Bowl

In House Tournaments
Family Twosome
High/Low Doubles
POA Tournaments
I Beat My Coach
I Beat My Average
Regional Tournaments
Multi-sport participation-physical literacy
This could also include beginning adult bowlers

8 months (Sept - April)

3 Train to Perform

Regional Tournaments
CTF Regional (Individual)
YBC Zone (Individual & Team)
Youth Challenge Zone (Individual)
Complementary sport
Skills Events – Targeting – formative

8 Months (Sept - April)

4 Train to Compete

Provincials –
YBC Provincials
CTF Provincials
Youth Challenge
Bowl Canada Cup (5 & 10 Pin, Age 19+)
Inter-provincials

10 months (Sept - June)

5 Train to Win (Nationals)

Youth Bowl Championship – 5 pin
Youth Bowl Championship - 10 pin
Team Trials (10 pin)
Bowl Canada Cup (Age 19+)
C5PBA National Open 5 Pin Bowling Championships

11 months
(July - May, June is transition)

6 Train to Win (International)

Pan American Games
World Youth & Adult
PABCON Youth & Adult
World Cup

11 months
(July - May, June is transition)

Bowling for Life

Tournaments and League play will be structured in a way that emphasizes skill development, healthy living, community and fun. Bowlers can opt in based on their motivation and ability.



GAP

ANALYSIS

One of the crucial elements detailed in the LTAD Plan for Bowling is the stage-specific set of criteria which indicates when a bowler has learned the content of the applicable stage and is fluent in its application. The demonstrated acquired ability, therefore, indicates that the athlete is ready to move on to the next stage in the athlete's pathway.

The advancement “indicators” for bowling include;

- the rate with which the athlete can hit the head pin on the first ball of a frame
- the percentage of shots in which the ball remains on the lane
- the strike percentage in a game
- the number of games the athlete should be able to bowl comfortably, and...
- the percentage of spares a bowler who is ready to advance is expected to be able to convert.

With these indicators in place, it is prudent to conduct a field test to measure the plan's effectiveness and accuracy in the field.

A “**Gap Analysis**” was utilized as a systematic approach to testing the expectations of bowling's LTAD Plan. To be specific, the actual ability levels demonstrated by bowlers in the respective LTAD Stages were held up to the advancement indicators for each stage and compared. This measurement of abilities vs. expectations helps identify any “gaps” in the system, which will come to light through analysis of the data collected. Any Gap is therefore an identified shortfall to the LTAD framework developed for the sport OR, alternatively, suggests a shortfall in the sport support system which the LTAD plan can address and correct.



The BFC's LTAD committee ran control tests to measure actual abilities vs. advancement indicators in several test groups, ranging from youth bowlers of all ability levels observed at their club level training competitions, to youth bowlers in performance at a major national competition, to advanced adult bowlers in training for a major competition.

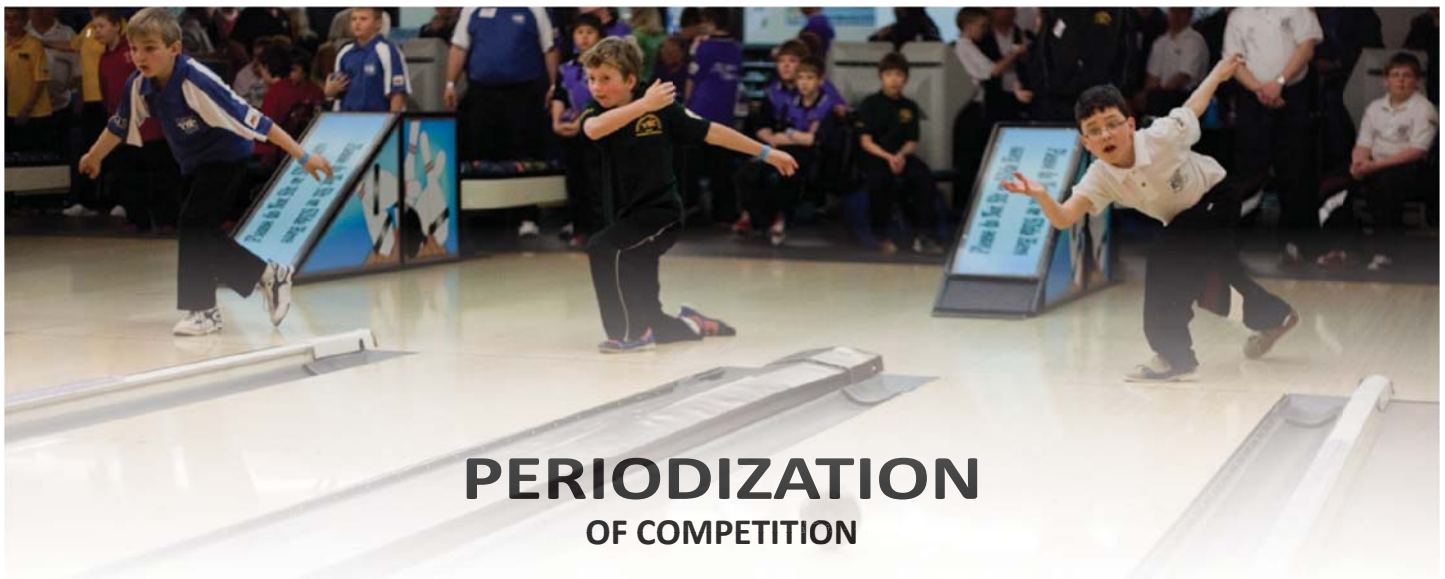
In all sets of data, from all ability levels tested, the LTAD indicators of advancement held up and proved accurate except for one specific set of criteria; **spare conversion**. The ability to consistently convert spares is considered a key to success in the sport of bowling, yet the Gap Analysis clearly showed that the sport support system is failing its athletes by not properly preparing them and training them in this key ability to the extent the sport system expects.

Appendix A shows the proficiency level of a group of elite 5 pin bowlers, both men and women, competing in the B.C. Open in 2013. Winners of this tournament went on to compete in the Canadian Open. This data provides a basic outline of the proficiency needed for a bowler who aspires to Stage 4 (Train to Compete) and Stage 5 (Train to Win). Interestingly, the results showed a significant gap in the bowlers ability to convert spares. **Appendix C** shows a Stage 5 bowler (Train to Win National) should be converting 90% of his spare shots. These results, however, show the entire field averaged 65% on spare conversions with not one of the competitors, in either the women's event or the men's, hitting the expected 90% mark. The highest was 87%, the next highest was 74% and the lowest level of proficiency clocked in at a surprising 53%.

Appendix B provides the data collected in a survey of Youth Bowl Canada program participants (listed under stages 1 to 4) while the athletes were bowling in club level train-through competition. Stage 5 results listed in the document were taken from a sample of elite tenpin bowlers in training. What was found through the process is that bowlers in the earlier stages of development (Stages 1 & 2) displayed abilities in line with LTAD expectations. The Spare Conversion rate for Stages 3, 4 & 5, however, showed a significant gap in our expectations (**Appendix C**) and show clearly that bowlers are not at the level our indicators suggest they should be at in their respective stages along the athlete pathway.

Accordingly BFC is utilizing this recognized gap to build improvements into our programs and events which will better develop this key ability among participants at all stages of development. At the same time, it would be prudent to reevaluate the expectations identified in bowling's LTAD plan to ensure its expectations are reasonable.





PERIODIZATION OF COMPETITION

Periodization of competition refers to developmentally appropriate training schedules in preparation for competition. This concept adheres to the understanding that certain steps must be followed in order to maximize an athlete's effectiveness in training and competition. Dr. Istvan Balyi, an expert on Periodization, is a consultant to the Bowling Federation of Canada and provided valuable insights for this report. The following information provides a detailed account of appropriate training and competition for each LTAD stage for bowling in Canada. This concept is the beginning of a paradigm shift in Canadian bowling, and will help to change the view of bowling as an athletic endeavour. Also, for those already in the sport, it will change the way that we approach training and competition. In general, target sports such as bowling, curling and shooting can benefit from the principles of periodization in determining the optimal timing of competition. Coaches and athletes can use these principles to partake in the optimal amount and degree of preparation prior to a competition, as well as recovery after the competition.

One of the biggest changes is the way that Summer months are used. Traditionally May through August has been the 'off-season', with many bowling centres limiting hours of operation, and some even closing altogether. In order to be adequately prepared for the competitive season (September - April), bowlers should use the Summer months to develop fundamental skills and/or participate in a complementary sport - whichever is developmentally appropriate and will help the bowler excel during competitions. For example, Stage 1, 2 and 3 bowlers can benefit significantly from participating in a variety of complementary sports:

- **ATHLETICS** Run, jump, throw complements hand-eye coordination and the agility needs of bowling
- **GYMNASTICS** Complements the agility, balance and coordination needs ("A, B, C's") of bowling
- **SOCCER & BASKETBALL** Participation in aerobic activities helps bowlers recover faster from minor injuries
- **LAWN BOWLING** Movements are very similar, complements targeting needs of bowling

PERIODIZATION

Stage 4, 5 and 6 bowlers can benefit from participation in a variety of aerobic activities, such as running, swimming and cycling. The better one's aerobic system, the faster one's recovery time will be.

Bowling is a 'Target Sport', as are Curling, Archery, Lawn Bowling and Shooting, to name a few. For these sports, the principles of periodization can be used to determine the optimal training for competition. Using the LTAD principles, it is possible to produce a training and recovery regimen for the major and minor competitions that a bowler may encounter so as to maximize performance at these competitions. Dr. Charles Samuels, a Calgary-based sleep expert, has pioneered considerable research in the area of sleep and the elite athlete. Dr. Samuels' research indicates that a 30 minute catnap in the afternoon (sometime between 2-4 pm, but not after 4 pm) is a must. This has been proven to enhance brain function and concentration for six hours (Samuels & Alexander, Sleep, Recovery & Human Performance). These physiological functions are absolutely essential for top-level target sport athletes such as bowlers.

See Appendices D through H for Annual Planner Charts (or ATPs: Yearly Training Plans) for the various stages of athlete.



Tapering for Major Competitions

For one week prior to a Major Competition, a bowler should experience no physical or mental fatigue. Bowlers should only engage in light training programs. For example, a typical training session during this so-called 'Prophylactic Break' would consist of only 30-60 minutes per session, including warm-up and cool-down. Other activities during this break may involve some relaxing socio-cultural activities in the location of the competition (i.e. sightseeing, team bonding, general rest, etc.)

Calendar Planning

For stages 3-6, once the major competitions have been identified, then we are able to design appropriate training and recovery schedules. For the Train to Win Stages (Stages 5 & 6), the training, competition and recovery schedules should be aligned with the major competitions, as the dates of some of the competitions are beyond our control (e. g. World Cup, Pan Am Games, etc.). However, for the Train to Compete (Stage 4) and Train to Perform (Stage 3) competitions, the BFC stakeholders are able to plan the calendar based on our needs. In addition, BFC stakeholders can decide upon the optimal number of competitions as well as their locations for stages 3 and 4. The number of competitions is important, as getting this number right will help to produce elite athletes. The caveat here is to limit the number so as to reduce the perils of over-training and over-competition.

Data Collection

In the past, the sport of bowling in Canada lagged behind some other national sports in terms of data collection. Fortunately, there are numerous international and national champions that can supply valuable insights into how they became champions. With the recent acquisition of the Athlete Management Platform software (AMP Sport), the Bowling Federation of Canada has been able to track and analyze High Performance Bowler data. Through data-mining processes and AMP Sport, BFC is able to track such information as:

- details of their training regimen (frequency, volume, intensity)
- how they measured volume and intensity of their training
- frequency and quality of sleep
- pre-competition routines
- recovery during competition
- what other sports are/were the athletes involved in
- nutritional habits and intake before, during and after competition
- at what age did the athlete specialize in bowling ('I want to be an elite bowler')

The benefit of such data collection and analysis should help up-and-coming bowlers to tailor their training regimens in such a way that would help them reach their sport goals. This process is also a great benefit for coaches in that they are not simply guessing when it comes to training and competition - they have the benefit of quantitative data and are able to analyze a variety of factors that may determine competition successes.

Training Sessions

The frequency, volume and intensity of training sessions will vary depending upon a bowler's LTAD stage. A bowler who wishes to maintain their level should be training 3 times per week, including a complementary activity. A bowler who increases the number of training sessions to 3 times per week will see significant improvement for the first 1 to 1-1/2 years. However, to become an elite athlete, a bowler must commit to increasing the frequency (i.e. number) of training sessions.

Recovery

Another key component of Periodization is that of Recovery. This concept helps to reduce an athlete's training or competition fatigue so that they can maximize the effectiveness of their training sessions and thus perform better during competition (Calder - Recovery and Regeneration for Long-Term Athlete Development). After a training/competition session, or a portion thereof, the body must have adequate time and conditions to 'reset' itself to participate in further training sessions and competitions. Bowling - a Target Sport - relies heavily on an athlete's nervous system, as hand-eye coordination is a key to success. Due to the fact that nervous cell recovery occurs 5-7 times slower than that of a physical cell, athletes and coaches must formulate a specific plan that will assist in the process of nervous cell recovery. An everyday analogy could be a full tank of gas in your car, but a dead battery - an athlete could have had the proper sleep and nutrition (also important factors in the recovery process), but not have paid sufficient attention to the nervous system. Following is a post-competition Nervous Cell Recovery Plan, as devised by Istvan Balyi:

- following daily competition, ensure proper NUTRITION AND HYDRATION

- fill a BATHTUB WITH HOT WATER and stay in until you are SWEATING

- while in tub, LISTEN TO BAROQUE MUSIC (i.e. Vivaldi, Haydn, Pachelbel, etc.)

- after exiting the tub, dry off and immediately GO TO BED IN A COLD ROOM

However, the concept of recovery need not be reserved for elite-level athletes. It is very beneficial to introduce recovery techniques at an early age. This can be as simple as ensuring that youngsters learn the importance of proper hydration. It is very important that bowlers at all LTAD stages are aware of how to:

- 1) recognize when they are experiencing fatigue and how to manage it effectively; and,
- 2) how to develop specific plans for training and recovery (Calder)



PERIODIZATION

A RELATIVELY NEW CONCEPT FOR MOST BOWLERS.

From Itad.ca:

“Periodization involves creating comprehensive training, competition and recovery plans to deliver peak athlete performance at the right time. Scientific research in periodization helps coaches to create logical training plans for athletes at all ages and stages of LTAD.

Simply put, periodization is time management. It outlines all annual and seasonal training within a logical schedule to bring about optimal improvements in athlete performance at the right times, while minimizing injury and burnout. Periodization plans connect the LTAD stage of the ath-



lete with the training and development requirements of that stage.

Periodization breaks training into months, weeks, days and individual sessions. It helps coaches to organize all aspects of volume, intensity, frequency and type of training, competition and recovery programs through long-term and short-term timelines.

Periodization is a highly flexible tool. When it is used in combination with proper training techniques, athlete monitoring and athlete evaluation, it becomes an essential component to deliver optimal sport performance and athlete development at all stages of LTAD.”

RECOMMENDATIONS

- Produce nationally accessible website that contains numerous drills for bowling practice sessions (lesson plans for each stage) with a focus on the A-B-C's (Agility, Balance, Co-ordination)
- Provide numerous LTAD-friendly practice sessions for coaches to follow
- Produce database of drills that can help to shore up various shortcomings in fundamental skills
- Produce website for bowling parents that provides information about bowling and how they can help their kids excel in bowling
- Develop tournaments for each discipline (5 pin, 10 pin) that can reward skill development rather than traditional scoring methods.
- Reward bowling centres for LTAD adoption
- In order to increase spare accuracy, offer spare-shooting competitions
- Produce an informational LTAD poster for display at all bowling facilities in Canada
- Develop an Integrated Support Team (IST) for each sport;
 - physiologist, psychologist, nutritionist
 - as finances may be a concern, locate people in the sport or who are in college/university programs
- Develop training & competition pathways for Late Entry Athletes (i.e. entering the sport in teens or adulthood)
- In the tenpin game, bowlers should have two year terms as national team members due to international competition calendars (Pan Am & Commonwealth Games.... offset in 2 year cycles)
- Develop lesson plans for each stage:

Combine specific bowling training with general training exercises that can work to enhance a bowler's Agility, Balance and Coordination (example: line up kids on a line, instruct them to jump and turn 90 degrees to the left; 180 degrees to the right; 360 degrees to the left. Then repeat with eyes closed)

RECOMMENDATIONS - continued

- Produce Training Manual for Coaches featuring tips on;
 - Strength training
 - Aerobic training
 - Agility, balance & coordination training
 - Warm-up fundamentals (general and sport-specific warm-ups)
 - Recovery & regeneration
- Data Mining : survey elite athletes to determine how they reached their level of proficiency in the sport
- Define 'Volume' of training for periodization (e.g. time spent? balls thrown?)
- Define 'Intensity' of training for periodization
- Undertake demographics study of bowlers by stage (per Feb 2012 LTAD meeting - Winnipeg);
 - how many bowlers are in the competitive bowling stream? Bowling for Life Stream?
 - send RFI, RFP
- Determine the number of coaches who have coached at least once in the past 2 years (i.e. active coaches)
- Develop a fundamental skills curriculum for new bowlers and young bowlers
- Ensure that young bowlers (i.e. < age 10) are not subjected to mental and physical stresses of intense competition
- Determine how to consistently measure Spare Percentage, as there are a variety of methods at present:
 - Option 1
#spares/#second balls thrown;
 - Option 2
#spares/#second balls thrown (not including HP, A, S)
- Ensure that competitions are meaningful (example: top x bowlers and/or teams advance to next round of competition, regardless of region)
 - possibly to be held centrally each year
 - potential problem of added financial hardship if additional teams from remote locations
 - will this encourage bowlers to improve, or will this frustrate bowlers so that they quit?
- Review best practices of other Sport for Life, target sports (USBC, Curling, Golf, etc.)
- Work to eliminate 'Blowouts' at competitions (data collection and research required).

APPENDIX A

During the 2013 BC 5 Pin Bowlers' Association Provincial Open, stats were gathered for the top 5 bowlers in both the Men's and Ladies' Singles competitions. Winners of this tournament went on to compete in the Canadian Open. This data provides a basic outline of the proficiency needed for a bowler who aspires to Stage 4 (Train to Compete) and Stage 5 (Train to Win). Results are as follows:

Placing	Headpin 1st Ball %	Strike %	Spare Conversion %	Avg. Value of Pins Left per Game
Ladies #1	86%	51%	56%	9
Ladies #2	82%	42%	87%	5
Ladies #3	72%	44%	53%	6
Ladies #4	76%	43%	59%	6
Ladies #5	82%	43%	67%	7
Ladies' Average	80%	45%	64%	7
Men's #1	90%	58%	63%	5
Men's #2	93%	54%	68%	5
Men's #3	87%	53%	71%	10
Men's #4	82%	52%	54%	7
Men's #5	79%	50%	74%	7
Men's Average	86%	53%	66%	7

APPENDIX B



Bowling Federation of Canada's LTAD COMMITTEE (Competition review) Survey Results: October 2013



STAGE 1: FUNDAMENTALS	LTAD Expect's	Male	Female	Btm's	Jr's	Sr's	Fivepin	Tenpin	ALL
		119	78	117	60	20	189	8	197
Hit Headpin %	30%	23.5	24.0	22.0	25.7	26.8	23.1	36.3	23.7
First Ball Remains on Lane %	30%	73.0	65.6	63.7	76.3	90.1	70.0	66.4	69.5
# Games bowler plays per week	3	2.9	2.9	2.8	3.0	3.0	2.9	3.0	2.9
Spare Conversion %	n/a	17.5	18.2	15.8	18.3	22.3	18.1	12.6	17.8
Strike %	5-10%	55.1	54.8	52.6	52.4	68.0	56.1	14.2	55.0

STAGE 2: LEARN TO BOWL	LTAD Expect's	Male	Female	Btm's	Jr's	Sr's	Fivepin	Tenpin	ALL
		72	60	37	43	52	117	15	132
Hit Headpin %	40%	37.2	41.5	35.5	41.4	39.8	38.0	48.2	39.2
First Ball Remains on Lane %	60%	90.1	87.9	2.0	91.1	94.3	91.3	80.6	88.9
# Games bowler plays per week	6	4.4	3.3	3.0	4.4	3.8	4.0	3.1	3.8
Spare Conversion %	15-20%	26.4	26.1	20.8	25.0	30.0	26.5	24.3	26.2
Strike %	10%	46.0	39.9	38.8	39.6	48.8	45.7	19.2	43.4

STAGE 3: TRAIN TO PERFORM	LTAD Expect's	Male	Female	Btm's	Jr's	Sr's	Fivepin	Tenpin	ALL
		52	38	11	30	49	72	18	90
Hit Headpin %	50%	58.7	61.0	57.6	59.3	60.4	55.0	78.0	59.7
First Ball Remains on Lane %	90%	97.7	97.1	96.8	96.0	99.4	97.4	97.6	97.4
# Games bowler plays per week	6 - 8	4.1	4.4	4.1	4.1	4.4	4.2	4.4	4.2
Spare Conversion %	50%	34.2	35.5	32.1	31.2	37.6	34.0	37.5	34.7
Strike %	20-30%	44.2	43.0	30.7	40.4	47.9	47.1	30.8	43.7

STAGE 4: TRAIN TO COMPETE	LTAD Expect's	Male	Female	Btm's	Jr's	Sr's	Fivepin	Tenpin	ALL
		17	21	1	8	29	24	14	38
Hit Headpin %	70%	66.9	73.0	57.2	68.0	71.3	61.6	85.3	70.3
First Ball Remains on Lane %	90%	98.8	99.3	100.0	99.0	99.1	99.6	98.3	99.1
# Games bowler plays per week	10-15	5.8	6.7	6.0	4.9	6.8	7.6	4.5	6.4
Spare Conversion %	60-70%	42.8	42.5	28.7	33.9	45.3	40.8	45.5	42.6
Strike %	30-40%	47.3	38.9	68.0	43.7	41.5	46.9	35.5	42.6

STAGE 5: TRAIN TO WIN	LTAD Expect's	Male	Female	Btm's	Jr's	Sr's	Fivepin	Tenpin	ALL
		2						2	2
Hit Headpin %	90-95%	82.5						82.5	82.5
First Ball Remains on Lane %	100%	100.0						100.0	100.0
# Games bowler plays per week	20-40	4.0						4.0	4.0
Spare Conversion %	90%	55.0						55.0	55.0
Strike %	50%	76.3						76.3	76.3

459 Records in total...262 Male/197 Female...402 Fivepin/57 Tenpin...166 Btm/141 Jr/150 Sr/2 adult

APPENDIX C

Performance Indicators Summary

Compiled by the LTAD Committee, this summary details the expectations for each Stage bowler. These figures were employed in the chart (Appendix B) as base figures and were used to compare actual survey results to LTAD expectations. This was crucial in our GAP Analysis and helped determine the need for bowling's support system to work on Spare Conversion.

LTAD STAGE:	1	2	3	4	5	6
	FUNDAMENTALS	LEARN TO BOWL	TRAIN TO PERFORM	TRAIN TO COMPETE	TRAIN TO WIN (National).	TRAIN TO WIN (Intern'l).
Hits Head Pin	30%	40%	50%	70%	90-95%	95%
Ball Remains on Lane	30%	60%	90%	90%	100%	100%
# Games Bowler can complete	3	6	6 to 8	10-15/week	20-40/week	6 games/day
Spare conversion	5-10%	15-20%	50%	60-70%	90%	90-95%
Strike Percentage	n/a	10%	20-30%	30-40%	50%	50-60%

APPENDIX D

ANNUAL PLANNER

Youth Bowling - 5 Pin

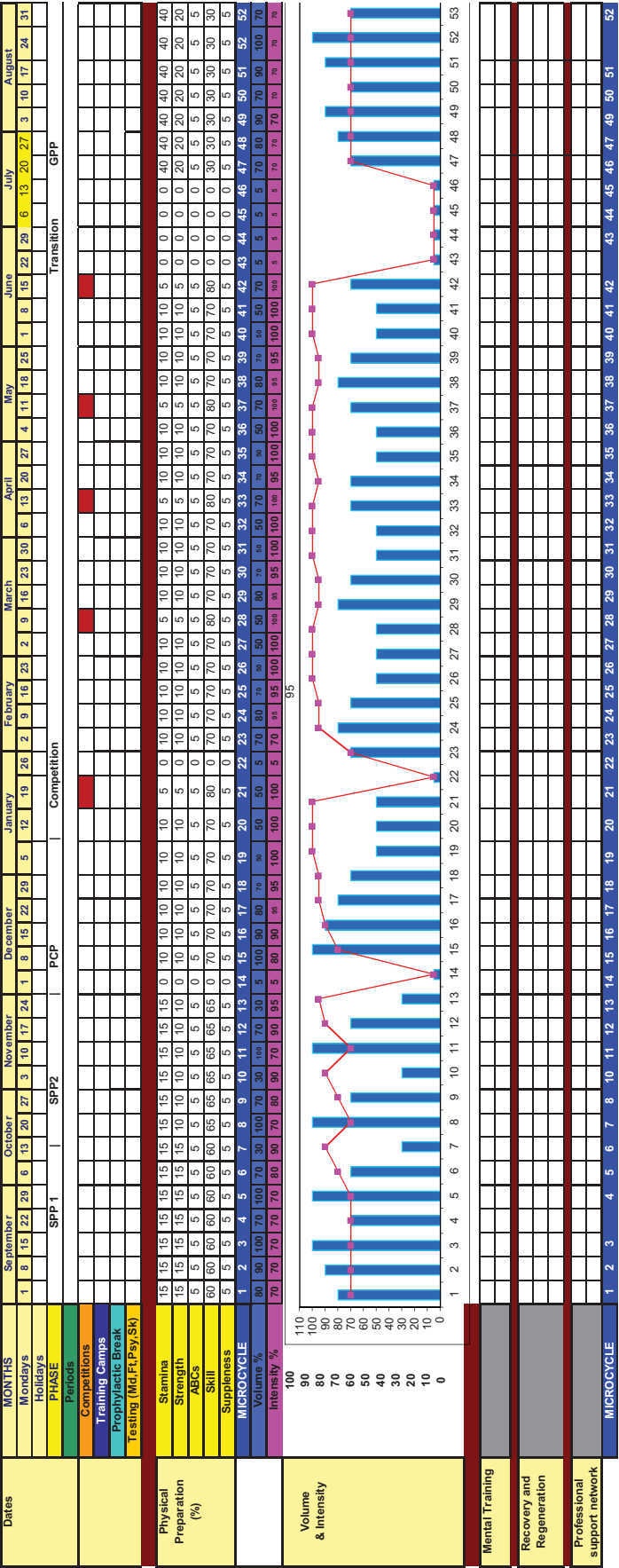
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APPENDIX E

Youth Bowling - 10 Pin

Figure 1 is a combined bar and line chart showing the number of cases (blue bars) and deaths (red line) in the United Kingdom from January 1, 2020, to May 12, 2020. The x-axis represents dates, and the y-axis represents the number of cases and deaths. The chart shows a significant increase in both cases and deaths starting in late March, peaking in early April, and then declining through May.

ANNUAL PLANNER
Stage 5



ANNUAL PLANNER

Stage 5 Detailed

[illegible]

ANNUAL PLANNER

Elite Bowler

[illegible]



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