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MEASURING THE IMPLEMENTATION FIDELTY OF USA HOCKEY'S  
AMERICAN DEVELOPMENT MODEL

A Dissertation Presented

by

Leon Lifschutz

to

The Faculty of the Graduate College

of

The University of Vermont

In Partial Fulfillment of the Requirements  
For the Degree of Doctor of Education  
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## ABSTRACT

Critics of youth sports in the United States have lamented a system that creates issues of access and could be detrimental to the physical and mental health of its young participants. In response to these concerns, USA Hockey, using Long Term Athlete Development Theory (LTAD) as a key theoretical framework, created the American Development Model (ADM) to improve the delivery of youth hockey in the US. While USA Hockey has invested greatly in bringing ADM to scale across its constituents, it is not known to what extent the model is being implemented in its member organizations. Implementation fidelity of a prescribed treatment or curriculum is tied to better outcomes. This study leverages key concepts of program evaluation theory and survey development to produce a valid and reliable survey instrument that can be used to assess the implementation fidelity of ADM at the 12U age group across the nation.

A survey instrument was developed through three waves of development. The first wave included local pilot testing and cognitive interviews. The second wave including a regional sample and utilized factor analysis coupled with item analysis to improve the instrument and to create composite scores of key constructs. The third and final wave included a national sample of 214 parents of 12U hockey players.

The results of the survey produce psychometric properties indicating good reliability and validity of the instrument including face and content validity, internal reliability, and factor analysis. Analysis of composite scores for each construct of the model identified strong implementation of much of the on-ice components but was lacking in other areas such as physical development and mental skill development. The final ADM scale demonstrated statistically significant positive associations with two subscales of the Athlete Engagement Questionnaire, further validating the study and demonstrating an important association with the delivery model to key outcomes. The study concludes with a discussion of ADM's implementation fidelity and policy recommendations regarding how the ADM curriculum may be improved given key findings.

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## CHAPTER I: INTRODUCTION

In the early 2000s, 20% of youth hockey players only lasted one season in USA Hockey's grassroots programs and 60% more dropped out by age 12 ("American Development Model", n.d.). Seeking to identify the reasons behind these disturbing participation trends, USA Hockey determined playing hockey was too expensive, travel too prevalent, and a culture that overemphasized winning were primarily to blame. On top of this, USA Hockey was not developing elite players at the rate it had hoped ("American Development Model", n.d.).

These issues are not unique to USA Hockey. Youth sports have witnessed a decline in participation in recent years and have been receiving additional scrutiny from the public. According to Project Play, a youth sports advocacy group out of the Aspen Institute, only 37% of youth participated in team sports on a regular basis in 2017 compared to the 44.5% in 2008 (Project Play, 2015; 2018). In 2017, only 23.9% of kids participated in high calorie burning sports, down from 28.7% in 2011. In 2017, 17% of children between ages 6 to 12 did not engage in any sports at all which is actually an improvement on a peak of over 19% between 2012 and 2014 (Project Play, 2018).

Factors, such as income, race, location and social class, are all associated with children's sports participation (Sabo & Veliz, 2008). Income is a leading factor to sports participation as only 38% of youths from households earning less than \$25,000 participated in youth sports in comparison to 67% of kids from homes with incomes over \$100,000 (Rosenwald, 2016). Perception and reality of injuries have also proved a deterrent to sports participation with an increase of overuse injuries due to early specialization, as well as additional attention to head injuries (Jayanthi et al., 2012;

Project Play, 2016). Finally, increasing intensity and undue pressure to win from young ages has led many to drop out of sports because they are, “not having fun” or burning out at young ages (O’Sullivan, 2014; Sabo & Veliz, 2008; Wallace, 2016; Woods, 2007).

With major concerns like retention, accessibility, burnout, and lackluster player development, USA Hockey endeavored to look hard at its grassroots model and shift the paradigm of youth hockey in this country. USA Hockey is the main governing body for ice hockey in the US. Amongst its areas of oversight are national teams, elite player development, adult hockey, sled hockey, junior hockey, and hosting national championships. USA Hockey’s largest constituency though is its grassroots youth hockey programs. According to USA Hockey’s *2017-18 Final Registration Report*, there were 646,120 participants at all ages including, players, coaches, and officials. Of that number, 382,154 were players under the age of 18.

With hopes of improving grassroots delivery, USA Hockey adopted the Long Term Athlete Development Theory (LTAD). LTAD provides evidence based solutions as the backbone for redesigning their delivery model. LTAD is a theory that originated in 1995 as a stage by stage age appropriate athlete development model for young athletes and was updated in 2005 and 2013 (Balyi & Way, 1995; Balyi & Stafford, 2005; Balyi, Way, & Higgs, 2013). LTAD suggests the current models of delivering youth sports programs is not age appropriate from physiological or psychosocial standpoints. The model therefore proposed developmentally appropriate stages for acquiring physical literacy and cognitive development through sports. The belief behind LTAD is that following the stages will have the dual effect of creating more elite athletes as well as more lifelong athletes.



In 2009, USA Hockey launched the American Development Model (ADM), a hockey specific framework borrowing heavily from LTAD. ADM seeks to increase participation and retention, curb costs and travel, better physically and mentally develop athletes, as well as reduce injuries (“American Development Model”, n.d.). ADM suggests more preparation, proper training schedules, and reducing competition while emphasizing age appropriate training for young hockey players. With LTAD’s looming influence, sports specific skills and physical literacy instead of team-based training are the guidelines for the younger ages. ADM recommends developmentally appropriate skill training for each age group as well as appropriate practice to play to rest ratios. Team configuration, as well as season duration and structure, are key components of the model. ADM has also emphasized training for coaches, which emphasize age-specific training knowledge, hockey concepts, and pedagogy. On the topic of prevention, ADM encourages participation in multiple sports and discourages specialization. It also has moved the age for body checking up an age bracket in hopes of reducing injuries and concussive hits (“American Development Model”, n.d.). USA Hockey hopes that implementation of these practices will develop more hockey players, better hockey players, and better people.

USA Hockey has undertaken these widespread reforms even though LTAD nor ADM have been heavily investigated. Researchers share concerns about the empirical evidence backing LTAD (Ford et al., 2011; Holt, 2016; Thibault & Harvey, 2013). They argue that more research is needed to explore the efficacy of the theory. A literature review by Ford and colleagues (2011), believe LTAD may not acknowledge the diverse individuality of young athletes making the implementation of the theory’s windows

counterproductive. Thibault and Harvey (2013) share that in Canada, LTAD's widespread implementation prior to empirical proof of its value may create a situation where it is too late to turn back even if it is disproved.

As a young model, especially in the US, we do not yet know the long term impacts of ADM or LTAD for USA Hockey or other entities that are adopting the theory into its program designs and curriculums. According to USA Hockey's ADM Technical Director Ken Martel, who leads the ADM initiative, there is good anecdotal feedback for the model and USA Hockey have seen an increase in retention, one of its key goals (Ken Martel, personal communication, December 15, 2015). However, USA Hockey has yet to do research of implementation or the ramifications of ADM across its constituents. In fact, the governing body is not even aware of to what extent its model has been implemented across its membership. This study will seek to rectify that by investigating the implementation of ADM and examining some initial associations with outcomes.

### **Purpose and Research Questions**

The purpose of this quantitative research study is to measure the implementation of ADM across the membership of USA Hockey at the 12U age group. This study will follow process evaluation and implementation monitoring theory, specifically examining implementation fidelity. Process evaluation, sometimes known as program evaluation, seeks to understand how efficiently and effectively a program has been implemented. One key piece of process evaluation is implementation fidelity which refers to the adherence and integrity of practitioners to the model (Mowbray et al., 2003; Saunders, 2016). Using a positivist approach, this study will utilize survey research techniques to

collect and analyze data to determine the level of adherence by grassroots organizations and coaches to ADM.

Durlak and DuPre (2008) found through an extensive literature review that fidelity of implementation often led to substantially better outcomes. It is important to understand if, how, and how much ADM is being implemented to better understand its potential to positively impact youth hockey players. Therefore, the main research question that will guide this study is:

1. What is the implementation fidelity of the ADM model across the country at the 12U age level?

The goal of this study will be to develop a valid and reliable survey instrument to assess implementation fidelity of ADM. Using Athlete Engagement measures in the survey instrument as a validating measure will allow this study to examine ADM implementation's relationship to a desired outcome. A strong relationship between ADM and Athlete Engagement measures will demonstrate a positive association between the model and a desired outcome. Analysis of this study will also allow for an initial evaluation of what aspects of ADM are being implemented and where it is not achieving desired benchmarks. This analysis will also lend itself to policy recommendations to enhance the implementation of ADM and improve the delivery of grassroots hockey.

This study will examine ADM at the 12U age bracket. Much like other sports, attrition occurs at high rates at the middle ages for USA Hockey. USA Hockey's 2017-18 final registration report states an enrollment of 62,960 12U players, 59,106 14U players, and 43,994 16U players illustrating this trend. USA Hockey has spent much energy focusing on the recruitment and retention of the 8U age group. At this point, not much

attention has been given specifically to the 12U age group which is at the tail end of LTAD's Learn to Train phase. Players at the 12U age are appropriate for this study because they should have been exposed to ADM principles since the beginning of their hockey careers. The conclusion of the Learn to Train phase, and just before or at the brink of puberty, is also an important phase as athletes have a key window to embed physical skills into their repertoire. From a cognitive development stage, it also marks the transition into broader team concepts, decision-making skills, and general preparation (Balyi, Way, & Higgs, 2013). It is also the age of middle school and many social changes for pre and early adolescents. As such, it is rich for investigation. Looking beyond the 12U age group would also not be appropriate for a couple of reasons. The first is that these players may not have been impacted by ADM as much because of the lifespan of the model. The second is that older age groups are impacted by High School hockey which takes precedence in some regions. High School hockey delivery models are not necessarily affiliated with USA Hockey and have very different parameters.

### **Statement of the Researcher's Role**

I have enjoyed games and sports ever since I was little. One of my first words was 'ball' and I have spent much of my childhood, and now my adult life, involved heavily in sports, specifically hockey. As the story goes, I was a very rambunctious toddler but the one thing that would make me sit still was a hockey game. Ever since those early days playing in the dining room, I have been involved in the sport.

I had the opportunity to play Tier 1 hockey growing up with my competitive career ending at the Junior level at the age of 20, just short of playing hockey collegiately. However, an opportunity to coach young goaltenders while in college,

coupled with a degree in education, fueled a desire to coach and I have been lucky enough to coach at the youth, interscholastic, and intercollegiate levels. I recognize, in reflecting on my experiences and interests, that I have been lucky to have these opportunities as a middle class, white male, growing up in the northeast of the US as having different socioeconomic or geographic identities may have made my childhood passions a moot point.

My current involvement in coaching hockey at the collegiate level provides me with a level of credibility amongst partners in this study. My coaching background coupled with my academic background make me uniquely qualified to perform this investigation. I also have no specific ties to USA Hockey. Therefore, it was not challenging for me to be objective working as a consultant as opposed to working for the organization.

While I do not specifically have a vested interest in this research, I do have a level of bias. Specifically, I am a believer in the goals USA Hockey has set and their strategies for getting there. I have tried hard to minimize my bias by wording questions in a neutral way. Performing a quantitative study will also help remove my bias. I have also selected to not share the overarching research questions of the study as to not bias respondents. With these neutral questions and a quantitatively driven instrument and analysis plan, I believe the survey will remove my bias and prove credible and useful.

## **Conclusion**

This chapter presented the main challenges USA Hockey identified over a decade ago and demonstrated similar trends and issues within the overall youth sports landscape in the US. Subsequently USA Hockey identified LTAD as a key theory to create ADM

in hopes of providing a more accessible and productive delivery model. Little research has been done on the subject of LTAD and no specific research has examined ADM. The purpose and research question guiding this study seeks to understand the implementation fidelity of ADM at the 12U age level through the development of a reliable and valid survey instrument. The study will also seek to identify relationships between ADM and AE outcome measures. Examination of the data will also provide an opportunity for evaluation of the model and provide evidence for policy recommendations to enhance the fidelity and efficacy of the learn to train stage of ADM. The chapter concluded with a statement on the researcher's role.

## **CHAPTER II: LITERATURE REVIEW**

Sports in America have a prominent place. Youth Sports have been embedded in our society since the late 1800s (Albrecht & Strand, 2010). For the purpose of this review, youth sports will focus mostly on the elementary and early adolescent ages. Youth sports are currently at a crossroads with advocates trumpeting its ability to combat our obesity epidemic and create many positive physical and psychosocial benefits. To the contrary, youth sports have been criticized in recent years on issues of access, concerns over injuries, and the practice of specialization. This literature review shares the positive benefits while also shining a light on some of the current issues facing youth sports. The review then shares several sports development models before turning its focuses on the LTAD, which looks to increase the benefits and combat issues in youth sports. The review then follows the genesis of the ADM, USA Hockey's LTAD driven plan to improve youth hockey in the US. Finally, a brief discussion is included on Athlete Engagement, an important concept to strive for in young athletes and the survey instruments' validating scale.

### **Defining Youth Sports**

Youth Sports are defined as, “organized physical activity for children and adolescents offered through schools, community organizations or national sports organizations” (Dixon & Bruening, 2014, p. 145). This definition is very broad and encompasses different types of organizations that exist based on region, philosophy, and economics (Dixon & Bruening, 2014). The Youth Olympics have an age cut off of 18 years, suggesting that the age of majority may serve as a guide for defining the age cut off of youth sports. In the US, many individuals of high school age play sports for their

school. Coakley (2009) shares that the US has nearly 20 million sports participants between the ages of 6 and 16. The US is unique in its emphasis on school-based sports, very uncommon on an international level, with the belief being that school-based sports participation supports the academic missions of schools. (Ridpath, 2018; Whisenant, Forsyth, & Martin, 2014). Interscholastic sports also have state-sponsored sanctioning bodies that largely govern each state's system. High school sports may also have an emphasis on competition, entertainment, and promotion of athletes (Ridpath, 2018; Whisenant et al., 2014).

Getting into the high school ages, youth sports organizations can conflict with interscholastic sports, which carries its own set of different variables and issues to consider (Ridpath, 2018). For purposes of this investigation, I will mainly be looking at organized activities for children in elementary school until early adolescents. I am choosing this age group because this is often where the greatest discrepancy between what the research tells us and the practice of running youth sports exists (O'Sullivan, 2014). Many youth sports participants drop out before they reach middle or high school; therefore the largest participation rates and the most significant issues of attrition exist at the younger ages. As will be exhibited, the younger ages are where many of the biggest conversations around the future of youth sports are occurring now. Finally, this age group harnesses the potential to create widespread and positive change (Project Play, 2015).

### **History of Youth Sports**

Youth sports have changed immensely since their inception in the late 19<sup>th</sup> century (Albrecht & Strand, 2010). Looking at their evolution, and the reasons behind its



growth and change is valuable in understanding the current landscape and issues.

Organized youth sports began in the late 1800s, emerging during industrialization to instill strong values in boys. This movement was referred to as "muscular Christianity" and was largely based on the influences of the ancient Greeks (Albrecht & Strand, 2010). Organizations like the YMCA and Boy's Club emerged at this time to advance these values (Dixon & Bruening, 2014).

Moving into the early 1900s, as industrialization continued and in reaction to newfound free time and leisure, sports and recreation assumed a key role in the lives of many Americans (Friedman, 2013). Numerous organizations popped up between the 1900s and World War II looking to provide organized spaces including the Police Athletic Leagues, Pop Warner Football, Christian Youth Organization, and Little League Baseball (Albrecht & Strand, 2010; Dixon & Bruening, 2014). During this period, cities began developing playgrounds and recreation facilities furthering sports participation by creating a larger infrastructure for both informal and formal sports. Interscholastic sports also gained prominence during this time with many states establishing associations to govern interscholastic sports in the 20s and 30s (Whisenant et al., 2014). During the early 1930s, an interesting conversation on youth sports began and to a great degree is still relevant today. Professional educators had concerns over the possible negative physical, and more so, psychological effects that formalized youth sports might have on younger children in elementary and middle schools. These concerns removed sports largely from public schools in the younger ages. However, numerous private youth sports organizations stepped in to fill the gap (Albrecht & Strand, 2010).

While the depression and World War II dampened growth, by the 1960s national governing bodies emerged across a wide array of sports. Examples of this growth include the American Youth Soccer Association, Pony League Baseball, National Youth Sports Programs, and the Special Olympics. This surge in growth continued throughout the late 20<sup>th</sup> century into the 21<sup>st</sup> and by 2005 youth sports governing bodies were responsible for sponsoring and putting on over 250 unique national championship events (Friedman, 2013). Parents during this time, and still today, believe the positive characteristics of youth sports could develop in their children largely outweighed the negatives. As well, the notion of striving to become a professional athlete took hold during this era and encouraged parents to enroll their children at young ages with hopes of gaining an advantage at attaining professional status someday (Albrecht & Strand, 2010).

One might wonder, why the big surge in youth sports organizations and massive growth to nearly 35 million participants by 2013 (Koba, 2014)? One might cite the growth of professional sports, community cultures, and other factors amongst the explanations but some researchers have found perhaps another more extrinsic motivator for participation. Friedman (2013) explains that as college acceptance has become more competitive, participation in extracurricular activities, such as sports, provides an avenue for aspiring college students to distinguish themselves from their peers and gain acceptance to better colleges. Lareau (2003), in a groundbreaking ethnographic study, found this practice through her research in the homes of middle and upper-class families. She observed the family life of some of her subjects overturned to accommodate athletic pursuits which were explicitly and implicitly cited as having the ability to improve their

children's stations later in life. This research backs Friedman's (2013) assertion that there is no coincidence that when college acceptance became more competitive in the 1960s, that youth sports enrollment also began to mushroom.

Moving into the 1970s, another landmark served as a catalyst for youth sports growth and capturing the attention of a new demographic. Title IX of the Educational Amendment Act of 1972 mandated equal opportunities for all in the public domain. Title IX, coupled with other watershed moments for women's sports in the 1970s such as Billie Jean King's demands for equal pay for tennis players and Maria Pepe's lawsuit victory desegregating Little League Baseball, opened the doors to massive growth in participation from young girls (Albrecht & Strand, 2010). In 1971 only 294,015 girls participated in interscholastic sports, roughly 7.5% of total participants. By 2013 more than 3.2 million girls participated and comprised roughly 42% of total participants (Whisenant et al., 2014). According to the National Federation of High School Sports, that number has increased to over 3.4 million in 2018.

Beginning in the 1970s, Albrecht and Strand (2010) explain when youth sports began receiving more attention. Organizations like the American Alliance for Health, Physical Education, Recreation, and Dance emerged and generated public awareness for youth sports as well as sponsoring forums and conferences on the matter. This trend continues today with the prominence and advocacy from organizations like the National Youth Sports Council, Women in Sports Foundation, American Athletics Union, and Project Play who all provide a variety of sporting opportunities or public advocacy towards youth sports participation and issues. Another development that originated in the 1970s that continues receiving attention is the training of youth sports coaches. The

American Coaching Effectiveness Program, now known as the American Sports Education Program, originated this concept (Albrecht & Strand, 2010). Organizations like Project Play and the Positive Coaching Alliance, to this day, continue to advocate for increased and wide-scale youth coach training, pointing out that outcomes for youths are much improved when they have a coach who has received some training (Beatty & Fawyer, 2013).

The youth sports system continues to evolve as we enter the early parts of the 21<sup>st</sup> century. Building off what was seen in the early and mid-20<sup>th</sup> century with private entities stepping in to fill perceived voids, a private club system has emerged as a prominent delivery method of youth sports (Friedman, 2013; Koba, 2014). The club system features specialized teams from early ages often practicing with higher intensity and with more games and travel than we have ever seen before. This is leading to what many refer to as the “Youth Sports Arms Race” including Irvine (2012) who explains that in a day and age when fewer families are able to enroll their children in competitive sport than years prior, those that can are investing more time and energy into it and at younger ages.

Youth sports continue to evolve and many of the discussions that were prevalent amongst youth sports observers in the early 1900s, be it access, developmentally appropriate activities, or lack of autonomy for youths in play, continue in the early 2000s. Regardless of your perspective, in the words of Albrecht and Strand (2010), “It appears the vitality of organized youth sports is here to stay” (p. 16).

## **Positive Outcomes of Youth Sports**

There are many practical benefits to youth sports participation beyond gaining a competitive advantage in college admission. Research reflects that there are a tremendous number of benefits to participation in youth sports both from physiological and psychological standpoints. Young athletes also gain motor skills at faster rates than their peers as well as other positive physical health outcomes (Fraser-Thomas & Cote, 2006). At a time when obesity is reaching epidemic levels (nearly 1 in 5 children) in our nation and our youth are increasingly sedentary, youth sports and physical education programs have the opportunity to counteract this trend (Basset, John, Conger, Fitzhugh, & Koe, 2015; Strong et al., 2005). Hedstrom and Gould (2014) report that inactive children possess significantly higher rates of adult obesity than those who are active. Strong and colleagues (2005) also found that it is extremely beneficial health-wise for children to participate in developmentally appropriate physical activity at least 60 minutes a day, including many traditional sports related activities. In addition to the long term health benefits, motor skills and physical development are also important to the overall health of children leading to adulthood. Humphrey (2003) trumpets the importance of a holistic approach to child development considering the development of the body to be up there with the mind. The development of proper motor skills can also be attributed to participation in recreation later in life, further curtailing risks for health issues (Fraser-Thomas & Cote, 2006).

While we may look at our obesity epidemic in the US and see recreation and sport participation as a remedy to such an issue, the benefits to participants go even deeper than that which could prove a game changer as we become increasingly aware of the

importance of mental health. According to *TrueSport: What We Stand to Lose in Our Obsession to Win* produced by the U.S. Anti-Doping Agency in 2012, research states the following benefits:

- (1) higher grades, expectations, and attainment;
- (2) greater personal confidence and self-esteem;
- (3) greater connections with school – that is greater attachment and support from adults;
- (4) stronger peer relationships;
- (5) more academically oriented friends;
- (6) greater family attachment and more frequent interactions with parents;
- (7) more restraint in avoiding risky behavior and;
- (8) greater involvement in volunteer work.

These benefits demonstrate that participation may lead to success in other areas such as academics, behavior, and relationships contributing to overall better quality of life.

These assertions are backed up by many other research studies. Studies by researchers interested in positive youth development programs found that participation in sports-based programs often led to the desired outcomes (Eccles, Barber, Stone, & Hunt; Zarret, Fay, Li, Carrano, Phelps, & Lerner, 2003). Felfe, Lechner, and Steinmayr (2011) found improved cognitive and non-cognitive skills when examining children involved in sports clubs. They surmised that this is due to physical activities replacing passive ones in the subject's leisure time. Boone and Leadbetter (2006) examined early adolescents, an age group often times at risk for depressive moods in many cases attributed to challenges socially. They set out to determine if positive involvement in team sports would help mediate the risks and did, in fact, find a correlation to improved moods and lower risk of depression in those subjects. Fraser-Thomas and Cote (2006) speak of the societal benefits as youth sports athletes may also foster a sense of citizenship, leadership skills, and a sense of initiative which can benefit the individual as well as the community

later in life. Youth sports participants exhibit, and can be taught to be, more civically engaged than their peers (Coakley, 2011). A 1980s study of minority high school athletes demonstrated better grades, lower dropout rates, and more community involvement than their non-athlete peers (Sabo, Melnick, & Vanfossen, 1989).

Looking at the many potential benefits from a psychological, emotional, and social perspective proves that sports have a great deal to offer society beyond just the physical benefits. Eime, Young, Harvey, Charity, and Payne (2013) learned that physical activity recommendations can just be the beginning of improving outcomes for youth sports. They discovered that being part of teams has tremendous psychosocial benefits and recommend pushing community sports as an avenue for physical activity and leisure time to increase these benefits for youngsters. It is essential to leverage these positive outcomes because as the following section will show, the US is at a crossroads between youth sports being a boon for individuals and society or creating a new set of physical and social issues.

### **Current Youth Sports Landscape**

The current youth sports system is rife with criticism and presents a number of opportunities for improvement. Bowers, Chalip, and Green (2011) explain the current sports landscape in the US is complex, nuanced, and complicated. The current model is systematically eliminating opportunities and exacerbating a number of issues that lead to attrition. Ridpath (2018) argues that the school-based model of delivery is continually skewing towards elite and commercial enterprises and diminishing athletic opportunities while simultaneously hindering the academic and personal growth of young athletes.

To understand the system, and its shortcomings, we must look back at its recent evolution. True to its federalist roots the U.S. government has mostly stayed out of sports unlike many other nations (Ridpath, 2018). As such, private organizations, grassroots efforts, and local government dominated the youth sports landscape. For many years, in-town recreational leagues and interscholastic sports dominated our nation's sports scene. Town leagues are often run by municipalities and therefore subsidized by and for residents. Local community groups, such as a local chapter of Little League baseball, also run in town leagues and work closely with local municipalities around facilities (Friedman, 2013; Project Play, 2015). The US is also unique in having sports tied to the educational landscape, unlike most other countries (Ridpath, 2018). School systems fund sports' participation and give access to many members of their student body to participate (Friedman, 2013; Nafzinger, 2008). In 2013, nearly 52% of all U.S. high school students participate in an interscholastic sport (Whisenant et al., 2014). Through these systems, youth had many opportunities to participate close to home and for little to no financial commitment. For years, sports teams were community teams supported and run by the local community. Participation trends have also evolved. Originally, working-class boys in cities were the prime audience of local sports organizers (Albrecht & Strand, 2010).

However, the system is facing major pressure points that threaten to undermine it. The first is declining funding for in town leagues, municipal recreation facilities, and school budgets due to fiscal pressures on governments and districts. The inadvertent consequence of lowered funding to traditional extracurricular participation opportunities are being reduced or becoming more expensive. While there are still many municipal or community run sports programs, these are often much more instructional in nature, may



not be well run, or facing financial constraints subsequently providing limited opportunities for participants (Ridpath, 2018; Tipping, 2011). This is especially true in cities with high rates of poverty like Baltimore, which had 130 recreation centers in the 1980s and just over 40 today (Project Play, 2017). The same is true for rural areas where a loss of programs and an inability to commute to other areas eliminates opportunities for those populations (Project Play, 2015). Many school districts are adopting pay for play models, charging for participation in school sports because of budget cuts (Chen, 2016). These reductions in opportunities and increasing cost of participation are affecting participation in youth and interscholastic sports, especially for underserved populations (Project Play, 2015; “Youth Sports League Trends for 2017”, 2016). Now, the emphasis on sports participation resides in middle and upper-class families (Friedman, 2013; Lareau, 2014; Project Play, 2015). With this shift towards upper-class and middle-class families, local leagues that originated in the early 20<sup>th</sup> century in cities and rural areas are becoming scarce while programs in more wealthy parts of suburbia grow (Friedman, 2013; Project Play, 2015).

Private club teams have evolved in the past few decades and are drawing large amounts of participants from the in-town leagues and programs. Cook (2012) warns that the same may soon become true for interscholastic sports. Friedman (2013) explains private clubs are rising at the grassroots level with their own decision makers who have lots of freedom in dictating the playing season, coaching style, and general philosophy of the program. Some of these clubs emerged to fill the voids of dwindling town leagues, but many came to fruition intentionally to create higher levels of competition and further develop young athletes (Koba, 2014). Private clubs often feature lengthier seasons, more

travel, and more intense training and competition. Those characteristics mean a greater cost associated with participation. This sector of the industry has grown rapidly and captured predominantly middle and upper-class families (Lareau, 2003; Project Play, 2015; “Youth Sports League Trends for 2017”, 2016). While some of these clubs may have a governing body to answer to, such as USA Soccer or USA Swimming, they generally have significant leeway in decision making for their organization.

### **Issues in Youth Sports**

The current youth sports landscape is currently fraught with issues. Amongst the concerns are participation trends and access to sports, increasingly competitive club programs, reductions in funding to municipal and school recreational programs, and injuries (Project Play, 2015). The percentage of children deemed inactive is up substantially. According to Project Play, a youth sports advocacy group out of the Aspen Institute, only 37% of youth participated in team sports on a regular basis in 2017 compared to the 44.5% in 2008 (Project Play, 2015; 2018). In 2017, only 23.9% of children participated in high calorie burning sports in 2017, down from 28.7% in 2011. In 2017, 17% of children between ages 6 to 12 did not engage in any sports at all which is actually an improvement on a peak of over 19% between 2012 and 2014 (Project Play, 2018).

Many groups are also left out when it comes to youth sports (Rosenwald, 2016). According to Sabo and Veliz in their groundbreaking 2008 report, *Go Out and Play*, many youths are not getting the chance to participate in sports until advanced ages or not getting to participate at all. Woods (2007) also affirms that gender, race, location, and socioeconomic status have a significant impact on youth sports participation. In pure

percentages, only 38% of youths from households earning less than \$25,000 participated in youth sports in comparison to 67% of kids from homes with incomes over \$100,000 (Rosenwald, 2016). White families, in general, enter their children in sports younger than African-American peers. African-American families, in general, enter their children in youth sports younger and have higher participation rates, than their Hispanic peers. Late entry to sport can have negative impacts on a youth's physical development, self-efficacy in sports, and continued participation. A prime example of the discrepancy in entry points to sports is families with income levels over \$100,000 that begin their children in sports nearly two years earlier than those earning less than \$35,000 (Sabo & Veliz, 2008). According to the report, there is a similarly notable gap amongst girls of color to their male and white peers, respectively. In her groundbreaking sociological study, *Unequal Childhoods*, Annete Lareau (2003) highlights the emphasis put on youth sports, specifically organized sports, amongst middle- and upper-class families in contrast to that of their working class and poor counterparts. Other populations, such as immigrant families, participate at lower rates than the general population (Sabo & Veliz, 2008).

In addition to segments of the population exhibiting lower participation rates, youth sports are experiencing another major condition - attrition. Amongst those who do start playing youth sports, 70% drop out by the age of 13 (Wallace, 2016). Those in urban areas drop out of sports with more frequency than their suburban and rural counterparts (Project Play, 2015). One possible explanation for this may be poor access to community programs and opportunities in urban settings. Having said that, the main reason for boys, girls, and in all areas for dropping out is, "not having fun" (Sabo &

Veliz, 2008). Time commitment and intensity have had the additional impact of turning off many younger and middle-aged children and have contributed towards diminishing fun (Wallace, 2016). Adding to the no fun camp is parent behavior. In his *Changing the Game Project*, O'Sullivan (2014) faults adults for developing the hyper-competitive youth sports system and putting undue expectations for success on the young players.

Specialization and an increasingly competitive youth sports culture are correlated to attrition (Woods, 2007). One reason may have to do with physical injury and physical burnout. Specialization is the act of focusing on just one sport early. Jayanthi et. al (2013) investigated the effects of early specialization and found that it led to an increased risk for injury particularly when individuals do so before puberty. It has been noted that the rate of burnout amongst youth athletes, or those who decide to drop out of sports especially around the middle years, is significantly on the rise (Jayanthi et al., 2013; O'Sullivan, 2014). Along the lines of these findings, Hedstrom and Gould (2004) noted that while youth athletes experience fewer injuries than adults, these numbers were increasing and a significant percentage of the injuries were of the overuse variety. They explain that children's physical development makes them prone to overuse injuries and other harmful injuries like avulsions and those affecting growth plates. The American Medical Society for Sports Medicine (2014) confirmed that finding stating that at least 50% of youth sports injuries were due to overuse and also expressed that these types of injuries could have long term impacts on health.

Specialization can also create mental health issues and have negative psychological effects (Woods, 2007). An increasing feeling of needing to win at a young age can create undue pressure and anxiety in youths which can lead to lower self-

confidence and esteem (Fraser-Thomas & Cote, 2006). The additional pressure and anxiety of ultra-competitive youth sports, especially at the younger and middle ages, has been speculated as one of the major causes of burnout. Hedstrom and Gould (2004) found that was indeed the case for many who dropped out, especially at the middle ages, noting amongst the major causes were participants not feeling competent in the sport or not desiring to have it be so competitive and pressure-filled. While the systems intentional outcome was to develop elite athletes, in many ways it has contributed to the opposite. In fact, in many cases, specialization at a young age does not increase the likelihood of becoming an elite athlete and may lead to negative outcomes (Cote, Lidor, & Hackfort, 2009). The American Medical Society for Sports Medicine (2014) also mentions the potential for cognitive, emotional, and social issues related to burnout. To be blunter, O'Sullivan (2014) believes that creating this type of atmosphere for youth sports robs children of being what they are, children.

Another major issue facing youth sports is the national conversation surrounding concussions. While much research still needs to be done on this topic, the increasing number of professional athletes being diagnosed posthumously with Chronic Traumatic Encephalopathy (CTE) is jarring. CTE, according to the Boston University CTE Center is a progressive degenerative brain disease that can cause cognitive issues later in life and even lead to dementia. The repetitive brain trauma, even if minor, experienced by athletes in their sports puts them at significant risk for developing CTE. Not much research had been done until recently in regards to non-professional athletes. However, findings for a recent Mayo Clinic study found that 1 in 3 individuals who participated in contact sports as a youth showed signs of CTE when the brains were studied after their

deaths (Goldman, 2015). This is a disturbingly high number, especially compared to the non-contact sport playing brains in the study, and should be strongly considered by youth sports administrators moving forward.

Many argue that these adult run and focused private clubs contribute significantly to the decline in participation (Dworkin & Larson, 2007; O'Sullivan, 2014;). The rise of the club system has led to a number of inadvertent outcomes. The sheer cost of participation, let alone the time commitment, has priced many families out (“Youth Sports League Trends for 2017”, 2016).

Our current system has evolved over many years due in large part to budgetary cuts of municipal governments and school districts, as well as the rise of private clubs. Our system is more expensive than ever and not readily available in all geographic regions. Coupled with other factors, this leads to lower participation trends overall and amongst specific demographics. The current system also contributes to extraordinary rates of attrition before the middle ages due to less fun, increasing rates of injury, and increasing rates of burnout.

### **Delivery Methods for Youth Sports**

As the research has indicated, youth sports have the tremendous ability to transform our society in a positive or negative way in the coming years. With 35 million participants, it is imperative that youth sports practitioners create systems that benefit the future of our nation and leverage the positive outcomes that are possible while limiting the potential for negative consequences. There is perhaps some disagreement over what sports are for. Are they for developing the best athletes to become professionals and compete in world championships? Or should a sport for all models be the standard,

primarily focusing on the benefits of participation for the average citizen? Cote and Vierimaa (2014) share the Developmental Model of Sports Participation (DMSP), which denotes three stages of sports participation: sampling (age 6-12); specializing (age 13-15); and investment (age 16+). DMSP identifies three specific paths athletes take: "(1) recreational participation through sampling, (2) elite performance through sampling, and (3) elite performance through early specialization" (Cote, Strachan, & Fraser-Thomas, 2008, p. 35). However, we know that the concept is shifting with increased specialization. Cote (1999), as well as Bruener and colleagues (2010), are amongst several scholars who have identified models or pathways to athletic success. However, these models really do not identify an intentional development model, just the trajectories that most athletes follow. Identifying best practices for youth sports governing bodies, administrators, or policy makers for managing or running youth sports systems should be viewed as integral to harnessing youth sports' power to benefit individuals and society. This section will examine several approaches including those geared towards elite athlete development and sports for all. The section will then feature a more in-depth discussion of LTAD which seeks to accomplish both lofty goals. The ADM will then be highlighted as a real life application of LTAD and to shed more light on the key focus of this research study.

### **Elite Athlete Development Pathways**

Cultivating elite athletes is sometimes seen as one of the goals of youth sports. Professional sporting events exhibit societies' desire to watch the best at a given sport duel it out in the competitive arena. Perhaps no other event than the Olympics exhibits a country's desire to cheer on their peak performing athletes. Houlihan and Green (2008)

investigate this phenomenon and how it is handled across the globe. They share that there are a number of different models but some key aspects need to exist to ascertain elite levels and global success. They specifically noted aspects like financial support of national governing bodies, quality of coaching, athletic and post career support, and good facilities as essential factors.

Another factor that is prevalent in most of the countries around the world when it comes to athletics is the role that government plays in supporting national governing bodies, infrastructure, and elite athlete support. Many other countries also have a rich history of multisport, community-based clubs, especially in European countries (Ridpath, 2018). Governments often subsidize and generally apply oversight over these governing bodies or club systems (Houlihan & Green, 2008; Ridpath, 2018). This is not true in the US where the government typically stays out of sports and we do not have a traditional club system. The US oftentimes has a disjointed development system for elite athletes further complicated by the nation's school-based sports model (Ridpath, 2018; Sparvero, Chalip, & Green, 2008). As such, it is not designed for a structured elite athlete development pathway. There is much reliance on parks and recreation departments and then schools to provide the athletic opportunities for young athletes which in many cases do not encompass diverse offerings. To put it plainly, the US has no intentional elite athlete development system proffered by the federal government, but rather has a disjointed collection of predominantly school-based sport systems coupled with national governing bodies and grassroots programs. While the US is highly successful at international competitions, considering its size and wealth, it would likely be much more



successful with a better developed elite athlete development model and an increase in policy coordination (Ridpath, 2018).

Sparvero and colleagues (2008) share that the US system creates a few phenomena that impact youth sports as touched on in earlier sections. They point out that clubs sometimes fill in the gaps where parks and recreation departments are lacking. In many cases, this means expensive programs that many cannot afford to participate in. Sports like tennis, golf, and equestrian which are largely played in the US by the wealthy highlight this point. The lack of a system also diminishes the diversity of sporting opportunities available to youths as they are dictated by what is popular at the professional ranks. This would explain why the US has no real handball program to speak of and why a sport like rowing lies almost exclusively at the intercollegiate level or at elite and wealthy high schools. Finally, the laissez-faire attitude and lack of guidance towards creating structured or equal opportunities for all children exacerbates the divides between classes, regions, and other variable factors in much more significant ways than other countries. Having the resources to access high level sporting opportunities in the United States may play a larger role in some instances than athletic talent. We can see this playing out in the country with an increase in early specialization as parents hope to give their children the opportunity to get ahead.

### **International Olympic Committee Consensus Statement on Youth Athletic Development**

The International Olympic Committee (IOC) put together a list of worldwide scholars in 2014 to critically evaluate the current state, challenges, practices, and science surrounding youth sports and to subsequently propose recommendations for a healthy

youth sports model. The goal of the IOC with these recommendations is to create “a sustainable model to develop healthy, resilient, and capable youth athletes while providing for all levels of sports participation and success” (Bergeron et al., 2015, p. 843). From this charge came the 2015 *International Olympic Committee consensus statement on youth athletic development* written by Bergeron and colleagues.

The paper begins by analyzing many of the physiological considerations such as what youths can perform or should be performing physically as they mature. Attention was paid to aerobic and anaerobic performance, muscle development, fatigue and recovery, cardiac capacity, and injury prevention. In addition to physiological issues, psychosocial issues were also examined such as burnout, anxiety, and potential for abuse. The researchers also look into other issues such as the potential for eating disorders and environmental challenges.

Talent identification is seen as a major challenge. Identifying young top talent is both challenging and potentially detrimental. Having a short term approach in identifying youngsters may lead to missing late bloomers and fails to acknowledge a number of other factors in an athlete's life that may drive them to success as an adult. In this vein, coaching is also identified as a key factor in a young athlete's development. Bergeron and colleagues (2015) assert that the coach must be able to develop in a young athlete the four Cs – competence, confidence, connection, and character.

From their critical look at all these factors, the researchers present a broadly based list of guiding principles to improve current practices. General principles focus on creating more holistic and inclusive practices based on safety and the development of the whole athlete including psychological growth and an emphasis on good character.

Coaching principles focus on training coaches to be well versed in the sport, coaching pedagogy, and caring for athletes psychological needs. From a physiological standpoint, the researchers recommend best practices surrounding developing physical literacy, age-appropriate training, and a proper structure for injury prevention. Principles are also recommended for sports governing bodies and include creating policies that protect and safeguard their youth athletes, create selection and development philosophies that emphasize the long term success of all athletes, discourage specialization, and practice good injury prevention strategies.

The IOC has made a strong statement in this piece on the need for safe and evidence-based practices throughout youth sports. It also continues to put a high emphasis on sports systems creating structures for the purpose of developing top talent. It does, however, recognize that athlete's paths vary and no development path is the same. However, the documentation and model are clearly geared towards well organized and higher level sports organizations, not the local 10 and under soccer league.

### **Positive Youth Development through Sports**

Positive Youth Development (PYD) is defined as an:

Intentional, prosocial approach that engages youth within their communities, schools, organizations, peer groups, and families in a manner that is productive and constructive; recognizes, utilizes, and enhances young people's strengths; and promotes positive outcomes for young people by providing opportunities, fostering positive relationships, and furnishing the support needed to build on their leadership strengths. (n.d.)

The belief of PYD advocates is that creating programs that foster positive skill building and increasing leadership opportunities can be used as a prevention strategy towards risky behaviors as well as contribute to positive outcomes as they move through adolescence and subsequently into adulthood. While PYD largely focuses on adolescents, advocates argue creating programming an infrastructure at younger ages as well (“Positive Youth Development”, n.d.).

Holt and Jones (2008) believe that sports, if done properly, can lead to PYD. Holt and Jones (2008) point out that sport can lead to what a leading PYD scholar refers to as the 5 Cs: competence, confidence, compassion, character, and connection. Developing these characteristics is seen as key to PYD driven programs and is believed to be assets needed for the prevention and success the model strives for. With this in mind, in 2008, Holt and Jones edited a book by leading scholars on PYD and in fields related to youth sports to look at intersections and opportunities between the two. Within the book, a number of key findings emerge. Scholars also identify key recommendations to infuse PYD intentionally into sports programs. The following paragraph lays out just a few.

Cote et al. (2008) share that at the younger ages of 6-12 (the sampling stage according to DSMP), young athletes should partake in sampling and playing – sports should be fun and they should try many. Coaches and parents play pivotal roles and heavily influence if PYD outcomes will occur. Therefore, attention should be given by coaches and parents to create well-structured programs for PYD outcomes (Cote et al., 2008; Holt et al., 2017). Petitpas, Cornelius, & Van Raalte (2008) identify some existing models which rely on well trained mentors and coaches to connect life skills and sports. Youth sports and its actors need to take the long-view and sacrifice short-term success for

long-term developmental outcomes. Cote and colleagues (2008) state that youth sports should not be shortsighted and need to take a long view of youth development that also includes psychosocial development.

PYD through sports may also be a model that can have a substantial impact on the world as a whole. Bailey (2008) shares that early indications suggest it can have a great impact on social inclusion if implemented properly. PYD has also been shown to be a potential model for peace education (Mandingo, Corlett, & Anderson, 2008). PYD has the power to create private and public good. In order to harness this power, it needs to embrace a sport for all approach and be delivered with intention (Holt & Jones, 2008).

### **Project Play**

Project Play is a product of the Aspen Institute and seeks to reimagine youth sports in America. Project Play, in its seminal 2015 publication *Sports for All, Play for Life: A Playbook to Get Every Kid in the Game*, identifies a broken system where children's needs are not being met. They identify sagging participation rates, alarming rates of attrition, fewer sporting opportunities for many, and an increasingly competitive club model at younger ages as key evidence that there is a problem. The organization believes this is a disservice to kids and society.

As a solution to the problem, Project Play proposes eight plays that they believe will inherently improve participation in youth sports, as well as positive outcomes of participation. The eight plays, or recommendations, are:

- (1) Ask kids what they want
- (2) Reintroduce free play
- (3) Encourage sports sampling
- (4) Revitalize in-town leagues
- (5) Think small
- (6) Design for development

- (7) Train all coaches
- (8) Emphasize prevention

A few of particular interest to the development of young athletes are (6) design for development, (7) train all coaches, and (8) emphasize prevention. Design for development recommends that programming must be developmentally appropriate - for example, six year olds should be playing T-ball, not participating on major league fields. Coaches can have a deep impact on the experiences of young athletes and their continued participation. Project Play points out that only 5% of participants with a trained coach dropped out the following year while the average attrition rate was 26%. The final play is to emphasize prevention. With an increase in awareness of injuries, especially concussions, one-quarter of parents indicated they may not let their child play sports. With these factors in mind, creating strategies for injury prevention are essential for the health of young athletes, let alone ensuring continued participation.

Project Play's advocacy work includes a nationwide network of youth sports organizations. They regularly hold forums and lobby policymakers. Recently they have created a Project Play inspired hub in partnership with Under Armor in Baltimore, Maryland and are supporting other initiatives in locales like Mobile County, Alabama and Western New York. It will be interesting to see in future years if their research, advocacy, and partnerships inspire a large-scale change of the culture and landscape of youth sports.

### **Long Term Athlete Development Theory**

One model that is gaining significant traction and can possibly effect this change is the LTAD Model. In 2002, the Canadian Center for Ethics in Sports released a major report which cautioned the "Americanization of sport are leading youth away from its

beginnings as a means to educate children and build leaders turning it into a source of revenue and entertainment” (Dixon & Bruening, 2014, p. 145). It is evident to anyone who has observed children that training techniques utilized for adults or late adolescents would not be appropriate for a six year old; however, for years this is how we trained our young athletes. This is where LTAD comes in, creating a plan for proper athlete development.

Building on previous scholarship, Bayli and Way (1995) began crafting an age appropriate athlete development model which they dubbed Long Term Athlete Development. It was originally published in 1995 with four stages and by 2005 had evolved into seven. Coupled with research and conversations alongside the Canadian Sports for Life committee, Balyi and Way (1995) were joined by Higgs and created their 2013 book on LTAD, the current seminal work on the topic for practitioners.

Balyi and colleagues (2013) tell us in its most basic form that LTAD is a “stage by stage approach [that] gives every child, youth, and adult the greatest opportunity to engage in lifelong, health enhancing physical activity and if they have the talent and the drive, to reach their highest sports performance potential” (p. 1). Lloyd and colleagues (2015) make a strong argument that implementation of LTAD could have far reaching effects on not only the production of elite athletes, but on increasing public health and creating more physically literate and healthy adults.

One of the key aspects of this model is its emphasis on creating physical literacy much the way a reading program seeks to create strong and lifelong readers. Physical literacy is defined by the International Physical Literacy Association as “the motivation, confidence, physical competence, knowledge, and understanding to value and take

responsibility for engagement in physical activities for life” (n.d.) Elements include affective, physical, cognitive, and behavioral components that are essential to achieving physical literacy. Young athletes need to develop the key motor and movement skills but also need to develop the motivation, knowledge, and lifestyle to improve in their athletic endeavors and also to be active for life (“Physical Literacy”).

Physical literacy, then, is the key component and the foundation of both elite athletes and lifelong sports and recreation enthusiasts (Balyi et al., 2013). Much like an academic curriculum, to continue the metaphor, physical literacy includes age and developmentally appropriate training that seeks both mastery and maturation before advancing to the next stage. In this manner, LTAD creates a clear and scientific approach that is apparent to stakeholders, such as parents, coaches, and athletes, at all levels (Thibault & Harvey, 2012). Similarly, the National Strength and Conditioning Association (NSCA) and the Society of Health and Physical Educators (SHAPE) have developed guidelines and benchmarks associated with proper athletic and motor skill development for different age groups and developmental stages (Couturier et al., 2013; Meadors, n.d.). These guidelines can serve educators, coaches, and parents in creating physical activity that is appropriate, develops a foundation for later success, and will reduce injuries.

The key component of LTAD, the stages, are as follows:

- (1) FUNdamental Stage (ages 6-8 females, ages 6-9 males);
- (2) Learn to Train (8-11 females, 9-12 males);
- (3) Train to Train (11-15 females, 12-16 males);
- (4) Train to Compete (15-17 females, 16-18 males);
- (5) Train to



Win (females 17+, males 18+) (6) Retirement and Retainment.

(Mackenzie, 2006)

Sports specific models based on LTAD have sometimes been modified to include an earlier start to being active and also include the Active Life or Sport for Life stages as individuals get older (American Development Model, n.d.). Active Life refers to those who continue to play lifelong sports, which is the end goal of LTAD for both elite and recreational athletes. This should contribute to a significant reduction in obesity and disease (Balyi et al., 2013). The Sport for Life stage is similar but can occur in younger athletes who do not, or no longer desire, to train or compete at the higher levels but would like to continue playing in a more relaxed environment (American Development Model, n.d.).

One of the key attributes of LTAD is that in addition to building physical literacy, it also advocates for sports participation that is developmentally appropriate from psychological, emotional, and social standpoints. Reducing the influence of competition early on allows for less stress and anxiety on young athletes and gaining strong physical literacy will allow for greater confidence and less dropout (Meadors, n.d.). As we will see in the next section's case study, LTAD can intentionally incorporate psychological and life skills within each stage. Additionally, LTAD can be adapted to specific developmental needs meaning it is more inclusive and therefore more accommodating of a diverse set of participants with a host of needs (Balyi et al., 2013; Stafford, 2005).

LTAD has made significant gains with entities like Sport Canada and UK Sport fully committed to implementing the model across their constituents (Ford et al., 2011; Hume, 2015; Lloyd et al., 2104). The U.S. Olympic Committee (USOC) is now

embracing the theory and have begun pushing all 48 of its member sports governing bodies to adapt the theory. The USOC is coining their adaptation the ADM, a nod to USA Hockey who adapted LTAD into an organization-wide model of the same name and began implementation in 2009.

LTAD is not without its criticism. Sports for Life advocates may take issue with the original model which leaned heavily towards the arena of elite athlete development. Thibault and Harvey (2013) point out a few criticisms of LTAD implementation primarily as it has been applied across the Canadian sports landscape. Tops amongst the criticisms are the prominence put on physiological development at the expense of what they refer to as 'holistic' growth. By holistic development, Thibault and Harvey (2013) share concerns that the psychosocial development of young athletes may be neglected, and fails to incorporate broader social and cultural context. Holt (2016) echoes this sentiment, arguing that while it is an interdisciplinary approach, much of it is based on physiology and does not incorporate enough psychosocial development. Holt (2016) calls for approaches like PYD which have more grounding in theory on children's psychological development. A prescribed theory may also exclude children from having influence over their own development and learning to navigate decision making in their sports careers (Thibault & Harvey, 2013).

Researchers also share concerns about the empirical evidence backing LTAD (Ford et al., 2011; Holt, 2016; Thibault & Harvey, 2013). They argue that more research is needed to explore the actual impacts of the windows. As well, a literature review by Ford and colleagues (2011) uncovered research that actually contradicts LTAD and argues the diverse individuality of young athletes may make the implementation of the

windows counterproductive. Lloyd and Oliver (2012) further this argument with their own model titled the Youth Physical Development model (YPD). YPD agrees with LTAD that age appropriate training is needed but disagrees with LTAD's limitations around windows of trainability and has some additional suggestions for what appropriate training should be. However, YPD is focused entirely on strength and conditioning and is not a comprehensive holistic model for practitioners.

Ford and colleagues (2011) do believe the implementation of LTAD in many organizations has been beneficial as it has made coaches and practitioners more conscious of age-appropriate activities. But they believe additional research and education is needed as it should not be seen as a one size fits all model. Thibault and Harvey (2013) share that in Canada, LTAD's widespread implementation prior to empirical proof of its value may create a situation where it is too late to turn back even if it is disproved.

Balyi and colleagues (2013) acknowledge some of the criticism facing their model. They agree with many researchers that their model is not a catch-all fit for everyone and that variation does exist. They also acknowledge that there is little empirical evidence and that it will need to be updated as new scientific research emerges. However, they believe that it would be impossible to set up a real world experiment to prove the model and believe that as researchers learn more about human growth and development, tweaks and changes will prove inevitable and necessary. They maintain a strong belief that their model provides the best chance of reaching the sometimes adversarial goals of high performance and more active participation.

## **American Development Model**

USA Hockey is the main governing body for ice hockey in the US. Amongst its areas of oversight are national teams, elite player development, adult hockey, sled hockey, junior hockey, putting on national tournaments, and last but perhaps most significant - grassroots youth hockey. According to USA Hockey's Annual Guide, USA Hockey's organizational structure divides the country into districts and affiliates. For example, New England is one district and within that is the Vermont State Amateur Hockey Association, an affiliate. District and affiliates are responsible for implementing USA Hockey policies and best practices across the country as well as running coaching clinics and development camps. While the national office has full-time professional staff, volunteers typically run districts and affiliates.

USA Hockey began the implementation of the ADM during the 2009-10 season with strong backing from the National Hockey League who were seeking more American born players in its ranks (Thompson, 2009). The model was designed with additional hopes of increasing retention, improving skills, increasing safety, and giving more players a chance to succeed (American Development Model, n.d.). The hope is that reaching these primary goals will lead to the dual goal of generating a higher number elite American players and more lifelong hockey players (American Development Model, n.d.).

ADM is based heavily on LTAD. An example of LTAD in practice can be seen in the ADM's recommendations for the "Learn to Train" stage designed for females aged 8-11 and males aged 9-12. Guidelines emphasize gains in sports specific skills as well as

both physical and psychosocial literacy. The guidelines in the ADM program manual include the key concepts of:

- (1) Training and Competitive Environment
- (2) Physical Development
- (3) Technical Development
- (4) Tactical Development
- (5) Coaching Considerations
- (6) Psychological Development
- (7) Ancillary and Life Skills

Examples of some of the specific guidelines for the Training and Competitive environment concepts in this stage include:

- (1) training to competition ratio of 70/30;
- (2) a season that lasts 7 months with approximately 4 events per week;
- (3) introducing concepts of fitness and warming up and;
- (4) continue to encourage daily physical activity and multiple sports participation.

In the Psychological Considerations concept examples include:

- (1) short and long term goal setting;
- (2) developing team spirit and teaching players to support their peers and;
- (3) concentration and visualization techniques (admkids.com, n.d.).

The model additionally includes a number of sports specific techniques and hockey concepts appropriate for this age group.

Following the LTAD theory, individual skills and physical literacy instead of team based training dominate the guidelines for younger age groups. Team concepts are being phased in more as players get to the end of the Learn to Train stage and have theoretically already developed strong individual foundations. ADM recommends developmentally appropriate skill training for each age group as well as appropriate practice to play to rest ratios. ADM has also emphasized training for coaches. Coaches are required to attain certifications and complete age-appropriate modules each year (usahockey.com). Trained coaches have shown to be a boon for player satisfaction and

retention (Beatty & Fawyer, 2013; Project Play, 2015). Coupled with the need for coaches to implement ADM best practices, coaches play an outsized role in youth sports programs. On the topic of prevention, ADM encourages participation in multiple sports and discourages specialization. It also has moved the age for body checking up an age bracket, now beginning at 13, in hopes of reducing injuries and concussions (American Development Model, n.d.). A study in Canada, who also recently increased the age of body checking to 13, indicated that this simple change reduced the number of injuries by half and even more for the rate of concussions, roughly two-thirds, of previous levels (Crist, 2017).

While a framework or policy is a start, implementation is key to its success. USA Hockey is employing many strategies in an attempt to have its member organizations buy into ADM. Amongst these strategies are tools like capacity building, mandates, inducements, and sanctions.

ADM was introduced in 2009. USA Hockey began phasing it in primarily with capacity building. USA hockey has made great efforts to educate constituents such as organizations, coaches, and parents on the theories and rationales driving ADM and the strategies needed for it to be successful. USA Hockey believes wholeheartedly and wants to demonstrate to constituents that ADM will benefit their children and the sport of hockey in the US. USA hockey has promoted ADM through its website, email newsletters, marketing materials, and educational offerings. They have sought and published testimonials from elite players, coaches, and intellectuals. USA Hockey has also hired and employed an ADM national technical director, as well as ADM regional managers, to work with the district, state, and local associations on implementation of the

model. Almost a decade since its inception, USA Hockey continues its efforts by highlighting model organizations, collecting and sharing ADM success stories, continuing to employ regional managers, and adding promotional and educational materials.

During ADM's rollout, USA Hockey began mandating some of the policies and recommendations of the model. One example of this is making the playing surface from the 8U age group smaller. To do this, a full-size hockey rink is divided into thirds and the players play cross-ice. USA Hockey did not initially force organizations to do this but through its mandate, more and more organizations bought in and it became common practice before later being mandated. This past season an independent initiative in the Pacific Northwest has seen a number of organizations at the 10U level playing half ice games (Carpenter, 2019). Another example of a mandate of ADM is to re-align practices to incorporate more players and station based skill development. While again USA Hockey cannot truly enforce this, through capacity building it is increasingly becoming the norm.

USA Hockey has also used inducements as a way to get buy-in on ADM. One prime example of this is 'model organization status'. If an organization commits to the principles of ADM and can demonstrate that it meets certain key benchmarks, USA Hockey will commit additional resources to the organization. Resources may include equipment, additional educational support, and additional staff support through the ADM regional manager (American Development Model, n.d.). In addition to the model organization program, USA Hockey has also created grants to help organizations

purchase equipment such as beginner equipment or the equipment needed to implement cross-ice hockey (usahockey.com).

USA Hockey also utilizes sanctions. Organizations not following some of its basic guidelines may not participate in games or tournaments against organizations that do. As most youth hockey organizations are members of USA Hockey, this essentially eliminates the competition pool. However, most of these essential guidelines do not include ADM specifically. Coaching education and certifications are perhaps the biggest way in which USA Hockey employs sanctions as a strategy related to ADM. In order to coach a team, each coach must attain certification through USA Hockey. With the implementation of ADM, the requirements for certification have increased and additionally include annual modules specific to the age group of the coach's team. It is the hope of USA Hockey that this requirement will also lead to capacity building amongst coaches and lead to increases in ADM implementation by coaches.

As a young model, especially in the US, we do not yet know how successful ADM will be. USA Hockey has yet to do extensive research on its ramifications across its constituents but has stated that anecdotally they have received good feedback and have seen an increase in retention, one of its key goals (Ken Martel, personal communication, December 15, 2015). The retention rate has increased 7% to 8% at the 8U level and the retention rate runs almost 90% from ages 9 to 12 (Sapurji, 2017). In some recent National Hockey League draft, U.S. born players were selected in the top rounds at an almost unprecedented rate, either a signal the new ideology is working or a mere aberration of exceptional talent. The fact that it is expected in the 2019 draft an American born and bred player will go first overall and a new record could be set for



number of Americans drafted in the first round, according to a number of talent evaluators, may further the narrative that USA Hockey has improved its development of elite players (Morreale, 2019).

However, there are still examples of organizations and regions that have not entirely bought into ADM, particularly those with rich and entrenched hockey traditions, according to Martel (Sapurji, 2017). For example, ADM now requires cross-ice only games at the 8U age group and there are still examples of organizations and local leagues that do not adhere or only adhere for a portion of the season, including a number of organizations in Michigan who opted out of USA Hockey entirely and created the Michigan Amateur Youth Hockey League, gaining sanctioning as a league from the Amateur Athletic Union (AAU). USA Hockey must continue its work to analyze the success of ADM and ensure nationwide buy-in from its constituents.

### **Athlete Engagement**

USA Hockey has stated key goals of reducing attrition and burnout of young athletes, improving their overall play, and gaining hockey players for life. The Athlete Engagement Questionnaire (AEQ) seeks to measure similar characteristics in athletes. Lonsdale, Hodge, and Jackson (2007) have been at the forefront of defining athlete engagement (AE) and are the developers of the AEQ. AE began as the conceptual opposite of burnout and later was investigated in relation to flow. AE is defined as "an enduring, relatively stable sports experience, which refers to generalized positive affect and cognitions about one's sport as a whole" (Lonsdale et al., 2009, p. 187).

AE is defined by four key constructs – confidence, dedication, enthusiasm, and vigor. The authors explain:

Confidence represents “a belief in one’s ability to attain a high level of performance and achieve desired goals”, while dedication represents “a desire to invest effort and time towards achieving goals one views as important.” Vigor was defined as, “a sense of physical and mental liveliness”, and enthusiasm was characterized by “feelings of excitement and high levels of enjoyment.” (Lonsdale et al., 2009, p. 187)

These attributes have a good deal of overlap with some of the concepts described by Bergeron and colleagues (2015) in their seminal paper for the IOC.

Lonsdale and colleagues (2007) believe that AE can signify positive sports experiences. Specifically, while developing the AEQ, they first determined that AE had a negative correlation to burnout (Lonsdale et al., 2007). This is a powerful finding, indicating the AEQ has a strong relationship to one of the key outcomes of ADM and the mission for many youth sports advocates - to reduce burnout. AE also demonstrate positive associations with flow (Lonsdale et al., 2009). Flow, unlike AE, is a transient phase but one desired by athletes. Achieving flow suggests the athlete is uniquely in tune with the activity they are performing, dedicated to the task at hand, has a feeling of performing well, and is enjoying the process (Lonsdale et al., 2009). Flow, in sports psychology, is seen as a key state to be in and of contributor to success (Lonsdale et al., 2009).

The AEQ was originally tested on elite athletes in predominantly Canada and New Zealand. It was further shown to have model invariance with respect to burnout amongst a more diverse set of athletes in ages (12 to 35) at multiple competitive levels (Francisco, Mar Gana, & Sanche-Romero, 2018). It has also been validated in multiple

countries and shown to have high reliability and validity in many additional studies, including a plethora of different sports (Babic, Sarac, Missoni, & Sindic, 2015; Martins, Roado, Ferreira, & Biscaia, 2014). Martins and colleagues (2014) also found that measures like AE signify positive feelings of involvement which in turn proved strong predictors of youth continuing to play sports. One curious area of the AEQ for further investigation was the findings of a study testing AEQ in regards to gender. Despite the study still finding strong reliability and validity of the AEQ across its participants, male and female participants at a sub-competitive level demonstrated statistically significant similarities on the subscales of dedication and enthusiasm but differences on the subscales of confidence and vigor (Martins et al., 2014).

## **Conclusion**

It is evident from the review of literature that youth sports can have great value for individuals and for society. It is also evident that more intentional delivery models are needed to create more accessibility, enhance positive outcomes, and minimize risks and potentially negative outcomes. ADM, using LTAD as its backbone, may be capable of accomplishing those goals for USA Hockey and create participants with higher levels of AE.

## CHAPTER III: METHODS

This study measures the degree to which ADM has been implemented among USA Hockey programs across the country using a reliable and valid survey instrument and psychometric measures. Utilizing the ADM program manual, question items were developed for the survey representing key elements of each concept of the ADM curriculum at the 12U level. Once an initial item pool was developed, the survey went through three rounds of testing and development. The first round included a local pilot accompanied by cognitive interviews. The second round included a regional sample encompassing the New England region. The third and final round featured the final instrument sent to a national sample of approximately 11,000. Quantitative analysis was conducted to validate the survey and to develop composite scores for the various constructs of ADM in order to answer the research question. This chapter describes the stages of survey development and subsequent data analyses used to create the ADM composite scores and measures of reliability and validity.

### **Methods**

An important part of implementing a new model is to ensure adherence and proper implementation. To start understanding the impacts of the model, it is first and foremost essential to understand the degrees to which ADM has been implemented in youth hockey programs across the country.

**Process evaluation and implementation fidelity.** This research will take on a positivist approach and seek to measure the degree of ADM implementation. In order to understand the success of a program, it needs to be evaluated. Saunders (2016) explains the act of process evaluation across disciplines, including education, seeks to determine if

and how an intervention worked. A good definition of process or program evaluation comes from the CDC who define it as "a systematic method for collecting, analyzing, and using data to examine the effectiveness and efficiency of programs and, as importantly, to contribute to continuous program improvement."

Saunders (2016) breaks down this definition further stating it is important to approach evaluation in a methodical manner. Saunders (2016) states evaluation takes on different forms, most notably impact evaluation and process evaluation. Impact evaluation can also be referred to as effectiveness or outcome evaluation and focuses heavily on if the intended goals of the program or treatment came to fruition. Process evaluation takes a look at the way in which the treatment or program was actually implemented. As such, a key component of process evaluation is implementation monitoring. Saunders (2016) tells us this can include a number of aspects such as fidelity, dose, satisfaction, reach, and recruitment.

This study will focus primarily on fidelity. Implementation fidelity measures "the extent to which a program, policy, or practice was implemented consistently with underlying theory or philosophy" (Saunders, 2016, p. 148). Implementation fidelity is sometimes also referred to as adherence or integrity (Mowbray et al., 2003; Saunders, 2016). Fidelity means the degree to which the program, curriculum, or treatment is being delivered as it was designed, written, or prescribed.

Durlak and DuPre (2008) share that research shows that when the fidelity is strong, typically at levels of 60% or higher, outcomes are frequently better. Breitenstein and colleagues (2010) share that poor fidelity may explain why interventions that worked in controlled settings fail at scale. While Durlak & DuPre (2008) looked at a wide range

of fields of study, including a few in the education sector, Albers and Pattuwage (2017) turned up similar findings when examining studies focusing on just the field of primary and secondary education.

**Survey and scores.** One key aspect of implementation monitoring is identifying the fidelity of the planned intervention, in this case, ADM. One such strategy that can reach far and wide and capture generalizable data, including data needed for implementation monitoring, are surveys (Dillman, Smyth, & Christian, 2014; Saunders, 2016). Therefore, this study will employ a survey and utilize a national sample of player's parents at the 12U age level to collect data relevant to the research questions. No such survey currently exists; therefore, the key component of this study will be to develop such an instrument.

Survey research can be a very effective method in gaining data and insights to formulate generalizable conclusions. Surveys will allow a collection of information from a wide national sample. In contrast, qualitative approaches would prove challenging in terms of efficiency and ability to generalize (Dillman et al., 2014; Saunders, 2016).

In the development of a survey, it is of importance to identify the constructs before designing measurements (Babbie, 2012; DeVellis, 2017; Dillman et al., 2014). Mowbray, et al., (2003) strongly recommends using program manuals to begin identifying constructs when developing implementation measurements. The item development of the survey instrument, in this instance, will come directly from USA Hockey's ADM program manual and other applicable USA Hockey materials. Identification of constructs will be further aided through the use of factor analysis and scale development best practices.

This study will also rely heavily on the work of DeVellis (2017) on scale development as implementation will be measured through the development of composite scores based on each ADM construct. In the development of a new survey instrument and in creating composite scores, it is essential to ensure reliability and validity. Steps will be taken to ensure face validity, content validity, internal reliability, and factor analysis throughout the process. Additionally, two AE subscales will be utilized to prove the external validity of the new measures.

### **Participants (Sampling Plan)**

As the ADM is meant to change the face of hockey in the entire US, a national survey was conducted. There were three rounds of survey development: a local pilot along with coinciding cognitive interviews; a regional sample; and the national sample. The local pilot included reaching out to two local youth hockey organizations. Convenience sampling was used in this round as the researcher reached out to personal connections to identify a sample for this small and initial pilot. Convenience sampling was appropriate in this instance as the goal of the initial round was mainly to test the instrument rather than make inferences from the data. The regional sample was sent to parents of all 12U players in the New England region (encompasses VT, NH, ME, RI, and CT). The survey was sent to the parents of all eligible players, approximately 4,800. Finally, the national survey was sent to the parents of 12U players across the country with the exception of the region previously sampled. With around 63,000 eligible 12U players and USA Hockey's desire to not sample all of them, it was decided that a random sample of 20% of each state would be sampled. In total, that equates to the survey being received by a little over 22,000 participants. Being a survey, by nature, responses are

voluntary and it was imperative to analyze the makeup of respondents versus non-respondents to ensure the sample reflects an accurate representation of USA Hockey members.

**Audience.** The player's parents and guardians were sampled for participation in this survey. Players, coaches, USA Hockey staff, as well as parents each have knowledge and perspective on the implementation of ADM. In deciding on the audience, each of these potential audiences were considered and parents were ultimately chosen.

Players are one of the alternate audiences that could have been selected. However, it would prove challenging to connect with players via a web-based survey due to access to technology and the fact their parents' emails are the ones on file with USA Hockey. There were also concerns about a 12U player's intellectual abilities in providing accurate answers given some of the constructs being addressed.

Coaches provide the next alternate audience that was considered. As coaches receive training in concepts of ADM they would seem like a good potential audience. However, concerns exist around their bias to objectively evaluate the model much of which is dependent on their skills, abilities, and desires to implement it. Answering on aggregate for the team as well may not be as ideal as receiving more individualized feedback from parents of just one or two players on a team. Another concern is that there are less coaches to sample than parents which may hamper the survey's ability to receive a critical mass of respondents. Finally, it was realized that coaches could be included in the parent survey as the vast majority are parents of players.

Parents overall are the best audience for this study amongst parents, coaches, and players. They will have the intellectual ability and observational perspective to answer



questions better than players. They will not be as biased as sample group as coaches. They will also better answer how ADM is being implemented for each individual and be able to provide insights for their child related to AE questions. Finally, there is a significantly greater number of parents creating a higher likelihood of receiving enough responses to be confident in the statistical significance of the study. Many coaches are also parents so inevitably some will respond and data can be compared across groups.

Concerns exist that parents may not have the engagement or knowledge needed to answer all questions and that there may be major differences in responses based on this. The study accommodated for this in two ways. First, items were overhauled after cognitive interviewing and after each round to ensure they are as clear and observable as possible. Second, several items measuring parental engagement and knowledge have been included in the survey. Statistical analysis, specifically Pearson's correlation, will help determine if parents provide different responses based on their levels of engagement, attentiveness, or knowledge.

**Age group.** The survey focuses on just the 12U age group. As each ADM stage and age group has unique recommendations, it would be challenging to develop an all-encompassing instrument for all ages. 12U falls into the latter half of the Learn to Train stage and is one of the prime stages of athlete growth and sports specific skill acquisition. It is also an interesting stage as team concepts as well as psychological development take on increasing meaning in player development (American Development Model, n.d.; Balyi et al., 2013). The middle-ages following this stage are also a known time when kids drop out of sports. Because of the pivotal nature of this stage, it is ripe for investigation.

**Additional concerns.** Some concerns exist in regards to the sampling plan, such as response rates from different populations. It will be important to look at the region, level of play, gender, race, and other demographic representation in the sample. Statistical analysis will assess if the sample is indicative of USA Hockey's overall makeup and conclusions can be generalized.

### **Measures**

**ADM measures.** USA Hockey's program manual, as well as other educational materials, share direct and concrete recommendations on the structure for each stage of development. The 12U age group falls into the latter part of LTAD's Learn to Train stage. The ADM manual identifies seven key concepts which are:

- (1) Training and Competitive Environment
- (2) Physical Development
- (3) Technical Development
- (4) Tactical Development
- (5) Coaching Considerations
- (6) Psychological Development
- (7) Ancillary and Life Skills

Using the ADM program manual as the primary source, items were created to measure if ADM recommendations, from each concept area, are being implemented. The survey is organized by these concepts. The items in each concept are measured on a 5-point Likert scale. Item response options either measure frequency or level of agreement. The concepts of physical development, technical development, tactical development, and coaching considerations utilize a frequency scale (never, rarely, occasionally, frequently, and very frequently). Technical and tactical development was merged into hockey development for organizational purposes in the final survey instrument. Psychological development and ancillary and life skills concepts ask respondents for a level of

agreement (strongly disagree, disagree, neither agree or disagree, agree, or strongly agree). The environment concept is also graded on a 5-point scale but response options vary depending on the USA Hockey recommendation and were re-coded from less to more desirable during data analysis.

In the local and regional rounds, not all questions were required. In the local pilot, a "not sure" option was available. This was changed to "unable to judge" in the regional sample. These response options were included to aid the researcher in identifying items that might be worded poorly or measured concepts that might be unobservable to respondents. These options were most helpful in survey development and were subsequently removed from the final version.

All items in the survey are positively worded. While adding in some negatively worded questions may have been prudent, DeVellis (2017) shares that item polarity can sometimes confuse the respondent. As the survey has many items and respondents may be moving quickly through it, the researcher chose to keep all items positive as not to confuse respondents.

**AE measures.** To help validate this new survey instrument, the AEQ was selected as an instrument to measure associations. Correlations with AE help provide strong evidence of external validity for the ADM survey and its scores (Babbie, 2012; DeVellis, 2017; Mowbray et al., 2003). External validity refers to how well conclusions of a study can be generalized to other contexts and situations. Demonstrating a positive relationship with AE would serve as key evidence that the ADM survey is performing as it should be and can be applied externally.

AE can serve as a strong measure of the ADM survey and scores. As AE has been found to correlate negatively with burnout and positively with flow, it can be a strong indicator that ADM is accomplishing key goals. As AE has been validated at a number of ages, levels, and countries, it is a good selection for this study. ADM should have a positive association with AE and the expectation is the higher fidelity of ADM for a participant, the more likely they will be an engaged athlete.

AE subscales such as confidence and enthusiasm provide great insights. Confidence, again, is defined as, “a belief in one’s own ability to attain a high level of performance and achieve desired goals” (Lonsdale et al., 2009, p. 187). ADM seeks to breed players that are more skilled, proficient, and confident than their predecessors - hence confidence can be a key measure. Confidence is also believed to lead to stronger self-efficacy and retention of young athletes (Hedstrom & Gould, 2004). Enthusiasm is defined as “feelings of excitement and high level of enjoyment” (Lonsdale et al., 2009, p. 187). ADM seeks to improve the retention of players and create more lifelong hockey players - hence enthusiasm can be a key measure.

Therefore, the AE subscales of confidence and enthusiasm were adapted to validate this survey. Each subscale is comprised of four items. While the original AEQ was intended for the athlete to complete, there is some precedence for adapting the items for parents. Prefixes of questions were modified from “I am...” to “My child is...” Alpha coefficients and factor analysis confirm that the AEQ’s performance was acceptable despite the modifications as will be illustrated in Chapter IV.

## **Survey Development**

Survey development took on a number of steps. This section discusses the steps from the development of the initial instrument through its testing phases.

**Pre-survey preparation and item development.** The researcher began by ascribing to Dillman et al.'s (2014) recommendations on survey development and DeVellis' (2017) and Babbie's (2012) recommendations on item and scale development. An example of Dillman and colleague's (2014) recommendations includes ensuring questions are asked properly so respondents both understand them and they do not lead or bias the response. As well, efforts were made to ensure the survey is laid out in a way that is easy to complete and will not confuse respondents.

The survey instrument went through extensive revision before utilization. Content validity was ensured through a thorough analysis of the literature (Babbie, 2012; DeVellis, 2017). The key concepts and subsequent survey questions are derived from the ADM program manual and other USA Hockey materials geared specifically at the 12U age group. Expert validity was further insured by garnering feedback from experts in the field on the appropriateness of questions (Babbie, 2012; DeVellis, 2017). In this instance that included sharing the survey with USA Hockey's ADM technical director and regional ADM managers. Their feedback indicated that the questions reflected the concepts appropriately. Questions were also shared with several University of Vermont professors with expertise in survey methods for review at various stages of the survey's development.

**Round 1: Local pilot survey.** The next stage in the development of the survey was an initial local pilot test. The pilot test was conducted in late October and early

November. This version comprised a total of 80 items including demographic, ADM, and outcome questions. An additional comment section was also included requesting comments on issues of understanding or functionality of the tool. Two local youth hockey organizations in the metro area of a small city in the northeastern US agreed to assist in sending out the pilot study to their respective teams. The survey was eventually sent out to three 12U teams, two 10U teams, as well as a couple of other friends of the researcher with children at the appropriate age in youth hockey programs in the same area. An administrator from one organization and a coach from the other agreed to send an email blurb with a link to the web survey to their constituents as well as a reminder email the following week. In total, there were 28 respondents at this stage. From the responses, significant item analysis was performed. Specifically, there was a desire to identify which questions seemed to perform as expected, which ones might not have been well understood, and which ones might be unobservable. Assisting this identification was a response option titled "not sure" in addition to the comment section. A number of decisions were made based on these initial observations. It was determined that some rewording was needed for several questions in the psychological development and coaching considerations sections. Initially, a 4-point scale was being utilized on most sections for responses and it was determined a 5-point scale would better serve the respondents as well as statistical analysis. It was also determined that the outcome questions used to help with external validity were not sufficient. As such, it was determined that two subscales of the AEQ would be inserted to assist with validation.

**Round 1: Cognitive interviews.** Coinciding with the pilot study, cognitive interviews were performed. Cognitive interviewing helps ensure the questions are being

interpreted as designed by prospective participants (Dillman et al., 2014). In total, six cognitive interviews were conducted. Interviewees ranged in age from 30 to 65. The pool included two females and four males. Amongst the interview pool were two veteran college coaches well versed in hockey concepts and somewhat familiar with ADM. A parent of two former high-level hockey players was also interviewed. The remaining three interviewees are current hockey parents with children in the general age range of the survey.

This process was instrumental in determining the face validity of survey items. Through the insights of the interviewees, many questions were tweaked to ensure that respondents would understand each item and be able to identify what it was asking. The researcher had some concern about the observability of the questions and this exercise was instrumental in making sure that questions were indeed observable. The majority of feedback on items had to do with the wording of the item or answer options and less so issues with concepts. Items were re-worded based on feedback from interviewees coupled with item analysis. As mentioned above, response options were increased from 4 points to 5 points and response options related to frequency were edited in turn. The "not sure" option was also edited to "unable to judge" and a more neutral option was introduced to the answer options. Content questions (non-demographic) originally were not forced and could be skipped and it was determined in the next round to force them.

**Round 2: Regional sample.** Following the local pilot and cognitive interviews, a revised version of the survey was shared with USA Hockey. The second iteration of the survey instrument included 81 items. USA Hockey took responsibility for sending the survey via email to 12U players' parents in the entire New England region. The

survey was sent out in the early part of December. The researcher provided USA Hockey with an initial and reminder email template to send out requesting participation in the survey. After adding in branding to the survey, USA Hockey sent out the emails. It is not possible to determine exactly how many individuals actually received the survey due to bounce backs and other tracking and privacy issues but the region sampled was comprised of 4,877 players in 2017-18 across all levels of play. 301 responses were received from this sample with 297 of them completing the survey in full. Assuming a similar enrollment in 2018-19 a response rate of this number would indicate a 95% confidence level with a margin of error of 5.5%. Distributions of different demographics were fairly close to being representative; for example, women comprise 19.8% of the overall players in the region and made up 20.2% of respondents.

Item analysis was again performed. The larger sample from a wider array of respondents was also helpful in determining distributions of responses. Distributions generally performed as desired. Changes to survey language and answer options also seemed to help considerably in eliminating opt-out responses. While the vast majority of questions received less than 3% "unable to judge," a few questions specifically in the psychological development section remained as high as 15%. These questions were reworded and the section reordered with a desire to improve the accuracy of these answers and confidence of respondents in the final national study. It was also decided that the "unable to judge" response could be removed at this point as respondents seemed to be doing well in understanding the questions as written and confident in their observations to respond accordingly.



Factor analysis was used at this juncture. Combining factor analysis and item analysis, five items were removed from the survey as their loadings did not indicate a strong connection to key constructs and reviewing them confirmed that they were redundant or did not contribute greatly to the understanding of the model. More details on this are shared in the next chapter.

Other changes to the survey included small tweaks on several items in relation to grammar, verbiage, and aesthetics. Data analysis was performed in detail on this second more substantial pilot and will be reported in the next chapter. Two additional items unrelated to any scale were added on USA Hockey's behest.

**Round 3: National survey.** The national survey was sent out at the end of February 2019 and ran through early March. These dates follow the conclusion of the hockey season in some areas and encompass the post-season for others. It was important that the survey be sent at a time when the season was concluding or recently completed so respondents could have a good view of the season to ensure good recall. One potential challenge with these dates is it may overlap with playoff time. Competitive sports are emotional, and playoffs can further fuel that emotion in all sorts of ways. Another challenge is that once the season has concluded others may not be interested in engaging on the topic anymore. Due to technical issues, it could not be sent sooner. Item and analysis will compare responses with the regional survey to help ensure reliability.

USA Hockey did not want to send the survey out to the entire population. The entire population is estimated around 63,000 based on USA Hockey's 2017-18 final membership numbers. An initial round of the survey was sent out to approximately 11,000 potential respondents with reminder emails following shortly after the initial

email. The response rate was poor from this initial sample so USA Hockey sent the survey to an additional 11,000 potential respondents. An equal percentage of participants were selected from each state in both rounds.

The final number of respondents was 214, unfortunately only a roughly 1% response rate. All 214 fully completed the survey and were included in the final sample. The confidence interval for this sample was 95% with a margin of error of 6.7%. Demographic information demonstrates a somewhat representative sample. Nationally, women make up 15.6% of players at this age level but were overrepresented making up 22.9% of respondents. 38 out of 50 states had at least one respondent. Distribution by level of play appeared consistent with national participation.

### **Data Collection**

Data collection for this survey was done using Survey Monkey. This was the preferred method for USA Hockey. Due to privacy concerns, USA Hockey assumed responsibility for sending out email requests to constituents for the regional and national surveys as they prefer not to share private emails of their members. For the local survey, members of the two local organizations shared the link to the survey with their respective email lists on the researcher's behalf for the sake of both privacy and to ensure trust from their members. For the regional and national surveys, the researcher prepared the survey and transferred it to USA Hockey's Survey Monkey account so they could add in branding and send it from their own IT department. For all stages, the researcher prepared email blurbs to accompany survey links for respondents to review. These blurbs included language detailing the voluntary and anonymous nature of the survey. They did not specifically share the research question of the study as to not bias respondents.

Upon closing of the survey, USA Hockey provided the researcher with a .pdf and SPSS version of the results. Survey Monkey allows for the collection of IP addresses but this function was turned off to further ensure privacy. Identifiers like region, gender, and level of play should not prove enough to identify individuals. Nonetheless, the shared documents will be properly and safely stored on only the researcher's password protected laptop and desktop. These computers will be the only places where data is analyzed.

### **Data Analysis**

SPSS software version 24 was utilized for statistical analysis of the data. Descriptive statistics were analyzed to screen for missing data, outliers, or other issues. In the first two rounds of the survey, issues existed around missing data. This was attributed to the ability to skip questions as well as opt-out responses. Not sure or unable to judge responses were recoded to missing. For purposes of preliminary statistical analysis after the regional survey, values were imputed using EM and factor analysis was conducted using pairwise.

Recoding and computing were done using SPSS. Demographics were recoded to allow for easier analysis later on. Composite scores were computed to represent key concepts of ADM and later on key constructs. Scores were computed by calculating the means of each item in the construct to form a composite score. Babbie (2012) shares that scales help social scientists create an ordinal measure to rank or order measurements of a construct. DeVellis (2017) explains that items can be combined to make composite scores in the quest to quantify a theoretical construct. In the local pilot of the survey, a composite score representing each of the seven key concepts was computed. In the regional sample and the national survey, factor analysis was utilized to identify key

constructs for scale development. Results of factor analysis informed which items would fall into which construct. In both instances, six constructs emerged.

The two AE subscales were also computed using the four items related to each construct and also added together to make an overall AE scale from a mean of all eight items. For all subscales, as will be seen in Chapter IV, Cronbach alpha scores indicated internal consistency above accepted standards, a strong measure of reliability. The one exception is the environment-oriented questions, which given their variety of response options, do not lend themselves to this type of analysis. Therefore, environment questions create an index rather than a scale. Removing the environment score was not considered, despite its put reliability scores, as many of its recommendations form the backbone of ADM. Statistically the items do not perform as a single construct due to the varying nature of the items as well as the non-uniformity of the answer options. They are, however, still important enough to model the score and subsequent analysis must remain in the study. AE performed well in factor and reliability analysis, allaying concerns about its reliability given modifications for this study.

Descriptive statistics were analyzed to view the overall level of implementation of different items and constructs of ADM. This was done through the development of composite scores as well as looking at the frequency of responses for each item. As Durlak and DuPre (2008) point out, there can be significant variations between sites so it is important to look beyond just the average. Descriptive statistics were further broken down by subgroups such as the gender of player, gender of team, and level of play.

Factor analysis was performed after the regional sample and national survey. Principal Component Analysis was performed on the data. Environment questions were

excluded from the analysis. Because of the inter-correlation of items across constructs, which was expected given the nature of the seven ADM concepts, an oblique rotation was selected, specifically Promax (DeVellis, 2017). The chosen model exhibits strong loadings overall, identifying seven factors. These seven factors accounted for 72% of the variance in the regional pilot and 69% of the variance in the national study. The factors largely matched the concepts of the ADM program manual and also identified the two AE scales. The one exception is coaching considerations and psychological development items which merged into one factor. The factors were named physical development (PD), hockey development - technical (HDTEC), hockey development - tactical (HDTAC), coaching and psychological considerations (CCPSY), ancillary and life skills (ALS), athlete engagement - confidence (AEC), and athlete engagement - enthusiasm (AEE). The same factors emerged in the national survey and items loaded similarly. The one exception is a couple of items that originally loaded in HDTAC in the regional survey loaded on the HDTEC nationally.

Factor analysis identified several questions that did not load well on constructs in the regional pilot. Coupled with item analysis, five questions were removed at this point from the next round of the instrument. Further factor analysis on the final survey tool may also assist in item reduction in future studies and, in fact, a few questions were removed from the final models of statistical analysis. It is important to note that AE loads quite well, showing its reliability in this study consistent with its previous usage despite its modifications in this instrument.

Bivariate correlations were calculated between the final ADM construct scores and the final AE scores to determine if a hypothesized positive correlation existed. A

couple of additional outcome questions including, “My child has improved a satisfactory amount as a player this year,” and “My child will play hockey again next season,” were also included. Positive correlations will serve the study in two ways. The primary way will be to validate the study as higher scores in ADM should in theory have a positive relationship with the already reliable AE measures. The secondary purpose is to glean insight into the actual relationship of ADM on desired outcomes.

Data analysis will serve several purposes. First and foremost it will aid in answering the main research question - to what extent has ADM been implemented? Through analysis of psychometric properties, the survey tool will prove reliable and valid. The analysis will contribute to future discussion around the impact of ADM on desired outcomes, like AE, for youth hockey participants. Finally, this analysis will aid in identifying future opportunities for exploration and research.

## **Conclusion**

Leaning on process evaluation and implementation fidelity, this study has developed a reliable and valid survey to measure ADM implementation across the country. Through three rounds of thorough survey development, ADM measures were created. Factor analysis identified six constructs of ADM and composite scores were created for each one. Psychometric properties related to factor analysis, reliability analysis, and bivariate correlations all indicate a valid and reliable instrument that contributes to answering the main research question.

## CHAPTER IV: RESULTS

This chapter presents the results of the data analysis for the survey instrument. Brief analyses are provided for the local pilot study with emphasis on how the analysis contributed to the development of the survey instrument. A more thorough analysis is presented for the regional pilot study beginning to identify constructs and development of composite scores. At this point, data analysis explores connections to outcomes while the main focus of analysis is still geared towards the development of the final instrument. A thorough analysis is provided for the final instrument sent to a national sample including descriptive statistics, measures of reliability and validity, and relationships to key outcomes.

### **Round 1: Local Pilot**

Twenty-three of the submissions from the local pilot were available to be analyzed due to some issues with missing data. At this stage, responses were scored from 1 to 4 based on a 4 point scale which was subsequently changed in the next round to 0 to 4 scoring system representing a 5 point scale.

**Data analysis.** Factor analysis was not possible at this juncture as there were not enough responses to run it accurately. As such, scales and composite scores were made based on the seven concepts outlined in the program manual. Items related to each were totaled and averaged to create a score for each concept. Scores ranged from ENV at 2.6 to the coaching considerations scale at 3.3. Reliability analysis for each subscale, excluding the environment scale which does not lend itself to this type of analysis, reported alpha scores between .825 and .933. Bivariate correlations were performed to outcome questions. While there were strong associations, they are not included in this

section as the outcome questions were deemed to have been too modified from their original validated formats. Due to this, the AEQ was identified as the appropriate scale in the next round to improve the ability to analyze psychometric properties surrounding reliability and validation. As well, AE was identified as a key desired outcome for youth hockey participants. Parental engagement at this juncture shows no substantial or statistically significant effect on responses.

**Cognitive interviews.** Cognitive interviews proved useful. The full notes from cognitive interviews are available in Appendix B. In general, results from cognitive interviews suggest the survey had a good format and was efficient and easy to complete. Several suggestions were made around word choices and clarity of questions which enhanced the effectiveness of the survey in future iterations.

## **Round 2: Regional Pilot**

Out of 301 responses, 297 were completed and deemed eligible for the final analysis of the regional survey. Missing data issues still existed in some of the eligible respondents but was still useful for the purpose of this part of the study. This section shares the results of that data analysis. Descriptive statistics prove informative while factor analysis provides insights into the initial scale development process. Pearson correlations are performed in order to examine the relationships between ADM and outcomes.

**Descriptive statistics.** While some issues exist regarding missing data at this juncture, 297 out of 301 responses were deemed usable for preliminary analysis of the regional pilot. The missing data was helpful in identifying instrumentation and item issues that were amended for the final survey. EM was used to impute data so the



researcher could do some basic analysis to better inform future tests. As data was not missing completely at random, this analysis should be used for informative purposes in designing an improved instrument and not generalized. Responses were recorded using a 5 point Likert scaled and coded as 0 to 4. Scale development is discussed following the section on factor analysis. While descriptive statistics from this section are valuable, it is important to note some of the instrumentation issues and missing data at this stage as well as the limited regional scope. Descriptive statistics in Table 1 represent composite scores for each ADM construct. HD constructs score fairly high while PD lags behind, a theme seen through all waves of this study.

Table 1

*Regional Descriptive Statistics*

Variable	M	SD
Environment	2.56	.44
Physical Development	1.77	.99
HD – Technical	2.62	.80
HD – Tactical	2.99	.71
Coaching/Psychology	2.71	.80
Ancillary and Life Skills	2.71	.80
AE - Confidence	3.05	.64
AE - Enthusiasm	3.48	.58
AE - Total	3.27	.55

**Factor analysis.** Factor analysis was conducted on the regional sample.

DeVellis (2017) shares that there is much discussion over what the total number of responses needs to be in order to conduct an accurate factor analysis. With 297 responses

eligible to be used, DeVellis (2017) shares that this is a good but not excellent number to use. Factor analysis at this stage was mainly used to identify key constructs, specifically to assist with scale development. It was also utilized to identify items that did not fit well or could be removed.

Using principal component analysis, 58 items were examined. This represented all items from the ADM concepts with the exception of the initial environment items that were not ripe for this type of analysis as explained in the last chapter. An oblique rotation, specifically Promax, was determined the best fit in this study. Pairwise was selected to deal with missing data. Factors loading below .4 were suppressed. Seven components emerged comprising 72% of the variance. The full set of components are displayed in Table 2.

Some items proved problematic during the factor analysis process. PD3 and PD8 loaded poorly and were deemed better suited for the environment composite score. PD4 loaded on the HDTEC factor and upon review made sense there and was added to that scale. HDTEC1 was deemed a poor and redundant question and was removed. HDTAC4 was deemed challenging to measure nor an essential recommendation of the model and was removed. HDTAC6 was deemed a poor question and removed. CC1 was deemed a redundant question and not specific enough to the CCPSY scale and removed. CC8, CC9, and CC10 were deemed more appropriate for the environment scale. PSY7 was deemed a redundant question and not specific enough to the CCPSY scale and removed. ALS1 and ALS2 were deemed a better fit for the environment scale. ALS3 and ALS4 did not load well on any factor and were not particularly well suited for any of

the scales. Coupled with not being essential recommendations of the model, they were removed.

Table 2

*Regional Factor Analysis*

	1 – CCPSY	2 – HDTAC	3 – PD	4 – AEE	5 – HDTEC	6 – AEC	7 - ALS
CC2	.685						
CC3	.445						
CC4	.455						
CC5	.559						
CC6	.523						
CC7	.807						
PSY1	.932						
PSY2	.897						
PSY3	.845						
PSY4	.933						
PSY5	.779						
PSY6	.664						
PSY8	.587						
TEC6		.561					
TEC7		.565					
TEC8		.524					
TEC9		.677					
TAC1		.747					
TAC2		.876					
TAC3		.966					

TAC5	.703		
PD1	.750		
PD2	.633		
PD5	.770		
PD6	.881		
PD7	.876		
AE5		.813	
AE6		.874	
AE7		.916	
AE8		.874	
PD4			.485
TEC2			.878
TEC3			.870
TEC4			.743
TEC5			.582
AE1			.784
AE2			.820
AE3			.826
AE4			.790
ALS5			.417
ALS7			.756
ALS8			.825
ALS9			.857

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Note. Values suppressed at .4

With just under 300 respondents, factor analysis at this stage was valuable but will need more attention with the larger national sample to assess if the constructs

perform similarly. Questions were only removed if further item analysis deemed it acceptable. A few items were not completely removed from the instrument at this point just to make sure future analysis from the national survey did not contradict these findings. Factor analysis proved fruitful at this juncture in identifying key constructs, creating a framework for scale development, and in helping to eliminate extraneous items.

**Scale development.** Scales were developed for each construct as identified by factor analysis. An ENV composite score was also created to measure the level of implementation of the training and competitive environment portion of the ADM curriculum. Athlete engagement measures performed well in reliability analysis helping to further the reliability of survey development thus far. All scales displayed acceptable alpha scores with the exception of the environment composite score. Given that this score was developed as an index and not a scale, the low score is not worrisome.

Table 3

*Regional Scale Reliability*

Scale Name	# of items	$\alpha$
Environment	14	.518
Physical Development	5	.888
HD – Technical	4	.868
HD – Tactical	8	.901
Coaching and Psychological	13	.949
Ancillary and Life Skills	4	.845
AE - Confidence	4	.914
AE - Enthusiasm	4	.959
Athlete Engagement Total	8	.929

**Correlation.** A bivariate correlation was also computed for the regional data set. While there are still some issues with the data set, correlation analysis at this juncture will help in beginning to validate the survey and initially investigating relationships to key outcomes. Using a Pearson correlation, relationships were identified between each of the constructs and the validating AE scales as well as a couple of other key outcome questions. ADM constructs all displayed statistically significant positive relationships with outcome measures. Associations were typically in the weak to moderate range with a couple approaching strong.

A correlation was also run between a parent involvement scale and the ADM construct scores to assess if there was a relationship between the two that could bias the survey. A significant but fairly weak positive association was found between three of the six scores. This provided some cause for concern but given some of the missing data issues and a very weak association judgments were set aside pending the results of the national survey.

Table 4

*Regional Relationships between ADM Construct Scores and Key Outcomes*

	1	2	3	4	5	6	7	8	9	10
AE – confidence	-									
AE – enthusiasm	.604**	-								
Improvement	.514**	.467**	-							
Play next year	.537**	.700**	.446**	-						
PD	.285**	.172**	.371**	.189**	-					
HDTEC	.359**	.266**	.519**	.243**	.520**	-				
HDTAC	.309**	.206**	.498**	.180**	.504**	.696**	-			
CCPSY	.345**	.314**	.622**	.207**	.555**	.695**	.643**	-		
ALS	.401**	.270**	.470**	.216**	.617**	.494**	.473**	.633**	-	
ENV	.274**	.212**	.317**	.252**	.641**	.515**	.480**	.512**	.578**	-

Note. \*\* p &lt; 0.01

### **Round 3: National Survey**

A national sample was pulled by USA Hockey for this final stage and emailed the survey. Initially a random 10% of each state was selected to be sent the survey. An additional 10% was randomly pulled to increase the total number of participants surveyed. In total, approximately 11,000 possible respondents were sent the survey. Only 214 respondents filled out the survey. This was a disappointing number especially after a stronger response from the regional sample. A hypothesis for this low response rate is the timing of year. The survey was sent out later than originally planned, after the completion of the season in some regions, and it is possible people were less likely to open emails or be interested in completing a survey from USA Hockey with the season in the past.

All 214 responses to the national survey were deemed eligible for final analysis. This section shares the results of that data analysis. Descriptive statistics prove informative while factor analysis provides additional insights into the scale development process. Finally, Pearson correlations serve to validate the ADM construct scores against AE scales.

**Descriptive statistics.** Descriptive statistics of the national sample are informative. Table 5 displays the composite scores for each ADM construct and AE measures in this sample. HD - Technical leads the way in regard to overall implementation while PD noticeably lags behind the rest of the constructs.



Table 5

*National Descriptive Statistics*

Variable	M	SD
Environment	2.39	.43
Physical Development	1.48	.91
HD – Technical	2.78	.74
HD – Tactical	2.26	.83
Coaching/Psychology	2.47	.82
Ancillary and Life Skills	2.51	.87
AE – Confidence	3.02	.77
AE – Enthusiasm	3.51	.59
AE – Total	3.26	.60

**Factor analysis.** Factor analysis for the national survey display properties very similar to the regional survey. Again using an oblique rotation, specifically Promax, the same seven factors emerged explaining 69% of the variance. Items loaded very similarly to the regional survey with small exception; for example, a couple of the hockey development items loaded on HDTEC rather than HDTAC. PD1 and HD10 double loaded. After item analyses, both seemed to belong in the scale of the higher loading construct. While HD8 did not load, it was considered an important HDTAC recommendation and did not impact scale reliability tests so it was not removed.

Table 6

*National Factor Analysis*

	1 – CCPSY	2 – HDTEC	3 – HDTAC	4 - PD	5 - AEE	6 – AEC	7 - ALS
CC1	.730						
CC2	.809						
CC3	.770						
CC4	.659						
CC5	.884						
CC6	.810						
CC7	.843						
PSY3	.484						
PSY4	.692						
PSY5	.652						
PSY6	.685						
PSY7	.771						
PSY8	.808						
PD4		.484					
HD1		.771					
HD2		.780					
HD3		.873					
HD4		.715					
HD5		.589					
HD6			.456				
HD7			.433				
HD8							

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HD9		.461	
HD10	.450	.473	
HD11		.655	
HD12		.942	
HD13		.910	
PD1		.401	.594
PD2			.525
PD5			.841
PD6			.882
PD7			.854
AE5			.896
AE6			.917
AE7			.889
AE8			.740
AE1			.775
AE2			.841
AE3			.882
AE4			.946

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ALS4			.692
ALS5			.891
ALS6			.895
ALS7			.686

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Note. Values suppressed at .4

With only 214 respondents, what would be called only a fair number for factor analysis, some concerns existed in analyzing this data. DeVellis (2017) shares that there is a large amount of discussion about the appropriate number of responses needed, coupled with the number of variables. Some scholars believe a minimum of 100 is enough while others believe you need 10 times the number of variables in your survey. DeVellis (2017) states that 200 or more responses is considered a fair number while 300 would be considered good. Despite some concerns, results of a Kaiser-Meyer-Olkin test indicated that this data set was ripe for analysis. As factor analysis performed quite similarly to the regional pilot, there was also additional confidence in utilizing it as a basis for scale development.

**Scale development.** Scale development followed the constructs that emerged from factor analysis as they closely mirrored the concepts outlined in the ADM program manual and were the same constructs identified in the regional pilot. Each construct was made into a composite score based on the means of the items within it. All construct scales displayed acceptable alpha coefficients with the exception of the environment score. Given this is an index rather than a scale, the low score is not worrisome. Athlete engagement measures continue to perform well in this analysis.

Table 7

*National Scale Reliability*

Scale Name	# of items	$\alpha$
Environment	17	.548
Physical Development	5	.864
HD – Technical	6	.875
HD – Tactical	8	.891
Coaching and Psychological	13	.945
Ancillary and Life Skills	4	.868
AE - Confidence	4	.938
AE - Enthusiasm	4	.918
Athlete Engagement Total	8	.916

**Correlations.** A bivariate correlation was also computed for the national data set. Correlation analysis will assist in proving validity and identifying relationships to key outcomes. Using a Pearson correlation, relationships were identified between the ADM construct scores and the validating AE scales as well as a couple of other key outcome questions. ADM construct scores displayed statistically significant moderate to strong positive associations with the AE – confidence scale. They displayed statistically significant weak to moderate associations with the AE – Enthusiasm scale. They displayed a significant moderate to strong positive relationship to satisfaction with player improvement. It also demonstrated a significant weak positive association with whether or not players would play again.

Table 8

*National Relationships Between ADM Construct Scores and Key Outcomes*

	1	2	3	4	5	6	7	8	9	10
AEC	-									
AEE	.546**	-								
Improve- ment	.574**	.516**	-							
Play again	.391**	.635**	.465**	-						
ENV	.228**	.191**	.256**	.226**	-					
PD	.374**	.217**	.419**	.204**	.454**	-				
HDTEC	.419**	.302**	.457**	.181**	.329**	.467**	-			
HDTAC	.520**	.256**	.404**	.222**	.477**	.600**	.639**	-		
CCPSY	.551**	.386**	.613**	.261**	.481**	.506**	.548**	.602**	-	
ALS	.461**	.309**	.435**	.199**	.432**	.486**	.423**	.493**	.683**	-

Note. \*\*  $p < 0.01$

Any associations between the parent scale and ADM construct scores proved statistically insignificant and quite weak allaying fears about parental involvement or knowledge influencing responses.

### Conclusion

This chapter presented the results from the three rounds of the ADM implementation survey. Through item analysis, cognitive interviews, and statistical techniques such as factor analysis, the survey was improved and construct scores were developed. The results of the final round, the national survey, provide insights towards

the main research question as well as the reliability and validity of the instrument, all of which will be discussed in the following chapter.

## CHAPTER V: DISCUSSION

The purpose of this study was to measure the implementation fidelity of ADM. In doing so, the study sought to develop a valid and reliable survey instrument to aid in measuring ADM. This chapter includes the major findings of the study, assessing implementation fidelity as well as discussing the validity and reliability of the instrument. Also included in the discussion is the relationship between ADM constructs and key outcome measures such as AE. The chapter concludes with a discussion on the limitations surrounding this study, implications of the research, and opportunities for future exploration.

### **Validity and Reliability of the Survey**

Psychometric properties indicate that survey development led to the creation of a valid and reliable instrument. Face and content validity were developed through pre-survey measures such as developing items directly from a program manual, working with content experts, and performing cognitive interviews. Item analysis also aided this process through the two initial rounds of the survey.

Validity was evaluated statistically through factor analysis and validation with an existing valid and reliable scale. Factor analysis aided in determining construct validity. In both the regional sample and national sample, factor analysis extracted seven factors. These factors largely mirrored the key concepts from the ADM manual. The one exception was a construct that combined coaching considerations and psychological development. A simple argument can be made the two may measure at least some of the same idea as one of a coach's main purposes which is to create an environment for the player not only to grow physically but psychosocially as well. With the national sample



extracting the same constructs as the regional sample, this affirms a level of confidence in the scale development process.

Scores of the Pearson correlation of ADM constructs to AE scales serve as a key validating measure of this study. Statistically significant positive associations across the board, many of them moderate to strong, demonstrate convergent validity with key outcome measures and goals that ADM should theoretically connect with. Through this study, those prove to be true. More on the associations of ADM constructs and key outcomes will be discussed later in this chapter.

The reliability of this study was measured through a few different measures. Cognitive interviews and pilot tests were employed to assess items with actual respondents to ensure questions actually measured what they were meant to. Tweaks throughout the process in response to these steps instill confidence that the final instrument is reliable. From a statistical standpoint, Cronbach's alpha was utilized to determine the internal consistency of the scales that were developed in this study. With the exception of environment questions, whose response options did not adequately lend itself to this type of test, all scales performed at acceptable levels suggested internal consistency and reliability in this study.

### **Implementation Fidelity of ADM**

The implementation fidelity of ADM can largely be measured through descriptive statistics. It is important to note again that implementation rarely ever comes close to 100% and that Durlak and DuPre (2008) report associations with positive outcomes with as little as 60% implementation. It is evident from Table 5 (National Descriptive Statistics) that certain constructs of ADM have caught on more than others. This is also

true within each construct with some recommendations showing high levels of implementation and others displaying lower levels. Table 9 illustrates the levels of implementation for each construct. It states the overall construct score and also will look at level of implementation for selected individual items. We will assume implementation of a recommendation if the number of respondents affirmatively responding that they observe the recommendation exceeds the threshold of 60% articulated by Durlak and DuPre (2008). Affirmation the recommendation was observed is measured as agree and strongly agree response on agreement scales. Affirmation on frequency scales is measured as occasionally, frequently, and very frequently.

Table 9

*Implementation Fidelity*

<b>CONSTRUCT</b>	<b>SAMPLE QUESTION</b>	<b>CONSTRUCT COMPOSITE SCORE</b>	<b>% OF SAMPLE AFFIRMING</b>	<b>EVIDENCE OF IMPLEMENTATION (YES/NO)</b>
<b>ENV</b>	I observed coaches incorporating stations into practice	2.39	86.4%	Yes
<b>ENV</b>	The team's schedule permitted my child opportunities to play other sports throughout the year	2.39	47.7%	No
<b>PD</b>	My child was taught about rest and recovery	1.48	52.4%	No

<b>PD</b>	I observed my child working on explosive strength through jumping and gymnastics maneuvers	1.48	32.8%	No
<b>HD-TECHNICAL</b>	I observed my child refining skating skills	2.78	89.7%	Yes
<b>HD-TECHNICAL</b>	I observed my child refining shooting and scoring skills	2.78	89.7%	Yes
<b>HD-TACTICAL</b>	I observed my child refining deception skills	2.26	62.1%	Yes
<b>HD-TACTICAL</b>	I observed my child applying decision making skills during small games	2.26	84.6%	Yes
<b>CC/PSY</b>	I observed coaches connecting skills to game situations	2.47	80.8%	Yes
<b>CC/PSY</b>	My child was taught strategies to focus their attention	2.47	34.6%	No
<b>ALS</b>	Being part of the team helped teach my child the importance	2.51	46.2%	No

	of hydration and nutrition			
<b>ALS</b>	Being part of the team helped teach my child the importance of physical activity	2.51	80.4%	Yes

There are lots of positive signs examining composite scores and measuring the implementation of specific recommendations. On the ice, it seems like many of the recommendations around hockey development are being implemented at least to some degree (deception) and many to a high degree (skating, shooting, small game decision making). This is a great development as USA Hockey really wanted to see youth players receive better skill development which is evidenced in the high composite score and strong percentages related to HD-Technical. It also appears a level of implementation is occurring in HD-Tactical but with some items just clearing the threshold (deception) and a lower composite score there does seem to be room for further implementation.

Evaluating CCPSY suggest coaches are understanding some of the important aspects of coaching youngsters. This is a construct where positive signs are most welcome and striving for even better is an absolute necessity as will be discussed later in the chapter. Sports specific items, such as connecting skills to game situations, are positive steps in teaching players effectively. However, not all items grade out strongly, especially those connected less directly to the sport, as evidenced by a low level of implementation on an item like teaching players strategies for focusing.

Off-ice and indirect athlete development seems to be where implementation falls flat. PDs composite score is by far the lowest at 1.48 and while ALS measures well at 2.51, some of its specific recommendations grade out poorly. This is evidenced by the lack of implementation on examples ranging from off ice training to conveying the importance of hydration and nutrition.

The overall environment (ENV) was a key aspect of the ADM design. Differences within regions and communities sometimes make ENV recommendations tough to implement exactly as prescribed. However, a composite score of 2.39 indicates things are moving in the right direction. Again, we note a similar trend with many of ENVs on-ice recommendations scoring well, for example the use of stations in the practice plans of teams. However, off-ice and indirect aspects continue to fall below the threshold. A low percentage of respondents reporting the schedule permits their child to play other sport throughout the year is a big concern. At the 12U level, ADM and LTAD both strongly recommend participation in multiple sports as a key component of physical and mental development.

Overall, the implementation fidelity of ADM nationally suggests a model that while not fully embraced across all facets, shows some positive signs of buy-in. Many facets, specifically on-ice and sports specific recommendations, are being implemented to a high degree. There is still room for growth though; for example, in the HD – Tactical construct where implementation generally just exceeds the threshold for implementation. Improvement in that area could greatly improve players' abilities. Substantial attention also needs to be given to the off-ice components of this model where PD has been fairly neglected. CCPSY, as well as ALS recommendations not directly related to the sport,

also need more attention. While the on-ice implementation, as well as positive metrics in CCPSY should be applauded, ADM will not achieve its goal of holistic athlete development until it addresses its implementation holes.

### **ADM Construct Scores Relationship with Outcomes**

Measuring how ADM implementation stacks up against outcomes, specifically the AE validating scales, was not only an important aspect of proving the validity of the survey but also an important finding in beginning to measure the efficacy of LTAD and ADM. Statistically significant positive relationships with these measures are valuable insights for advocates of these models as well and important information for critics. While these outcomes are unable to measure the model's physiological impacts, it was able to measure its relationship to player confidence, player enthusiasm, parent's satisfaction with player improvement, and potentially retention.

Results indicate that the ADM construct scores generally have a moderate, approaching strong, relationship with a player's confidence and parent's satisfaction with a player's improvement. On these two outcomes, the two HD constructs, along with CCPSY, have the strongest relationships. USA Hockey is striving to produce more technically sound players and it seems coach's attending to player's developmental needs and emphasizing key hockey foundations and decision-making skills, as might be expected, is substantially associated to this goal. While it seems like common sense in some ways, it is important to note that ADM was created due to anecdotal evidence that there was a lack of focus on these key foundations or poorly delivered training plans to accomplish the goal.

Relationships to enthusiasm and retention are less pronounced but still display positive relationships. The construct with the strongest association to these two is CCPSY. Confidence and enthusiasm have been shared as potential key components of retention and other measures of success (Bergeron et al., 2015; Hedstrom & Gould, 2004; Holt & Jones, 2008). USA Hockey states amongst the goals of ADM is creating more lifelong hockey players and seeing players improve across the board. Confidence and enthusiasm can be great contributors to these goals. According to this study, enthusiasm had the strongest relationship by almost double to whether a player would play again.

ENV is important to mention in this section. While the strength of association of ENV with confidence, enthusiasm and player improvement were on the weak to moderate side, it is interesting to note that it had a stronger relationship than other constructs on playing again next year. This suggests that ENV has an important relationship with enrollment that should be considered.

While this study cannot prove causation, it does show a relationship between players with heavier ADM implementation and a better chance of players having desired outcomes. Relationships with AE suggest ADM may lead to athletes less likely to burnout as AE is theorized to be burnout's opposite. Less chance of burnout means better retention and better health. It also means athletes have a better chance of attaining flow, meaning athletes are feeling like they are performing well and enjoying the process, another theoretical connection to AE. Finally, it suggests that athletes will have a positive view of the sport overall which may contribute to their growth and future involvement. With this in mind, it certainly seems like ADM has a role to play in creating happy, talented, and lifelong players.

## **Importance of CCPSY Relationship to Outcomes**

Amongst the most fascinating findings of this study are what a substantial association exists between coaching and psychological development with desired outcomes. Amongst all the constructs, CCPSY presents the strongest relationship towards all outcomes. Coaching was found by numerous studies to be an extremely important component of the youth sports experiences and to have a deep impact on participants (Project Play, 2015). Bergeron and colleagues (2015) spent extensive time discussing the importance of strong coaching in their work for the IOC. Beatty and Fawyer (2013) performed an extensive literature review examining the impacts of coaching and coaching education on participant outcomes. They shared that many of the negative outcomes associated with youth sports can be minimized by well-trained coaches and that there is a positive correlation to retention for athletes with trained coaches versus those with little to no training. The authors go on to summarize the literature sharing that while a coach's knowledge of technical sports specific skills are valued by athletes as are interpersonal and psychological development skills. Additionally, while the research is limited at this juncture, a number of findings suggested that coaches receiving some training in coaching strategies produced happier players more likely to play again. In another study, players whose coaches and teams better implemented effective coaching strategies and focused on psychological development displayed stronger scores in all key outcome metrics, especially in areas that would mirror confidence and self-esteem (Beatty & Fawyer, 2013).



This study affirms the prior research. While CCPSY has a strong relationship with satisfaction with player improvement, it also leads all constructs in the strength of relationship with confidence, enthusiasm, and if a player will play again. This key finding suggests that USA Hockey has been wise to develop a strong coaching education program and one aligned with LTAD. USA Hockey should find comfort knowing that a continuation of their policies has empirical support.

### **LTAD and ADM Efficacy**

These relationships may also be the first step in proving the efficacy of LTAD and ADM. While further studies must be done to isolate the impact of ADM from other potential factors, the positive relationships found in this study marks the first time LTAD or ADM has been tested against some of the positive outcomes its designers looked to accomplish. This study just looks at one age group and one sport. As well, much needs to be learned about the theory and models impact from a physiological lens. Nonetheless, this is a key step in the body of research on the topic of identifying best practices in youth sports development. The statistically significant positive findings begin to make the argument that the theory and model may be able to maximize the development and excitement of young athletes.

### **Limitations**

This study was not without its limitations. Several limitations are discussed in this section including the sample size and composition, a discussion of the targeted respondents, age groups, and position. Discussion of the limitations is followed up with recommendations for future research.

**The sample.** The main limitation of this study was the small sample in the final national round. The final number of respondents was frankly disappointing and while it proved a large enough sample for statistical analysis, it should be considered a major limitation of this study. Ideally, the margin of error would be smaller and there would be representation from every state where youth hockey is played in this country.

While the findings of this study are still valuable, there are some challenges in breaking the data down into smaller chunks. For example, it is not possible to examine regional differences in this study. The level of play also would be a good area to further break down but is also not possible due to the sample size. Making the level of play a more challenging demographic to use is augmented by the fact that youth hockey levels are not necessarily broken down in a uniform way according to ADM Technical Director Ken Martel. This was further confirmed by the number of individuals who reported “not sure” on that item.

Gender and race should also be mentioned in limitations around the sample. While the proportion of respondents in these demographics are close to matching with the overall percentages in the full population, it also means few respondents fit into these categories due to low overall response rate. This brings into question the generalizability when breaking these groups out from the larger sample. While much can be gleaned from the results of this study, it may not be possible to identify specific audiences where additional interventions would be most valuable at this moment.

**Parents.** As discussed in Chapter III, the decision was made to send the survey to parents of players. This decision took much consideration and was made largely to ensure the widest number of respondents and with the most individualized perspective.

Overall parents who were not involved in coaching or administration of the organization reported similarly to parents who self-identified as coaches or administrators which was a positive sign. However, as non-involved parents made up the vast majority of the sample, there are some questions what the aggregate results would be if, for example, the survey was sent to just coaches and administrators. Additionally, other methodologies could have been employed for this study that could have potentially produced different results. Direct observations by objective and trained observers is on such strategy. Surveying players directly is another strategy and may have also produced a different set of results. Therefore, it is important to consider the selection of parents, and their unique perspectives as respondents, when identifying limitations of this study.

**Age groups.** Another limitation of this study is it only measured implementation at a single age group. ADM is meant to be a fluid approach from a player's entry to the sport until they graduate youth hockey. This study only captures the experience of the latter part of the Learn to Train stage. Being able to identify the experiences of players in the youngest ages and the older ages as they work through the multiple stages of ADM, not to mention LTAD, would paint a much better picture of the overall implementation of the model and its relationships to outcomes.

**Goaltenders.** Goaltenders, always the difficult ones, posed another challenge. In this study, they were asked the same questions as the rest of the population. While this is not an issue on most constructs, it is problematic on both Hockey Development scales. While it did not seem to bias the study, it also did not allow measurement of goalie specific skills, techniques, and tactics that are foundational in nature at this age group.

## **Policy Recommendations**

This study provides an opportunity to examine USA Hockey's ADM model and its nationwide implementation thus far. Based on the findings, the study lends itself to a series of policy recommendations in order to improve the fidelity and efficacy of USA Hockey's ADM learn to train stage. This section of the discussion will focus upon four main policy recommendations, including: physical development; seeing continued growth in tactical development; continued emphasis on coaching and psychological considerations especially off-ice components; and creating additional materials and opportunities for organizations and coaches to integrate pieces of the model as well to evaluate their progress.

**Physical development.** Physical development (PD) is the one construct that is decidedly lower than other measures, which indicates that PD has a lower implementation level than other aspects of the ADM curriculum. This makes some sense as it is the component least directly associated with the act of playing hockey. However, LTAD emphasizes the significance physical literacy and the relationship between athleticism and player talent. This bears out in this study through Pearson correlations as PD shows a moderate relationship with player improvement. Parents that report higher observable PD scores also reported higher satisfaction with player improvement. USA Hockey in recent years has been adding off-ice training practice plans to its growing library of coaching resources. With materials now readily available, USA Hockey should look to further emphasize the importance of PD for on-ice improvement in the coach training modules and their communications.

**Tactical development.** The Hockey Development – Tactical (HDTAC) construct is often misunderstood. Viewed narrowly, ADM may appear as a skill development model. At the youngest ages this has some bearing as one of the goals of this model is to see coaches spend less time on team systems and focus more on the individual player. However, the learn to train stage is a pivotal moment in the model especially in the latter part of this stage, the 12U age group. This is the stage where skill application in game situations are taught. The ADM curriculum recommends this skill development through small area games and practices that mimic game-like situations. The survey findings indicated that a large majority of parents stated that small area games were readily observable. However other items such as learning deception and how to play when you do not have the puck, scored lower. Emphasizing to coaches the need to create more dynamic and game-like situations should be included in training at this learn to train stage. Furthermore, while ADM materials mention what concepts small games and drills are intended to work on, materials should include several points of emphasis for coaches to share, observe, and provide feedback on for each drill or game. For example, materials can include two to three learning objectives building on the key concepts. Frequent mistakes or points of emphasis should also be included to give coaches key points to look for and correct. Together these curricular policy suggestions will encourage further development of the tactical side of player development, which are dependent on the application of key skills in game situations.

**Coaching and psychological considerations.** This study, consistent with prior research, found that coaching and psychological considerations are a critically important part of an effective youth sports model. As such it is imperative USA Hockey continue

to build on what is already an encouraging coaching education program. However, the survey also found that portions of the construct, namely the mental skill development for players, was notably lower in comparison with other key measures of the coaching and psychological considerations. Specifically, implementation of mental skills like visualization and focus scored low. As ADM looks to create a whole athlete and develop life skills, this is a key age group to begin this type of training. A key recommendation is to treat mental skills training just like the HD and PD constructs and build specific drills and practices plans to share with coaches – none exist presently. Curricular policy recommendations should also involve time and frequency references, whether that be five-minute sessions before or after each practice or monthly standalone practices.

**Evaluation.** One of the successes of this study is the development of a valid and reliable survey to use in assessing ADM implementation. From a policy perspective, stringent evaluation should be a first step in creating a culture that values evaluation and opportunities for growth. This survey, or versions of it, could be expanded to each age group and expand the outcomes assessed. It should subsequently be completed annually across constituents to evaluate the levels of implementation and outcomes and identify areas of growth and need. This survey can also be shared with state and regional organizations to allow them to assess their individual level of implementation, identify areas to address, and track growth. Additional evaluative tools can also be developed to assist organizations in improvement. Some examples of this include templates for coach exit meetings with administrators, templates for player exit meetings with coaches, organization-wide assessment tools, organization wide checklists, and more. In this manner USA Hockey can assist its organizations, almost exclusively made up of

volunteers, with resources and data to make improvements. These types of evaluative tools can begin with ADM model programs as a pilot and then be rolled out as resources to organizations shortly after. With well designed tools, good data points, and consistent evaluation USA Hockey will have the opportunity to continuously improve their training and messaging at a national scale and organizations will be able to better assess and improve on a local scale – both of which will contribute to happier, more talented, and healthier youth hockey players.

### **Recommendations for Future Research**

This study should serve as the beginning of a comprehensive approach to the exploration of this topic. At the 12U level, it can first and foremost serve as a benchmark for the fidelity of implementation. USA Hockey can use it as a starting point for a longitudinal assessment of ADM. It may also serve as a foundation for future assessment of its programs. Survey instruments should be developed for all age levels to better understand how the model shows up across its membership at different junctures of each individual’s hockey journey. In doing so, USA Hockey will be able to better target parts of the model which require additional attention or emphasis to further aid its players and provide the best experiences possible across their youth playing careers. Specific items for goaltenders should also be included in future instruments. This is especially important as USA Hockey works towards developing young netminders through goalie specific ADM recommendations and increasing the capacity of its member organizations to provide goalie coaching through national and regional initiatives (“USA Hockey Goaltending”).

Performing this study again with a larger sample size is also essential. Doing so will aid in further proving the reliability of the study. It will also allow for a smaller margin of error in the results. Most importantly, a larger sample size will allow for closer analysis of demographic differences like region, gender, race, and level of play which were problematic with the small sample of this study.

Another possible opportunity in future studies is to expand the outcomes measured. In validating this study, AE was a valuable measurement to use as it both reflected a key desired outcome and also served as the proven scale for validating the study. Now that the reliability and validity of the instrument have been proven, it would be valuable to identify other outcome measures that might be desirable for USA Hockey to incorporate into future instruments.

USA Hockey may also want to look at additional approaches to future studies. Triangulating data may be a useful strategy combining this survey sent to parents alongside surveys to players or coaches. A final data point could see trained observers observing teams to corroborate the other evidence.

A mixed methods approach may also prove fruitful in identifying underlying factors for the low or high implementation of the model. A quantitative instrument can be used to identify organizations with different levels of fidelity and a qualitative follow up can be done to identify the underlying reasons why an organization, or team, may or may not be adopting the recommendations. Understanding the underlying reasons may assist USA Hockey in tweaking materials, adjusting training programs, removing barriers, and creating effective interventions.



This study may also serve as a foundation for other governing bodies in the US. As the USOC pushes governing bodies to develop LTAD influenced curriculums across their sports, a study like this may serve as a model for those organizations to measure the implementation of their curriculums and to determine its impact on desired outcomes.

Perhaps one of the greatest opportunities for further research is related to the examination of LTAD efficacy. LTAD, to date, has been largely untested. One argument for the inability to test it is in the difficulty to create control groups (Balyi et al., 2013; Thibault & Harvey, 2013). This study creates the closest thing to control groups in an effort to compare individuals who have experienced heavy implementation of the model over the past season versus those who have not. While this study demonstrates a relationship between some of the core principles of LTAD and desired outcomes, it is only a beginning. Studies designed to isolate ADM as a factor and prove causation would go a long way in making believers of the theory. More should also be done to identify physiological development and its relationship to the theory and outcomes.

## **Conclusion**

This research serves a purpose for USA Hockey and for advocates of LTAD. Through the development of a reliable and valid survey, we can now measure the implementation fidelity of ADM at the 12U level. This can be used in a multitude of ways to benefit grassroots hockey in our country. It also appears ADM is contributing to more confident, enthusiastic, and improved players who are more likely to continue on in their hockey careers. Finally, this study serves as an initial step in examining the efficacy of LTAD on youth sports.

## REFERENCES

- Albers, B., & Pattuwage, L. (2017). *Implementation in education: Findings from a scoping review*. Melbourne, AUS: Evidence for Learning.
- Albrecht, J., & Strand, B. (2010). A review of organized youth sports in the United States. *YouthFirst: The Journal of Youth Sports*, 5(1), 16-20.
- American Development Model. (n.d.). Retrieved from <http://www.teamusa.org/About-the-USOC/Athlete-Development/American-Development-Model>
- American Development Model. (n.d.). Retrieved from <http://www.admkids.com>
- American Medical Society for Sports Medicine (2015, December). *Overuse injuries and burnout in youth sports can have long-term effects*.
- Babbie, E. R. (2012). *The practice of social research* (13<sup>th</sup> ed.) Belmont, CA: Wadsworth.
- Babic, V., Sarac, J., Missoni, S., & Sindic, J. (2015). Athletic engagement and athletic identity in top Croatian sprint runners. *Coll Antropol*, 39(3), 521-528.
- Bailey, R. (2008). *Youth sport and social inclusion. Positive Youth Development through Sport*. New York, NY: Routledge.
- Bassett, D. R., John, D., Conger, S. A., Fitzhugh, E. C., & Coe, D. P. (2015). Trends in physical activity and sedentary behaviors of United States youth. *Journal of Physical Activity and Health*, 12(8), 1102-1111. doi:10.1123/jpah.2014-0050
- Balyi, I., & Stafford, I. (2005). *Coaching for long-term athlete development: to improve participation and performance in sport*. Leeds: National Coaching Foundation.
- Balyi, I., & Way, R. (1995). Long-term planning of athlete development: The training to train phase. *B.C. Coach*, 2(2), 2-10.
- Balyi, I., Way, R., & Higgs, C. (2013). *Long-term athlete development*. Champaign, IL: Human Kinetics.
- Beatty, G., & Fawyer, B. (2013, November). What is the status of youth coach training in the US? *UF Sports Policy and Research Collaborative*.
- Bergeron, M.F., Mountjoy, M., Armstrong, N., et al. (2015). International Olympic Committee consensus statement on youth athletic development. *British Journal of Sports Medicine* 49(13), 843-851.

- Boone, E.M., Leadbeater, B.J. (2006). Game on: Diminishing risks for depressive symptoms in early adolescence through positive involvement in team sports. *Journal of Research on Adolescence*, 16, 79-90. doi:10.1111/j.1532-7795.2006.00122.x
- Bowers, M., Chalip, L., & Green, C. (2011). Beyond the façade – youth sports development in the United States and the illusion of Synergy. In *Routledge Handbook of Sports Development* (pp. 173-183). London, UK: Routledge.
- Breitenstein, S. M., Gross, D., Garvey, C. A., Hill, C., Fogg, L., & Resnick, B. (2010). Implementation fidelity in community-based interventions. *Research in Nursing & Health*, 33(2), 164-173. doi:10.1002/nur.20373
- Carpenter, J. (2019, January). Half-ice, full flight: New trend taking root in the Pacific northwest looks to spread nationwide. *USA Hockey Magazine*, 34-35.
- Chen, G. (2016, September 22). *Hello budget cuts, goodbye sports: The threat to athletics*. Retrieved from <https://www.publicschoolreview.com/blog/hello-budget-cuts-goodbye-sports-the-threat-to-athletics>
- Coakley, J. (2011). Youth sports. *Journal of Sport and Social Issues*, 35(3), 306-324. doi:10.1177/0193723511417311
- Cook, B. (2012, May 09). Ex-college coach explains why high school sports should die. Retrieved from <https://www.forbes.com/sites/bobcook/2012/05/08/ex-college-coach-explains-why-high-school-sports-should-die/#5efdaac36754>
- Côté, J. (1999). The Influence of the family in the development of talent in sport. *The Sport Psychologist*, 13(4), 395-417. doi:10.1123/tsp.13.4.395
- Cote, J., Lidor, R., & Hackfort, D. (2009). ISSP position stand: To sample or to specialize? Retrieved from <http://www.issponline.org/documents/positionstand2009-1.pdf>
- Cote, J., Strachan, L., & Fraser-Thomas, J. (2008). Participation, personal development, and performance through youth sport. *Positive Youth Development through Sport*. New York, NY: Routledge.
- Cote, J., & Vierimaa, M. (2014, October). The development model of sports participation: 15 years after its first conceptualization. *Science in Sports*.
- Couturier, L., Chepko, S., Holt/Hale, S. (2013). Grade level outcomes for K-12 physical education. *SHAPE America*. Reston, VA: Author.

- Crist, C. (2017, March 21). Canadian youth hockey injuries cut in half after national policy change. *Reuters*. Retrieved from <https://www.reuters.com/article/us-health-injuries-youth-hockey/canadian-youth-hockey-injuries-cut-in-half-after-national-policy-change-idUSKBN16S1XL>
- DeVellis, R.F. (2017). *Scale development: Theory and applications* (4<sup>th</sup> ed.). Los Angeles, CA: Sage.
- Dillman, D. A., Christian, L. M., & Smyth, J. D. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. Hoboken, NJ: Wiley.
- Dixon, M., & Bruening, J. (2014). Community and youth sport. *Contemporary Sports Management* (pp. 140-161). Champaign, IL: Human Kinetics.
- Dworkin, J. (2016). Adolescents' negative experiences in organized youth activities. *Journal of Youth Development, 1*(3), 44-62. doi:10.5195/jyd.2007.373
- Dworkin, J., & Larson, R. (2007). Adolescents' Negative Experiences in Organized Youth Activities. *Journal of Youth Development, 1*(3), 44-62. doi:10.5195/jyd.2007.373
- Durlak, J. A., & DuPre, E. P. (2008). Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology, 41*, 327-350.
- Eccles, J., Barber, B., Stone, M., & Hunter, J. (2003). Extracurricular activities and adolescent development. *Journal of Social Issues, 59*(4), 865-889. doi:10.1046/j.0022-4537.2003.00095.x
- Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity, 10*(1), 98. doi:10.1186/1479-5868-10-98
- Felfe, A., Michael, L., & Steinmayr, A. (2011). Sports and child development. *CESifo Working Paper Series No. 3629*. Retrieved from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1959287](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1959287)
- Ford, P., Croix, M. D., Lloyd, R., Meyers, R., Moosavi, M., Oliver, J., . . . Williams, C. (2011). The Long-Term Athlete Development model: Physiological evidence and application. *Journal of Sports Sciences, 29*(4), 389-402. doi:10.1080/02640414.2010.536849

- Friedman, H. (2013, September 20). When did competitive sports take over American childhood. *The Atlantic*. Retrieved from <http://www.theatlantic.com/education/archive/2013/09/when-did-competitive-sports-take-over-american-childhood/279868/>
- Francisco, C. D., Arce, C., Graña, M., & Sánchez-Romero, E. I. (2018). Measurement invariance and validity of the Athlete Engagement Questionnaire. *International Journal of Sports Science & Coaching*, 13(6), 1008-1014. doi:10.1177/1747954118787488
- Fraser-Thomas, J., & Cote, J. (2006). Youth sports: Implementing findings and moving forward with research. *Athletic Insights: The Online Journal of Sports Psychology*, 8(3), 12-26.
- Goldman, S. (2015, December 1). Study: Youth contact sports increase risk of CTE. *Athletic Business*. Retrieved from <http://www.athleticbusiness.com/athlete-safety/study-youth-contact-sports-increase-risk-of-cte.html?eid=220905034&bid=1247166>
- Hedstrom, R., & Gould, D. (2004). *Research in youth sports: Critical issues status*. Kansas City, MO: Citizenship through Sports Alliance.
- Holt, N. (2016). *Positive youth development through sport*. London, UK: Routledge.
- Holt, N., & Jones, M. (2008). Future directions for positive youth development and sport research. *Positive Youth Development through Sport*. London, UK: Routledge.
- Holt, N. L., Neely, K. C., Slater, L. G., Camiré, M., Côté, J., Fraser-Thomas, J., . . . Tamminen, K. A. (2017). A grounded theory of positive youth development through sport based on results from a qualitative meta-study. *International Review of Sport and Exercise Psychology*, 10(1), 1-49. doi:10.1080/1750984x.2016.1180704
- Houlihan, B., & Green, M. (2008). *Comparative elite sports development: Systems, structures, and public policy*. Burlington, MA: Elsevier.
- “Huddle Up for Baltimore Kids.” Project Play. (2017). Retrieved from <https://baltimore.projectplay.us/>
- Hume, C. (2015, October 1). Structure of Australian sport. Retrieved from [https://www.clearinghouseforsport.gov.au/knowledge\\_base/organised\\_sport/sport\\_systems\\_structures\\_and\\_pathways/structure\\_of\\_australian\\_sport](https://www.clearinghouseforsport.gov.au/knowledge_base/organised_sport/sport_systems_structures_and_pathways/structure_of_australian_sport)
- Humphrey, J. (2003). *Child development through sports*. Binghamton, NY: Haworth Press.

- Irvine, M. (2012, November 21). To parents, youth sports an 'athletic arms race'. *Denver Post*. Retrieved from <http://www.denverpost.com>
- International Physical Literacy Association. (n.d.). Retrieved from <https://www.physical-literacy.org.uk/>
- Jayanthi, N., Pinkham, C., Dugas, L., Patrick, B., & Labella, C. (2012). Sports specialization in young athletes: Evidence-based recommendations. *Sports Health: A Multidisciplinary Approach*, 5(3), 251-257. doi:10.1177/1941738112464626
- Koba, M. (2014, January 13). *Spending big on kids' sports? You're not alone*. Retrieved from <http://www.cnbc.com/2014/01/13/youth-sports-is-a-7-billion-industryand-growing.html>
- Lareau, A. (2003). *Unequal childhood's class, race, and family life*. Berkeley, CA: University of California Press.
- Lloyd, R. S., & Oliver, J. L. (2012). The youth physical development model: A new approach to long-term athlete development. *Strength and Conditioning Journal*, 34(3), 61-72.
- Lloyd, R. S., Oliver, J. L., Faigenbaum, A. D., Howard, R., Mark B. A., De Ste Croix, Williams, C. A., . . . Myer, G. D. (2015, May). Long-term athletic development, Part 2. *Journal of Strength and Conditioning Research*, 29(5), 1451-1464. doi:10.1519/01.jsc.0000465424.75389.56
- Lonsdale, C., Hodge, K., & Jackson, S. (2007). Athlete Engagement: II. Development and initial validation of the Athlete Engagement questionnaire. *International Journal of Sports Psychology*, 38(4).
- Mackenzie, B. (2006). Long Term Athlete Development (LTAD). Retrieved from <https://www.brianmac.co.uk/ltad.htm>
- Mandingo, J., Corlett, J., & Anderson, A. (2008). Using quality physical education to promote positive youth development in a developing nation. In N. Holt (Ed.), *Positive Youth Development through sport* (pp. 110-121). New York, NY: Routledge.
- Martins, P., Rosado, A. Ferreira, V., & Biscaia, R. (2014). Examining the validity of the Athlete Engagement questionnaire in a Portuguese sport setting. *Motriz, Rio, Claro* 20(1), 1-7.
- Meadors, L. (n.d.). *Practical application for long-term athletic development*. Retrieved from <http://www.nasca.com/Education/Articles/Practical-Application-for-Long-Term-Athletic-Development/>

- Morreale, M. (2019, April 2). 5 things to watch for at NHL Central Scouting final meeting. Retrieved from <http://nhl.com>
- Mowbray, C., Holter, M., Teague, G., & Bybee, D. (2003). Fidelity criteria: Development, measurement, and validation. *American Journal of Evaluation*, 24(3), 315-340.
- Nafzinger, J. (2008). A comparison of the European and North American models of sports organization. *The International Sports Law Journal*, 7(3-4), 100-108.
- National Federation of State High School Associations. (2018). *2017-18 High School Athletics Participation Survey*. Retrieved from: <http://www.nfhs.org/ParticipationStatistics/PDF/2017-18%20High%20School%20Athletics%20Participation%20Survey.pdf>
- O’Sullivan, J. (2014). *Changing the game: The parent's guide to raising happy, high-performing athletes and giving youth sports back to our kids*. New York, NY: Morgan James.
- Petitpas, A., Cornelius, A., & Van Raalte, J. (2008). Youth development through sport: It’s all about relationships. In N. Holt (Ed.), *Positive Youth Development through Sport*. New York, NY: Routledge.
- Physical Literacy. (n.d.). Retrieved from <https://www.admkids.com/page/show/1205402-physical-literacy>
- “Positive Youth Development”. Retrieved from <http://youth.gov/youth-topics/positive-youth-development>
- Project Play. (2015), (2016), (2018). Retrieved from <https://www.aspeninstitute.org/tag/project-play/>
- Ridpath, D. (2018). *Alternative models for sports development in America*. Athens, OH: Ohio University Press.
- Rosenwald, M. S. (2016, May 17). Youth sports participation is up slightly, but many kids are still left behind. Retrieved from [https://www.washingtonpost.com/news/local/wp/2016/05/17/youth-sports-participation-is-up-slightly-but-many-kids-are-still-left-behind/?utm\\_term=.bfb10872e389](https://www.washingtonpost.com/news/local/wp/2016/05/17/youth-sports-participation-is-up-slightly-but-many-kids-are-still-left-behind/?utm_term=.bfb10872e389)
- Sabo, D., & Veliz, P. (2008). *Go out and play: Youth sports in America*. East Meadow, NY: Women’s Sports Foundation.

- Sabo, D., Melnick, M., & Vanfossen, B. (1989). *Minorities in sports: The effect of varsity sports participation on social, educational, and career mobility of minority students*. East Meadow, NY: Women's Sports Foundation.
- Sapurji, S. (2017, November 27). Grassroots to gold: How USA Hockey is making America great. *The Athletic*. Retrieved from <https://theathletic.com/130205/2017/11/27/grassroots-to-gold-how-usa-hockey-is-making-america-great/>
- Saunders, R. P. (2016). *Implementation monitoring & process evaluation*. Los Angeles, CA: SAGE.
- Sparvero, E., Chalip, L., & Green, C. (2008). *United States. Comparative elite sports development: Systems, structures, and public policy*. Burlington, MA: Elsevier.
- “Sport for All, Play for Life”. Project Play. (2015, December 05). Retrieved from <https://www.aspenprojectplay.org/>
- Stafford, I. (2005). *Coaching for long-term athlete development: To improve participation and Performance in sport*. Headingley, Leeds: Sports Coach UK.
- “State of Play 2016: Trends and Development.” Project Play. (2016). Retrieved from [http://aspenprojectplay.org/sites/default/files/StateofPlay\\_2016\\_FINAL.pdf](http://aspenprojectplay.org/sites/default/files/StateofPlay_2016_FINAL.pdf)
- “State of Play 2018: Trends and Development.” Project Play. (2018). Retrieved from [https://assets.aspeninstitute.org/content/uploads/2018/10/StateofPlay2018\\_v4WEB\\_2-FINAL.pdf](https://assets.aspeninstitute.org/content/uploads/2018/10/StateofPlay2018_v4WEB_2-FINAL.pdf)
- Strong, W., Malina, R., Blimkie, C., Daniels, S., Dishman, R., Gutin, B., . . . Trudeau, F. (2005). Evidence based physical activity for school-age youth. *The Journal of Pediatrics*, 143(6), 732-737. <http://dx.doi.org/10.1016/j.jpeds.2005.01.055>
- Thibault, L., & Harvey, J. (2013). *Sport policy in Canada*. Ottawa, ON: University of Ottawa.
- Thompson, H. (2009). American Development Model: High performance, high ideals. Retrieved from <http://www.usahockeymagazine.com/article/2009-02/american-development-model-high-performance-high-ideals>
- Tipping, E. (2011, June). A look at trends in parks and recreation. Retrieved from [http://recmanagement.com/feature\\_print.php?fid=201106fe04](http://recmanagement.com/feature_print.php?fid=201106fe04)
- USA Hockey. (2018). *2017-2018 Season Final Registration Reports*. Retrieved from [https://cdn3.sportngin.com/attachments/document/2210-1687681/2017-18\\_Final\\_Registration\\_Report.pdf?\\_ga=2.82215254.192056770.1547946511-666609834.1547946511](https://cdn3.sportngin.com/attachments/document/2210-1687681/2017-18_Final_Registration_Report.pdf?_ga=2.82215254.192056770.1547946511-666609834.1547946511)



- USA Hockey. (n.d.). *ADM Program Manual: Learn to Train*. Retrieved from [http://assets.ngin.com/attachments/document/0042/7320/Learn to Train 1.26.09.pdf](http://assets.ngin.com/attachments/document/0042/7320/Learn_to_Train_1.26.09.pdf)
- USA Hockey Goaltending. (n.d.). Retrieved from <http://www.usahockeygoaltending.com/>
- Wallace, K. (2016, January 21). Why are so many kids dropping out of sports? Retrieved from <http://www.cnn.com/2016/01/21/health/kids-youth-sports-parents/>
- What is Physical Literacy. (n.d.). Retrieved from <http://physicalliteracy.ca>
- Whisenant, W., Forsyth, E., & Martin, T. (2014). Interscholastic athletics. *Contemporary Sports Management*. (pp. 162-189). Champaign, IL: Human Kinetics.
- Woods, R. (2007). A closer look at some trends in sports participation. In *Social Issues in Sport* (2nd ed.). Champaign, IL: Human Kinetics.
- Youth Sports League Trends for 2017. (2016, December 28). Retrieved from <http://www.siplay.com/blog/youth-sports-league-trends-for-2017>
- Zarrett, N., Fay, K., Li, Y., Carrano, J., Phelps, E., & Lerner, R. (2009). More than child's play: Variable- and pattern-centered approaches for examining effects of sports participation on youth development. *Developmental Psychology*, *45*(2), 368-382.

## **APPENDIX A**

### **Final Survey and Results**

You are being invited to take part in a research study being conducted by USA Hockey and Leon Lifschutz (Doctoral Candidate at University of Vermont). The purpose of the study is to understand the experiences of 12U Hockey players across the country. Participation involves completing a brief survey about your child's experience on their team, practice schedule, and hockey development. The time to complete the survey is approximately 10 minutes. The results of this UVM research study will be shared with USA Hockey. USA Hockey is committed to providing the best experience possible for all players and your insights will help greatly in shaping the future of USA Hockey's curriculum and offerings.

All information collected during the course of this study will be stored without any personal identifiers. No one will be able to match you to your answers. Your participation is completely voluntary.

If you have any questions about this study now or in the future, you may contact me [Leon Lifschutz, Primary Investigator] at the following phone number [802-656-8723]. If you have questions or concerns about your rights as a research participant, then you may contact the Director of the Research Protections Office at (802) 656-5040.

Thank you in advance for your time and consideration.

OK

**Q1: What state does your child play hockey in?**

- Answered: 214
- Skipped: 0

<b>Answer Choices –</b>	<b>Responses –</b>
–	0.00%
AL Alabama	0
–	0.00%
AK Alaska	0
–	1.40%
AZ Arizona	3
–	0.00%
AR Arkansas	0
–	3.27%
CA California	7
–	1.87%
CO Colorado	4
–	2.34%
CT Connecticut	5
–	0.00%
DE Delaware	0
–	0.00%
DC District of Columbia	0
–	0.93%
FL Florida	2
–	0.00%
GA Georgia	0

–	0.00%
HI Hawaii	0
–	0.47%
ID Idaho	1
–	5.61%
IL Illinois	12
–	1.40%
IN Indiana	3
–	0.93%
IA Iowa	2
–	0.00%
KS Kansas	0
–	0.00%
KY Kentucky	0
–	0.47%
LA Louisiana	1
–	0.00%
ME Maine	0
–	1.87%
MD Maryland	4
–	7.94%
MA Massachusetts	17
–	10.28%
MI Michigan	22
–	12.15%
MN Minnesota	26
–	0.00%

MS Mississippi	0
–	2.80%
MO Missouri	6
–	0.93%
MT Montana	2
–	0.00%
NE Nebraska	0
–	0.47%
NV Nevada	1
–	1.87%
NH New Hampshire	4
–	1.87%
NJ New Jersey	4
–	0.00%
NM New Mexico	0
–	9.35%
NY New York	20
–	1.40%
NC North Carolina	3
–	0.93%
ND North Dakota	2
–	5.14%
OH Ohio	11
–	0.47%
OK Oklahoma	1
–	0.00%
OR Oregon	0

–	8.88%
PA Pennsylvania	19
–	0.93%
RI Rhode Island	2
–	0.47%
SC South Carolina	1
–	0.47%
SD South Dakota	1
–	0.00%
TN Tennessee	0
–	1.87%
TX Texas	4
–	0.00%
UT Utah	0
–	1.40%
VT Vermont	3
–	2.80%
VA Virginia	6
–	2.80%
WA Washington	6
–	0.00%
WV West Virginia	0
–	4.21%
WI Wisconsin	9
–	0.00%
WY Wyoming	0
TOTAL	214

**Q2: Race of player (select all that apply)**

- Answered: 214
- Skipped: 0

<b>Answer Choices –</b>	<b>Responses –</b>
–	92.06%
White or Caucasian	197
–	1.87%
Black or African American	4
–	1.87%
Hispanic or Latino	4
–	1.87%
Asian or Asian American	4
–	1.87%
American Indian or Alaska Native	4
–	0.47%
Native Hawaiian or other Pacific Islander	1
–	3.74%
Prefer not to answer	8
Total Respondents: 214	

[Comments\(6\)](#)

**Q3: Gender of player**

- Answered: 214
- Skipped: 0

**Answer Choices –Responses –**

–	76.64%
Man	164
–	22.90%
Woman	49
–	0.47%
Transgender	1
–	0.00%
Prefer not to say	0
TOTAL	214

[Comments\(1\)](#)

**Q4: Gender of team**

- Answered: 214
- Skipped: 0

**Answer Choices –Responses –**

–	40.19%
Men's	86
–	14.49%
Women's	31
–	45.33%
Mixed Genders	97
TOTAL	214

**Q5: Level of play**

- Answered: 214
- Skipped: 0



**Answer Choices – Responses –**

–	14.02%
Tier 1	30
–	30.84%
Tier 2	66
–	9.35%
Tier 3	20
–	30.37%
House/Local League	65
–	0.00%
Disabled	0
–	15.42%
Not sure	33
TOTAL	214

**Q6: Please select any positions you hold during this season**

- Answered: 214
- Skipped: 0

<b>Answer Choices –</b>	<b>Responses –</b>
–	5.61%
Head Coach	12
–	12.15%
Assistant Coach	26
–	11.68%
Team Manager	25
–	9.35%
Organization officer or board member	20

– 68.22%  
 None of the above 146

Total Respondents: 214

[Comments](#)(10)

**Q7: Age of parent/guardian completing the survey**

- Answered: 214
- Skipped: 0

**Answer Choices – Average Number –Total Number –Responses –**

[Responses](#)

45 9,586 214

Total Respondents: 214

**Q8: What is the highest degree or level of school you have completed? If currently enrolled, highest degree received?**

- Answered: 212
- Skipped: 2

**Answer Choices –**

**Responses –**

– 0.00%

No schooling completed 0

– 0.00%

Nursery school to 8th grade 0

– 0.00%

Some high school, no diploma 0

– 3.77%

High school graduate, diploma or the equivalent (for example: GED)8

–	8.49%
Some college credit, no degree	18
–	4.25%
Trade/technical/vocational training	9
–	8.96%
Associate degree	19
–	40.09%
Bachelor’s degree	85
–	28.77%
Master’s degree	61
–	2.83%
Professional degree	6
–	2.83%
Doctorate degree	6
TOTAL	212

**Q9: How often do you attend your child's hockey activities?**

- Answered: 212
- Skipped: 2

**Answer Choices – Responses –**

–	0.00%
Never	0
–	0.00%
Rarely	0
–	0.47%
Sometimes	1
–	22.64%

Frequently	48
–	76.89%
Always	163
–	0.00%
Prefer not to answer	0
TOTAL	212

**Q10: How attentive are you when attending your child's hockey activities?**

- Answered: 212
- Skipped: 2

**Answer Choices – Responses –**

–	0.00%
Not at all attentive	0
–	0.00%
Not so attentive	0
–	5.19%
Somewhat attentive	11
–	50.47%
Very attentive	107
–	44.34%
Extremely attentive	94
TOTAL	212

**Q11: How would you rate your knowledge of the sport of hockey?**

- Answered: 211
- Skipped: 3

**Answer Choices – Responses –**

–	0.00%
None at all	0
–	2.37%
A little	5
–	18.01%
A moderate amount	38
–	36.49%
A lot	77
–	43.13%
A great deal	91
TOTAL	211

**Q12: Is your child a goalie?**

- Answered: 214
- Skipped: 0

<b>Answer Choices –</b>	<b>Responses –</b>
–	6.07%
Yes, full time goalie	13
–	88.79%
No, full time player	190
–	5.14%
My child plays a little of both	11
TOTAL	214

**Q13: About how long do games generally take from the time your child gets on the ice for warm-up until its conclusion?**

- Answered: 214

- Skipped: 0

**Answer Choices – Responses –**

–	5.61%
49 minutes or fewer	12
–	43.46%
50-60 minutes	93
–	34.58%
61-75 minutes	74
–	11.68%
76-90 minutes	25
–	4.67%
91 minutes or more	10
TOTAL	214

**Q14: About how long is the season?**

- Answered: 214
- Skipped: 0

**Answer Choices – Responses –**

–	18.22%
5 months or fewer	39
–	39.72%
6 months	85
–	28.50%
7 months	61
–	8.41%
8 months	18
–	5.14%

9 months or more	11
TOTAL	214

**Q15: About how many times does the team touch the ice in an average week (practices and games)?**

- Answered: 214
- Skipped: 0

**Answer Choices –Responses –**

–	2.34%
1 time	5
–	14.02%
2 times	30
–	29.91%
3 times	64
–	35.98%
4 times	77
–	17.76%
5 times or more	38
TOTAL	214

**Q16: About how many games will the team play during the season (excluding post-season)?**

- Answered: 214
- Skipped: 0

**Answer Choices –Responses –**

–	20.56%
19 or fewer	44
–	24.30%

20-29	52
–	28.50%
30-39	61
–	15.89%
40-49	34
–	10.75%
50 or more	23
TOTAL	214

**Q17: About how many practices will the team have over the duration of the season?**

- Answered: 214
- Skipped: 0

**Answer Choices –Responses –**

–	38.79%
59 or fewer	83
–	22.90%
60-69	49
–	15.89%
70-79	34
–	14.49%
80-89	31
–	7.94%
90 or more	17
TOTAL	214

**Q18: The team consists of how many players (excluding goalies)**

- Answered: 214



- Skipped: 0

**Answer Choices – Responses –**

–	8.41%
10 or fewer	18
–	32.24%
11-13	69
–	45.33%
14-16	97
–	9.81%
17-19	21
–	4.21%
20 or more	9
TOTAL	214

**Q19: About how many times does the team engage in off-ice training in an average week?**

- Answered: 214
- Skipped: 0

**Answer Choices – Responses –**

–	46.26%
The team does not engage in off-ice ice training	99
–	20.56%
Less than once a week	44
–	21.03%
Once a week	45
–	9.35%
Twice a week	20
–	2.80%
Three or more times a week	6

TOTAL

214

**Q20: About what percentage of time does the team work on each of the following areas during on-ice sessions? (percentages for all 4 should add up too 100)**

- Answered: 214
- Skipped: 0

**Answer Choices – Average Number –Total Number –Responses –**

Responses

Individual Skill Development	37	7,913	212
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Responses

Hockey concepts and awareness	25	5,135	207
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Responses

Team play	33	6,725	206
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Responses

Other	20	1,627	80
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Total Respondents: 214

**Q21: Physical Development - Please answer the following questions based on your observations of your child with their team this season**

- Answered: 214
- Skipped: 0

	Never	Rarely	Occasionally	Frequently	Very Frequently	Total
–	–	–	–	–	–	–
–	15.42%	21.03%	37.85%	21.96%	3.74%	
My child was taught about general fitness	33	45	81	47	8	214
–	17.29%	30.37%	32.71%	16.36%	3.27%	
–	37	65	70	35	7	214

My child was taught about rest and recovery						
–	15.89%	11.68%	13.55%	16.36%	42.52%	
The team warmed up off the ice before games	34	25	29	35	91	214
–						
I observed my child working on improving their speed on the ice	4.67%	12.15%	30.37%	34.11%	18.69%	
–	10	26	65	73	40	214
–						
I observed my child working on improving their speed off the ice	28.50%	32.71%	21.03%	11.68%	6.07%	
–	61	70	45	25	13	214
–						
I observed my child working on explosive strength through jumping and gymnastic maneuvers	36.92%	30.37%	20.56%	7.48%	4.67%	
–	79	65	44	16	10	214
–						
I observed my child working on developing lower body and core stability	23.36%	26.64%	27.10%	16.82%	6.07%	
–	50	57	58	36	13	214
–						
I observed my child cool down after activity	35.51%	28.04%	21.03%	11.68%	3.74%	
–	76	60	45	25	8	214

**Q22: Technical and Tactical Development - Please answer the following questions based on your observations of your child with their team this season**

- Answered: 214
- Skipped: 0

	Never	Rarely	Occasionally	Frequently	Very Frequently	Total
I observed my child working on skill development	0.47%	5.61%	15.42%	47.66%	30.84%	214
I observed my child refining skating skills	0.47%	9.81%	24.77%	38.32%	26.64%	214
I observed my child refining puck control skills	1.40%	6.07%	23.83%	46.26%	22.43%	214
I observed my child refining passing and receiving skills	1.40%	4.67%	21.96%	46.26%	25.70%	214
I observed my child refining shooting and scoring skills	5.14%	5.14%	29.44%	43.46%	16.82%	214
I observed my child refining angling OR body checking skills	23.36%	16.36%	31.31%	24.30%	4.67%	214
I observed my child applying decision making skills during small area games	3.27%	12.15%	27.57%	42.52%	14.49%	214
I observed my child refining puck protection skills	7.48%	11.21%	29.44%	40.19%	11.68%	214
I observed my child refining deception skills (ex.	18.22%	19.63%	34.11%	21.03%	7.01%	214

Changing skating speed,  
dekes, fakes)

–						
I observed my child engaged in battles and competing for the puck	0.47%	7.94%	25.70%	40.65%	25.23%	
	1	17	55	87	54	214

–						
I observed my child working on the four game situation roles: puck carrier, offensive support player, defender at the puck, defender away from the puck	11.21%	14.49%	26.64%	35.05%	12.62%	
	24	31	57	75	27	214

–						
I observed my child working on coordinated attacks (2v1, 18 2v2, 3v2, 2v3)	8.41%	10.28%	28.04%	42.06%	11.21%	
	22	60	90	24	214	

–						
I observed my child working on basic team systems (breakout, forecheck, defensive zone, special teams, etc.)	10.75%	15.42%	23.83%	37.38%	12.62%	
	23	33	51	80	27	214

**Q23: Coaching Considerations - Please answer the following questions based on your observations of your child with their team this season**

- Answered: 214
- Skipped: 0

	Never	Rarely	Occasionally	Frequently	Very Frequently	Total
–	–	–	–	–	–	–
–	1.40%	7.01%	18.69%	44.39%	28.50%	

I observed coaches emphasizing skill development	3	15	40	95	61	214
–						
	3.74%	10.28%	19.63%	43.46%	22.90%	
I observed coaches providing quality visual demonstrations of skills	8	22	42	93	49	214
–						
	1.40%	7.94%	35.05%	43.46%	12.15%	
I observed players repeatedly performing skills accurately	3	17	75	93	26	214
–						
	3.27%	9.81%	24.30%	50.00%	12.62%	
I observed coaches focusing on just a few key teaching points per practice	7	21	52	107	27	214
–						
	5.14%	14.02%	21.03%	44.39%	15.42%	
I observed coaches connecting skills to game situations	11	30	45	95	33	214
–						
	3.27%	14.02%	33.18%	40.65%	8.88%	
I observed coaches creating repeated opportunities for decision making	7	30	71	87	19	214
–						
	4.21%	13.55%	24.77%	38.32%	19.16%	
I observed coaches providing regular and specific feedback to players	9	29	53	82	41	214
–						
	4.21%	9.35%	19.63%	36.45%	30.37%	
I observed coaches incorporating stations into practices	9	20	42	78	65	214
–						
	1.87%	9.35%	16.82%	45.33%	26.64%	
	4	20	36	97	57	214

I observed coaches  
incorporating small area  
games into practices

–

I observed coaches employing interval training (short bursts of high intensity followed by slightly longer periods of rest)	12.62%	14.95%	37.85%	27.10%	7.48%	
	27	32	81	58	16	214

**Q24: Psychological Development - Please answer the following questions based on your observations of your child with their team this season**

- Answered: 214
- Skipped: 0

	Strongly Disagree –	Disagree –	Neither Agree or Disagree –	Agree –	Strongly Agree –	Total –
–	1.87%	5.61%	4.67%	44.39%	43.46%	
My child regularly had fun	4	12	10	95	93	214
–	1.40%	7.48%	17.76%	48.13%	25.23%	
Players on the team generally enjoyed working hard	3	16	38	103	54	214
–	6.07%	17.29%	24.30%	34.58%	17.76%	
The team actively engaged in team building activities during the season	13	37	52	74	38	214
–	5.61%	6.54%	15.89%	43.93%	28.04%	
My child was encouraged to learn from mistakes	12	14	34	94	60	214
–	8.88%	14.95%	29.44%	27.57%	19.16%	

My child was encouraged to set long term goals	19	32	63	59	41	214
–	8.88%	14.49%	25.70%	36.45%	14.49%	
My child was encouraged to set short term goals	19	31	55	78	31	214
–	9.35%	21.50%	34.58%	23.36%	11.21%	
My child was taught strategies to focus their attention	20	46	74	50	24	214
–	9.81%	25.70%	30.84%	22.90%	10.75%	
My child was taught visualization strategies	21	55	66	49	23	214

**Q25: Ancillary/Life Skills - Please answer the following questions based on your observations of your child with their team this season**

- Answered: 214
- Skipped: 0

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree	Total
–	–	–	–	–	–	–
–	7.94%	16.82%	27.57%	35.98%	11.68%	
The team's schedule permitted my child opportunities to play other sports throughout the year	17	36	59	77	25	214
–	3.74%	17.29%	17.29%	49.53%	12.15%	
The team's schedule permitted my child opportunities to participate in non-sport cultural and lifestyle opportunities	8	37	37	106	26	214
–	8.88%	20.09%	32.24%	31.31%	7.48%	
Being part of the team helped teach my child the importance	19	43	69	67	16	214



of proper warm up and cool down						
–						
Being part of the team helped teach my child the importance of hydration and nutrition	7.94%	18.69%	27.10%	35.05%	11.21%	
	17	40	58	75	24	214
–						
Being part of the team helped teach my child to prioritize school and education	6.54%	10.75%	29.91%	40.19%	12.62%	
	14	23	64	86	27	214
–						
Being part of the team helped teach my child to prioritize family and friends	7.01%	8.41%	35.05%	40.65%	8.88%	
	15	18	75	87	19	214
–						
Being part of the team helped teach my child the importance of physical activity	2.80%	2.80%	14.02%	47.66%	32.71%	
	6	6	30	102	70	214

**Q26: What types of injuries did your child experience this season? Please only select injuries if they required a visit to the emergency room, care of a medical professional, or caused your child to miss more than 2 days of play (check all that apply)**

- Answered: 210
- Skipped: 4

Answer Choices –	Responses –
–	71.90%
My child did not suffer any injuries this season	151
–	12.38%
Strain or sprain	26
–	1.90%

Fracture	4
–	12.86%
Contusion (bruises) or abrasion (scrapes)	27
–	6.67%
Concussion	14
–	0.95%
Laceration	2
–	0.00%
Dislocation	0

Total Respondents: 210

[Comments\(5\)](#)

### Q27: Athlete Engagement

- Answered: 214
- Skipped: 0

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree or Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>	<b>Total</b>
–	–	–	–	–	–	–
–	0.93%	4.67%	14.02%	52.34%	28.04%	
My child feels capable of accomplishing their goals in hockey	2	10	30	112	60	214
–	1.40%	3.27%	11.21%	55.14%	28.97%	
My child feels capable of success in hockey	3	7	24	118	62	214
–	1.87%	3.74%	10.75%	55.14%	28.50%	
My child believes they have the skills/technique to be successful in hockey	4	8	23	118	61	214
–	1.87%	5.14%	15.89%	52.80%	24.30%	

My child is confident in their abilities	4	11	34	113	52	214
–	0.47%	0.47%	5.61%	37.38%	56.07%	
My child is excited about hockey	1	1	12	80	120	214
–	0.00%	1.40%	6.07%	38.32%	54.21%	
My child is enthusiastic about hockey	0	3	13	82	116	214
–	0.00%	0.00%	3.27%	32.71%	64.02%	
My child enjoys hockey	0	0	7	70	137	214
–	0.47%	2.34%	3.74%	35.51%	57.94%	
My child has fun in hockey	1	5	8	76	124	214
–	3.74%	5.61%	7.94%	42.06%	40.65%	
My child has improved a satisfactory amount as a player this season	8	12	17	90	87	214
–	1.40%	1.40%	3.74%	27.10%	66.36%	
My child will play hockey again next season	3	3	8	58	142	214
–						
It is important to me that my child learn about health and wellness through their participation in hockey	1.40%	2.80%	14.02%	42.52%	39.25%	
–	3	6	30	91	84	214
–						
It is important to me that my child learn about nutrition through their participation in hockey	0.93%	4.67%	21.96%	35.98%	36.45%	
–	2	10	47	77	78	214

## APPENDIX B

### Cognitive Interview Notes

- Cognitive interviews employed verbal probing techniques
- Most common questions:
  - Can you tell me what you think the question means?
  - How did you arrive at your answer?

Cognitive Interview #1: Marin Lifschutz, 60s, New York, 2 kids who played Tier 1 hockey, 1 played Junior, 1 played college

Took about 10 minutes

Question 9 – answer choices were easy

11 – never played but got into a material way around attendance but never involved, chose moderate, felt moderate from being around it so much

12 – took a little while to recollect, a little unclear since its been a while

13 – same as 12, counted on fingers

14 – counted number of practices and games

15 – question was easy because number was well over 41, wondered if the ranges were too close

16 – pointed out that my numbers might too high? Checked, it is not

17 – recalled roster size

18 – may need to point out that off-ice does not included warm-up, may need to clarify wording

19 – was a hard one, suggested maybe including some prompts or examples of what each category is

\*May need clarifying statement around what parents are observing

20 – duplicate on rest and recovery

21 – get rid of off the ice in speed question; on ice speed may refer to more specific activities or drills

22 – suggested again more clarifying specifically doing drills and structure on these concepts as opposed to doing so on their own – find a wording that explains where the observations should be happening most

23 – understood terms well; put tactics question before personal questions

24 – clarifying, coaches encourage or emphasizing players to execute these statements; teaching points question might be confusing – put feedback questions next teaching points questions; interval training might need explanation?

25 – clarify that this is team, coach, org encouraging these; typo on fail – perhaps wording is to take risks; visualization or focus examples

26 – straightforward

27 – straightforward

28 – easily understood

Cognitive Interview #2 - Swezey – Early 30s woman. College coaching experience and extensive and current experience in skill development delivery to youth players

12 – length of games

14 – clarify with their team

15 – consider wider ranges

16 – be consistent with 15

19 – was clear on different areas of

22 – angling (“and/or” bodychecking) – important because girls are not bodychecking

23 – wondering if folks understand the 4 roles enough

24 – clarifying visual demonstration of skills (perhaps share example) 24(3) has typo of performing twice and also might need language to be more clear; correct capitalizations of Coaches

27 – consistency of words like year, change all to season, include hockey where applicable

Stated largely straightforward

Cognitive Interview #3 – Kenny, late 30s, parent of a 12U female player and 2 young children in learn to play programs

Filipino as a race?

15. Wasn't positive on number of games

18. Mentioned dry ice stuff

19. Questions about team play and not totally sure of explanation of it

- 21A. thought of warm up as on ice warm up, may need to clarify pre-game
- 23. Are questions geared more towards practices or games? Something that was taught or just in the nature of the kid
- 24. teaching points and interval training were problematic
- 25. Trouble observing goal setting, focus hard to observe, visualization strategies 25C. has a typo “to”
- 26 – 28 good

Cognitive Interview #4 – Deb, mid to late 40s, mother to 3 players ranging from 10U to high school

Expressed overall formatting and questions made sense

Why Race first?

Need to be consistent in tenses

What am I attentive of?

Not sure she is going to know a bunch of them.

Girls and bodychecking

Wondering if those did happen, hadn't thought to watch for them

Define interval training

High volume of accurately performing skills – not sure how to answer

Suggested perhaps a more objective observation tool with experts going to observe

In intro include more specific goals of USA Hockey ADM model

Encouraged addition of team culture and atmosphere or hockey experience...preceding ALS section

Make sure injury section specifies during hockey

Missing “what mindset to be in” when filling this out – “solely to gather info”, a little more clear and emphatic at the start.

Outcomes should qualify that it is during or because of playing hockey

“How many years has your child been playing hockey?”

Suggested getting some additional info like “why did the choose hockey”

Mentioned excessive parent involvement in the sport of hockey

Cognitive Interview #5 – Chris, mid 60s, long time college hockey coach, has worked with USA hockey in the past in their elite development camps

12. Wonders about interpretation of question, wonders about getting dressed being misunderstood in there. Could be re-worded
16. Suggested asking how many times during the week and length of season and that this question might be harder recall and possibly redundant
18. asking per week should be consistent with other question like ice time
20. Suggested inquiring about weight training as well or trying to determine what type of off-ice training
21. Interpreted the warm up before games as on ice, need to clarify that it is off the ice
24. Coaches delivering regular feedback and 4-5 teaching points seem problematic and not sure observable
- 25 © has a typo – thinks that some of them should be known through communication from coach but dependent on if coach is communicative or not
26. Wondered if rather than team encouraged “the coach encouraged” would be a better wording

Cognitive Interview #6 – Jaime, early 40s, father of an 8U player, began playing hockey himself later in life

\*\*\*This interview featured the revised version of the survey after item analysis from local testing

5 – A little unclear on Tier but partially because of age group (son is 8U)

6 – Perhaps add an other category to positions held

- Question around level of play or experience of parent playing hockey

18 – typo, “less than once A week”

19 – wording is improved

21 – by naturally doing it? Or pushed by coaches?

22 – same question as 21

Questions about depth of questions and other types of questions around coaching and others that could bring more info to it.

## **APPENDIX C**

### Survey invitations

#### INITIAL E-MAIL

Dear Hockey Parent,

We are sending you this email to ask for your help with an important survey we are conducting to understand the experiences of 12U hockey players across the country.

You are being invited to take part in a research study being conducted by USA Hockey and Leon Lifschutz (Doctoral Candidate at University of Vermont).

To this end, we would greatly appreciate it if you would complete the survey at the link below.

#### ***INSERT LINK***

The survey should only take around ten minutes to complete.

All information collected during the course of this study will be stored without any personal identifiers. No one will be able to match you to your answers. Your participation is completely voluntary.

The results of this study will help us better understand the experiences of players in USA Hockey programs. We very much appreciate your help with this study.

#### FOLLOW UP EMAIL 1

Dear Hockey Parent,

Recently we sent you an email asking for your help with an important survey. We are conducting this survey to better understand the experiences of 12U hockey players across the country.

If you have already completed the survey, thank you so much for your time. If you have not yet done so, your attention to this would be greatly appreciated. The more information we collect the more useful the results will be.

To access the survey, just click on the link below.

#### ***INSERT LINK***

The survey should only take around ten minutes to complete.

All information collected during the course of this study will be stored without any personal identifiers. No one will be able to match you to your answers. Your participation is completely voluntary.



Your responses will help a great deal in delivering the best hockey experiences for youth across the country. We appreciate your time and considering our request.

## FOLLOW UP EMAIL 2

Dear Hockey Parent,

Thanks to the large number of you that have already responded to our request to complete our 12U Survey. It will help a great deal in understanding how youth hockey is delivered and in providing valuable feedback to continue to improve the experience.

***If you have not already done so, the survey will be closing very soon and we really want to hear from you. Please consider doing so.***

To access the survey, just click on the link below.

***INSERT LINK***

The survey should only take around ten minutes to complete.

All information collected during the course of this study will be stored without any personal identifiers. No one will be able to match you to your answers. Your participation is completely voluntary.

Your responses will help a great deal in delivering the best hockey experiences for youth across the country. We appreciate your time and considering our request.