

# APPENDIX: BIO-BANDED TRAINING

*#ToDreamIsToDo*





# BIOLOGICAL AGE TRAINING GROUPS

## TABLE OF CONTENTS

1. SUMMARY PAGE
2. *WHY?*
3. PHV, BIOLOGICAL AGE, CHRONOLOGICAL AGE, & RAE
4. PHV AS IT RELATES TO RISK OF INJURY
5. DIFFERING PHVs WITHIN A SINGLE BIRTH YEAR TEAM
6. RAE – JANUARY vs DECEMBER
7. RAE (MLS NEXT)
8. RAE (MLS)
9. PHV AT AJAX
10. U13 (2008) TEAM PHOTO
11. U14 (2007) TEAM PHOTO
12. U15 (2006) TEAM PHOTO
13. U16 (2005) TEAM PHOTO
14. BIOLOGICAL AGE TRAINING GROUPS





## LET'S START WITH WHY

We measure late developing players not to allow our teams compete better, but rather to allow our clubs to develop better players.

While teams are formed based on chronological age of players, we know that despite being the same age, players can be in very different phases and stages of development.

This process allows us to provide a standardized, yet individual approach to measuring a player's physical maturation and development. This creates space for all players to grow into an appropriate level of competition and ultimately reach their full potential.

While this tool doesn't guarantee absolute accuracy, it offers the league important and objective data in support of the decision.



# PHV, BIOLOGICAL AGE, CHRONOLOGICAL AGE, & RAE

**PEAK HEIGHT VELOCITY (PHV)** – *the period of time in which a child experiences their fastest upward growth in their stature – i.e. the time when they grow the fastest during their adolescent growth spurt. Before, during, and after PHV there appears to be certain periods in time in which young athletes are more sensitive to particular types of training, “periods of accelerated adaptation”. As this suggests, these time periods are simply opportunities for athletes’ to make greater improvements in athleticism than otherwise possible. These periods of accelerated adaptation have many implications for training program design, including training content, intensity, volume, frequency, periodization, coaching style, and training group segregation.*

**BIOLOGICAL AGE** – *refers to the biological status or maturity of the athlete depending on whether they are a pre-adolescent, adolescent, or an adult.*

**CHRONOLOGICAL AGE** – *the age of the individual by date of birth.*

**RELATIVE AGE EFFECT (RAE)** – *a phenomenon in which children born in, or close to, a critical age cut-off period may have an athletic advantage. An earlier birth is typically associated with increased physical ability.*



# PHV AS IT RELATES TO RISK OF INJURY

## How does growth affect the player?

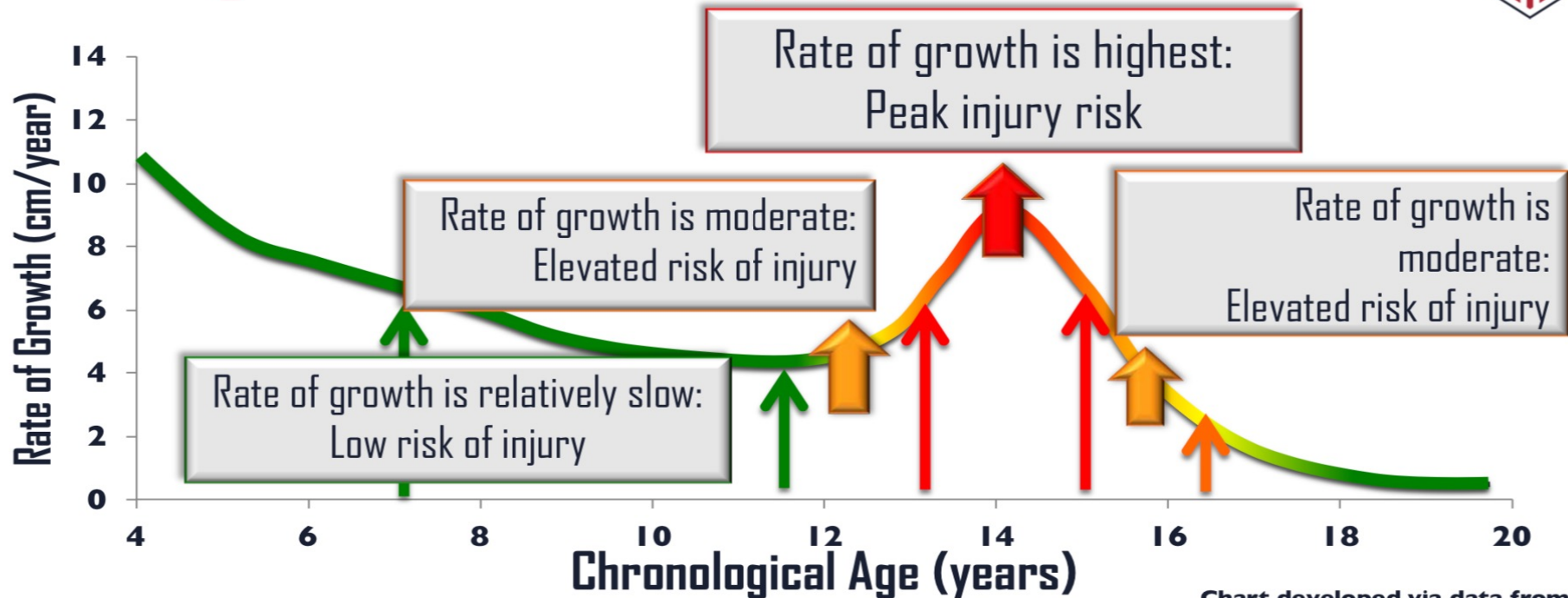


Chart developed via data from:  
 van der Sluis, A., Elferink-Gemser, M. T., Brink, M. S., & Visscher, C. (2015). Importance of Peak Height Velocity Timing in Terms of Injuries in Talented Soccer Players. *Int J Sports Med*, 36(4), 327-332. van der Sluis, A., Elferink-Gemser, M. T., Coelho-e-Silva, M. J., Nijboer, J. A., Brink, M. S., & Visscher, C. (2014). Sport injuries aligned to peak height velocity in talented pubertal soccer players. *Int J Sports Med*, 35(4), 351-355.

# DIFFERING PHVs WITHIN A SINGLE BIRTH YEAR TEAM

Will these players respond the same to training?

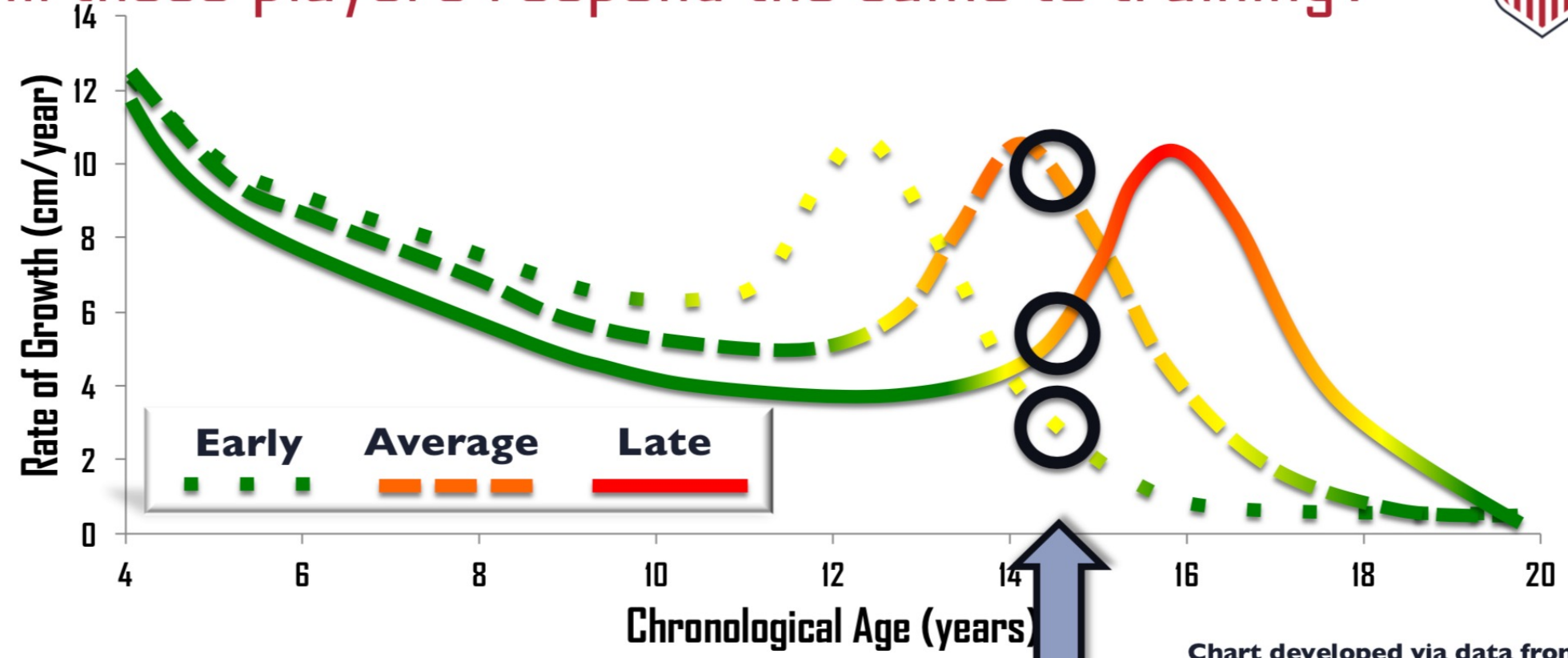
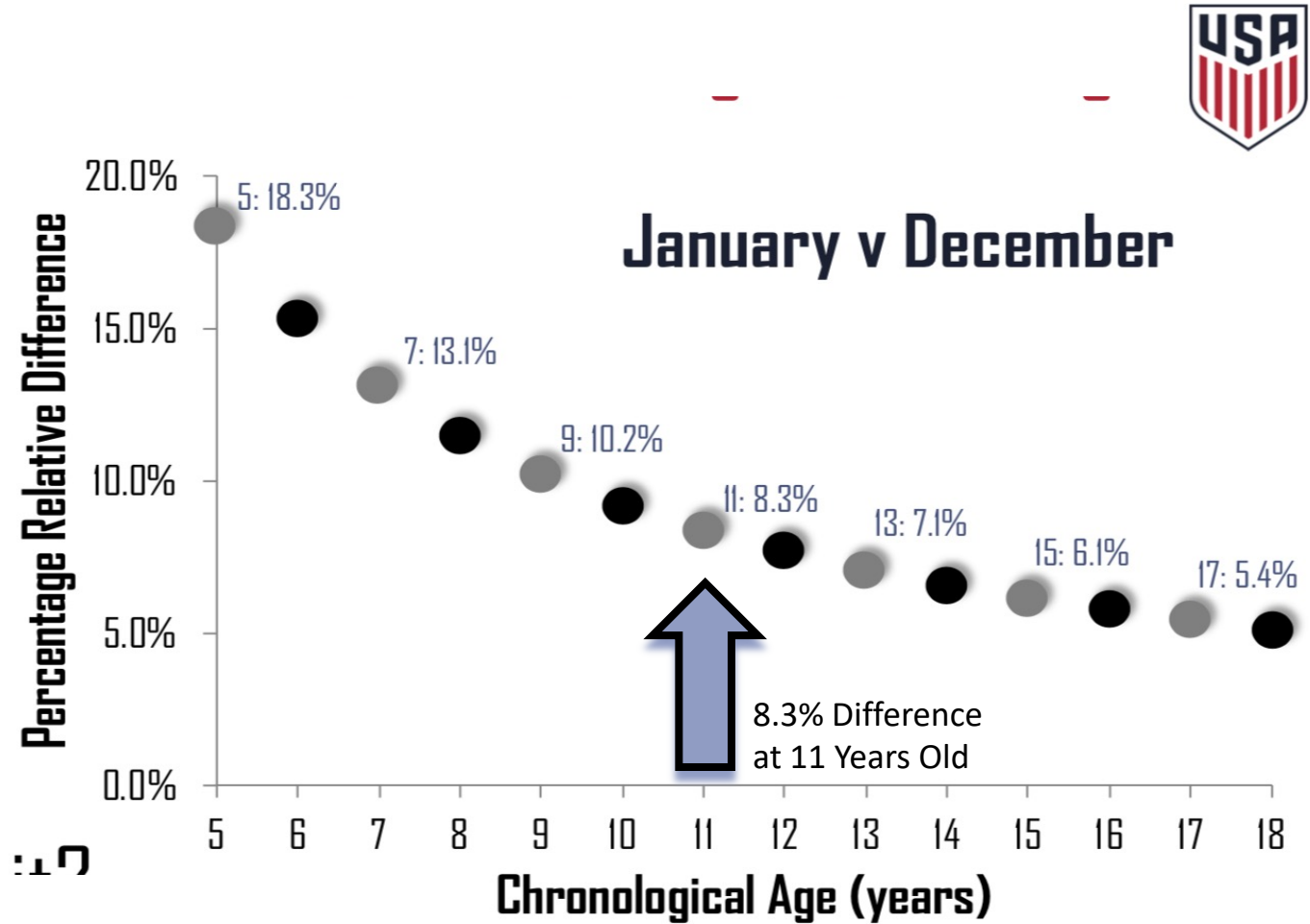


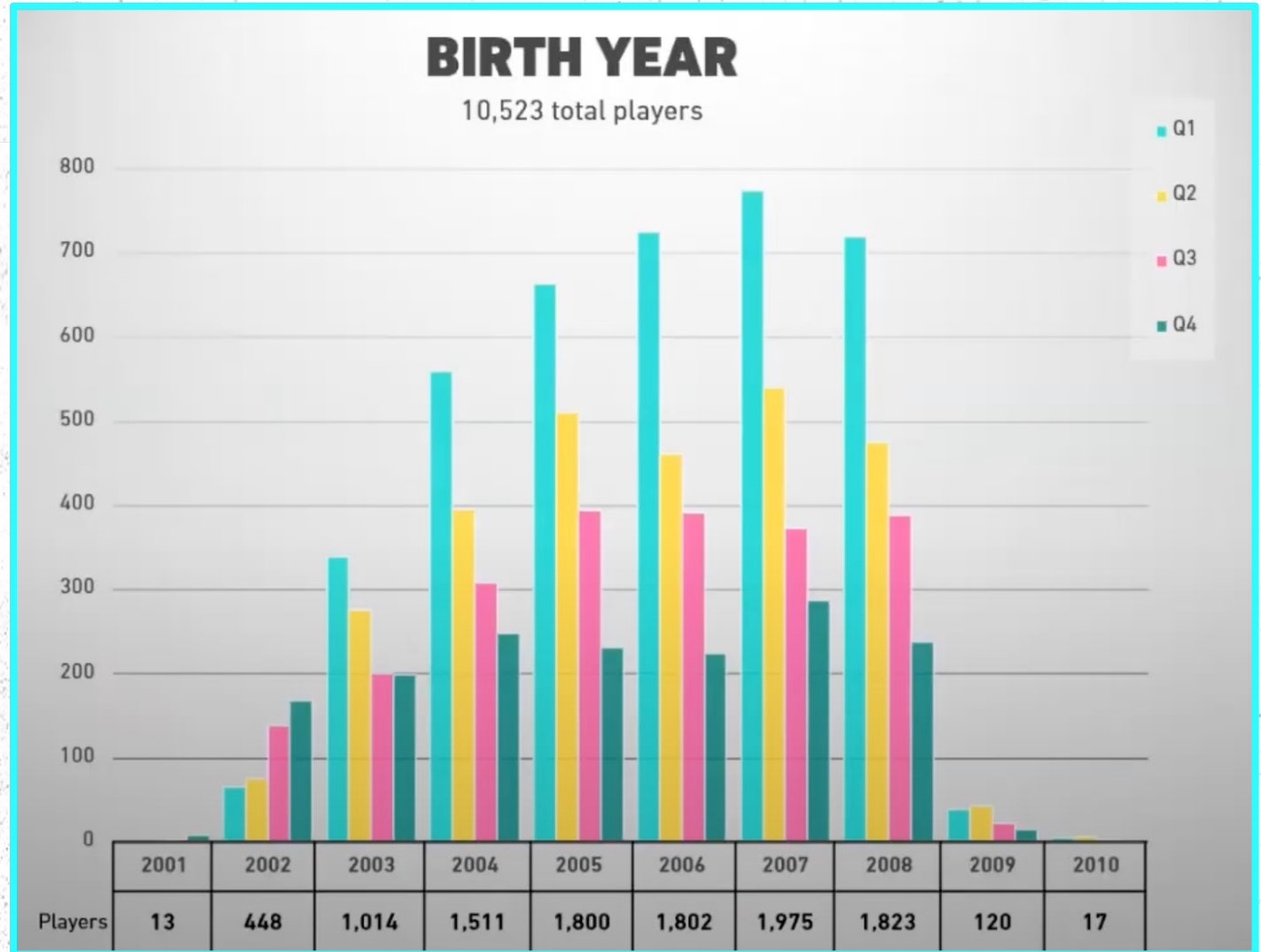
Chart developed via data from: van der Sluis, A., M. T. Elferink-Gemser, M. S. Brink and C. Visscher (2015). "Importance of Peak Height Velocity Timing in Terms of Injuries in Talented Soccer Players." *Int J Sports Med* 36(4): 327-332.



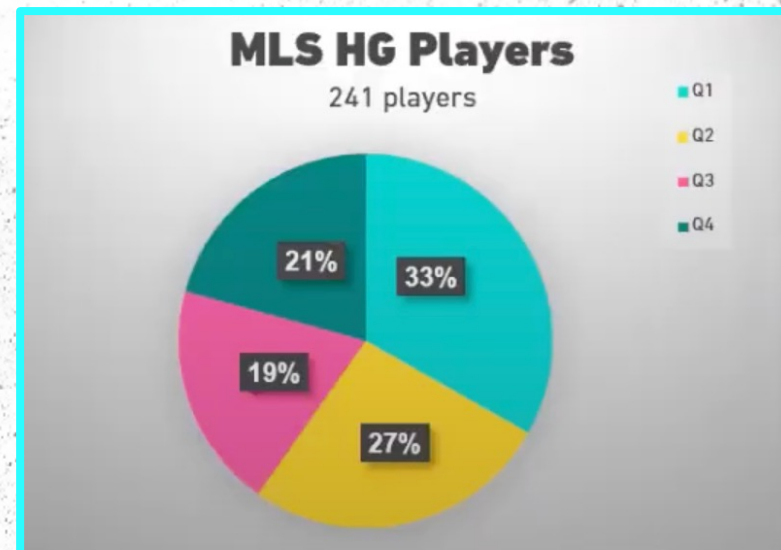
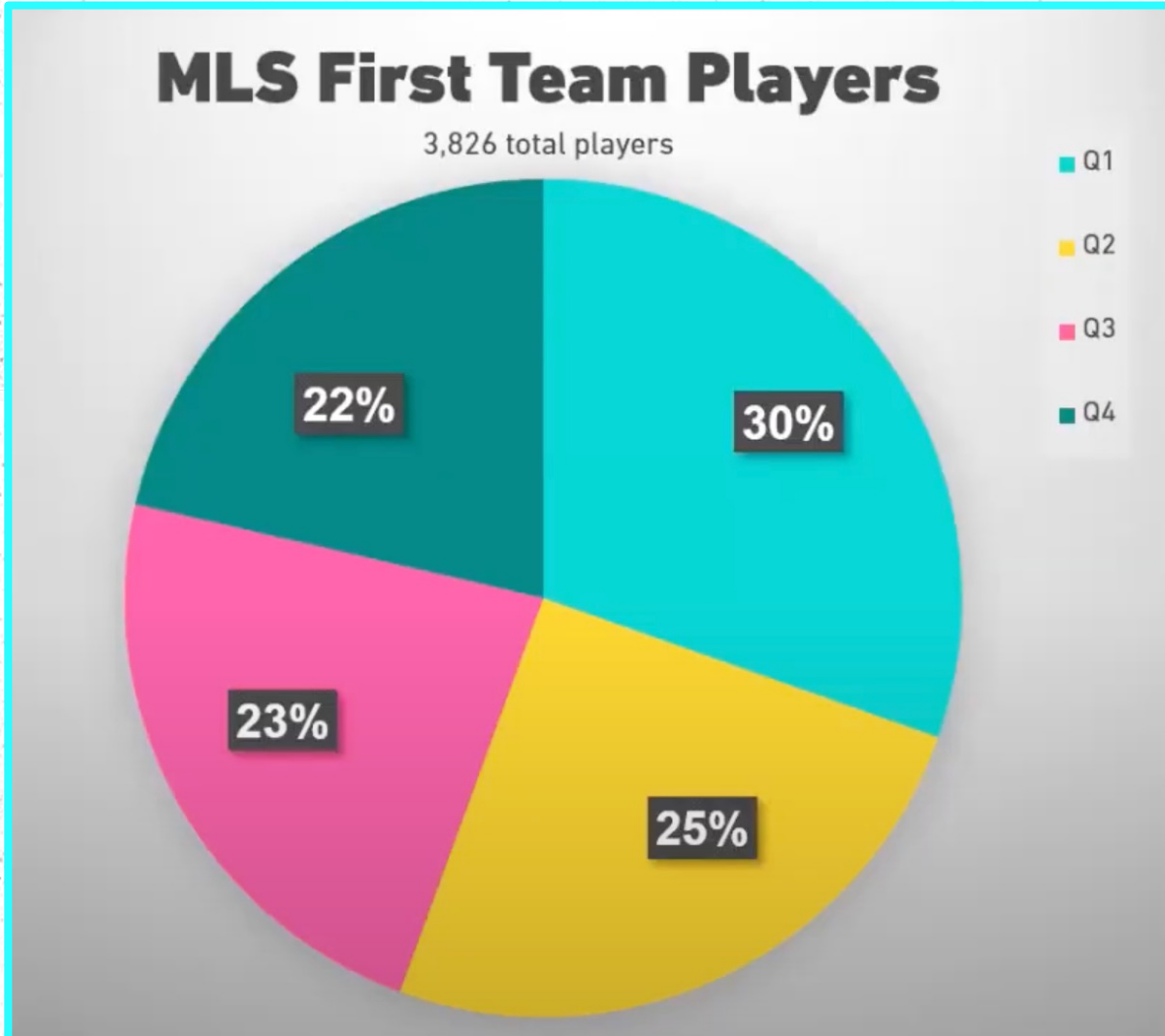
# RAE – JANUARY vs DECEMBER BIRTHDATES



# RAE (MLS NEXT PLAYERS: 2020 – 2021)



# RAE (MLS PLAYERS: 2015 – 2020)



# PHV AT AJAX

Ajax utilizes bio-banding in four preformation age categories (U13 to U16). Players are grouped for training based on their PHV index once a week.

## GROWTH GROUPS — BIOLOGICAL AGE

- > Group 1 < - 0.5 y before PHV
- > Group 2 - 0.5 y – 0.5 y
- > Group 3 0.5 y – 1.5 y after PHV
- > Group 4 > 1.5 y after PHV

Similar development phase  
Efficient training  
Physical equality  
Different behaviour



## WHEN TO START TRAINING ENDURANCE CAPACITY

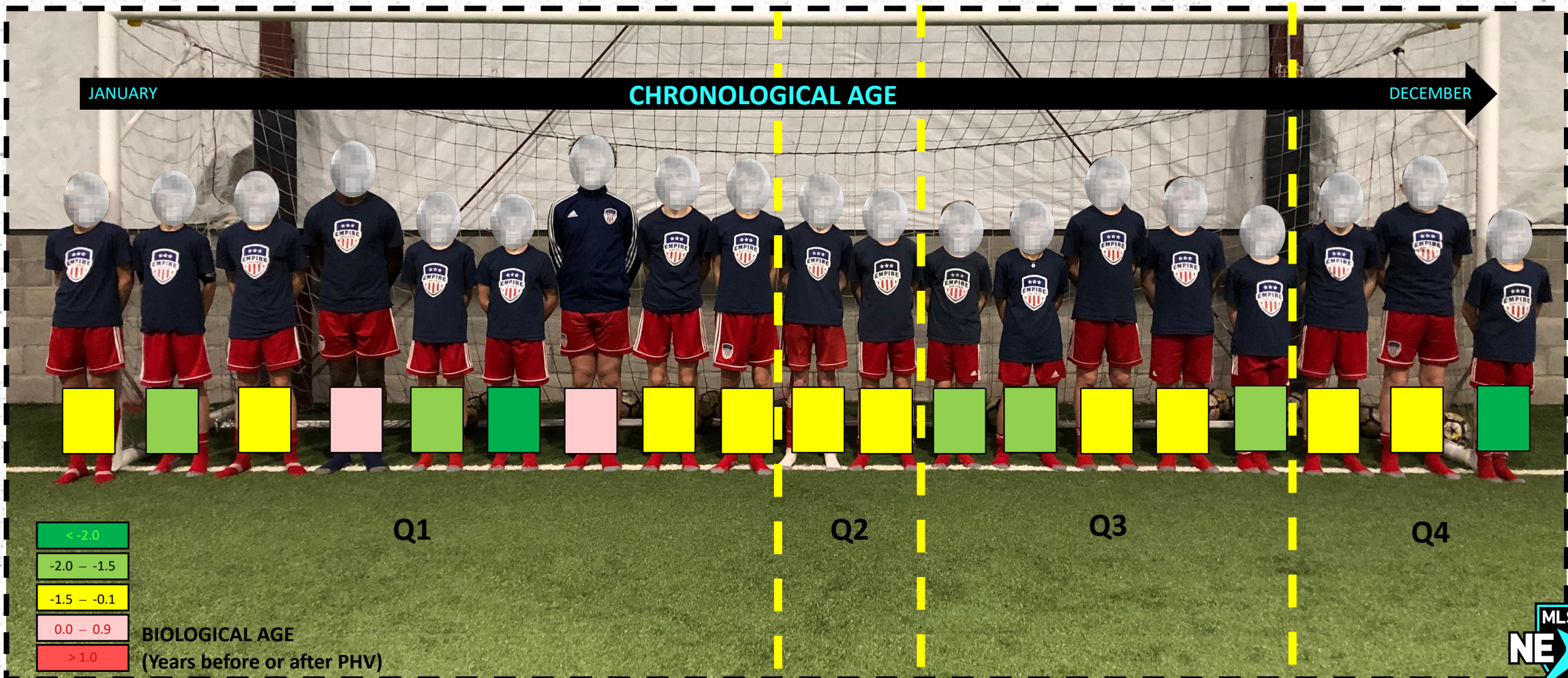
- Motor-/cognitive/technical skills
- Testosterone
- Training overload
- Overuse injuries - load capacity (highest 1<sup>st</sup> year after PHV)
- Adaptation

## SUMMARY

- Staff must try to be aware in what phase the player is in
- Effectively use every maturation phase to speed up the development in a responsible way
- Monitor youth development, avoid judging skills based on unpredictable parameters
- Have a clear end goal in terms of match load and physical parameters

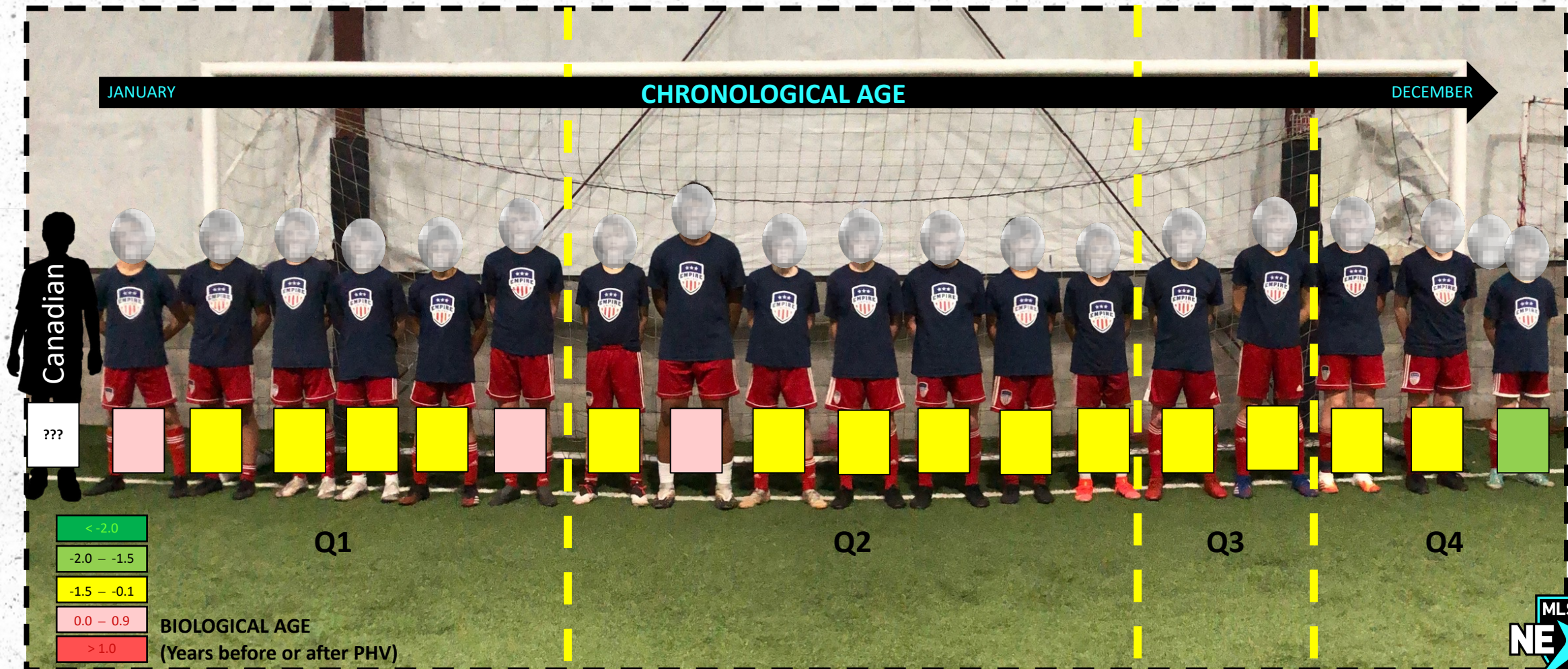
# RNY FC ACADEMY U13

## BIRTH QUARTERS, CHRONOLOGICAL AGE, and PHV



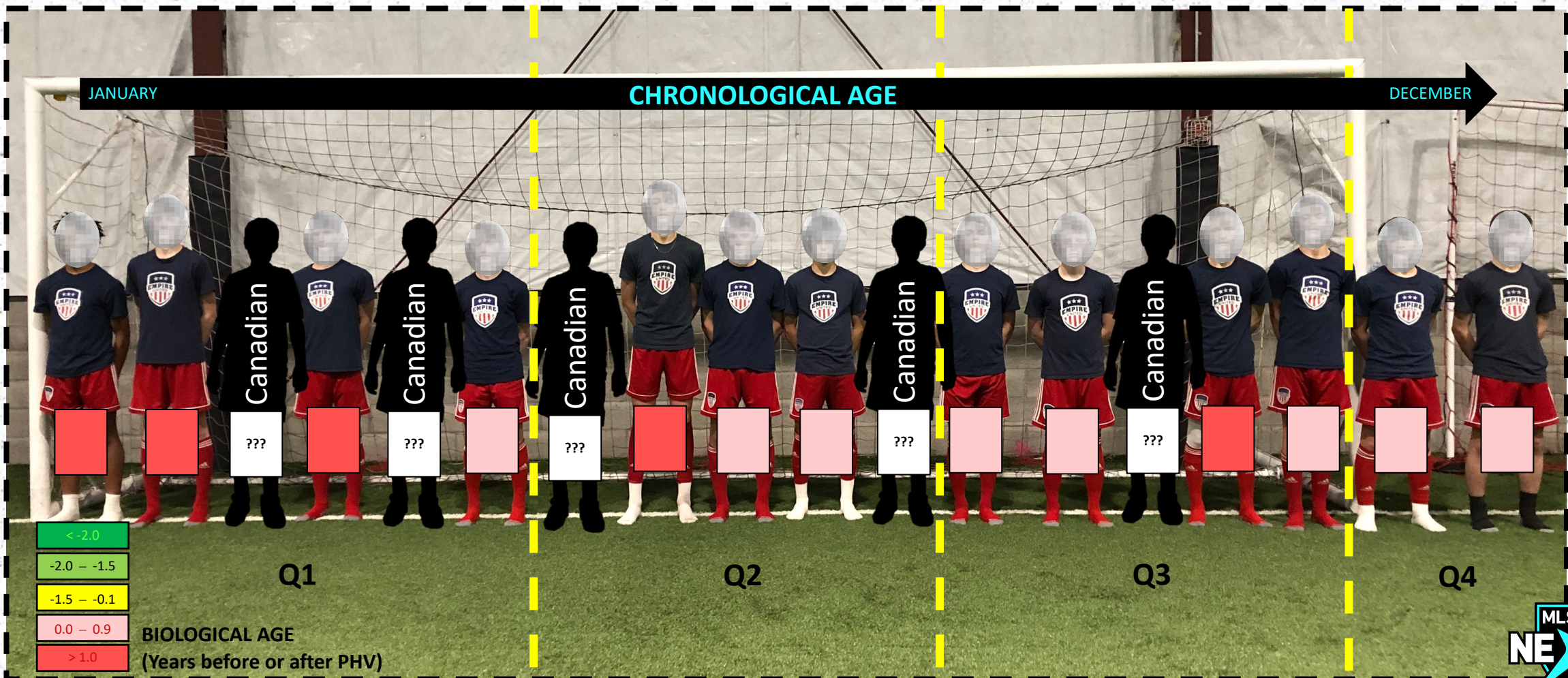
# RNY FC ACADEMY U14

## BIRTH QUARTERS, CHRONOLOGICAL AGE, and PHV



# RNY FC ACADEMY U15

## BIRTH QUARTERS, CHRONOLOGICAL AGE, and PHV



# RNY FC ACADEMY U16

## BIRTH QUARTERS, CHRONOLOGICAL AGE, and PHV





# BIOLOGICAL AGE TRAINING GROUPS

>1.5 y after PHV

u16 Player
u16 Player
u16 Player
u16 Player
u16 Player
u16 Player
u16 Player
u16 Player
u16 Player
u16 Player
u16 Player
u15 Player
u15 Player
u15 Player

0.5 y – 1.5 y after PHV

u16 Player
u16 Player
u16 Player
u16 Player
u16 Player
u16 Player
u15 Player
u15 Player
u15 Player
u15 Player
u15 Player
u15 Player
u15 Player
u15 Player
u15 Player
u15 Player
u14 Player
u13 Player

-0.7 y – 0.5 y

u14 Player
u14 Player
u14 Player
u14 Player
u14 Player
u14 Player
u14 Player
u14 Player
u14 Player
u14 Player
u14 Player
u14 Player
u13 Player
u13 Player
u13 Player
u13 Player

< -0.7 y before PHV

u14 Player
u14 Player
u14 Player
u14 Player
u14 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player
u13 Player

2008
2007
2006
2005

