DCU

CSPPA STUDY
follow-up

Sports participation in youth as a predictor of physical activity: A 5-year longitudinal study.

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Background

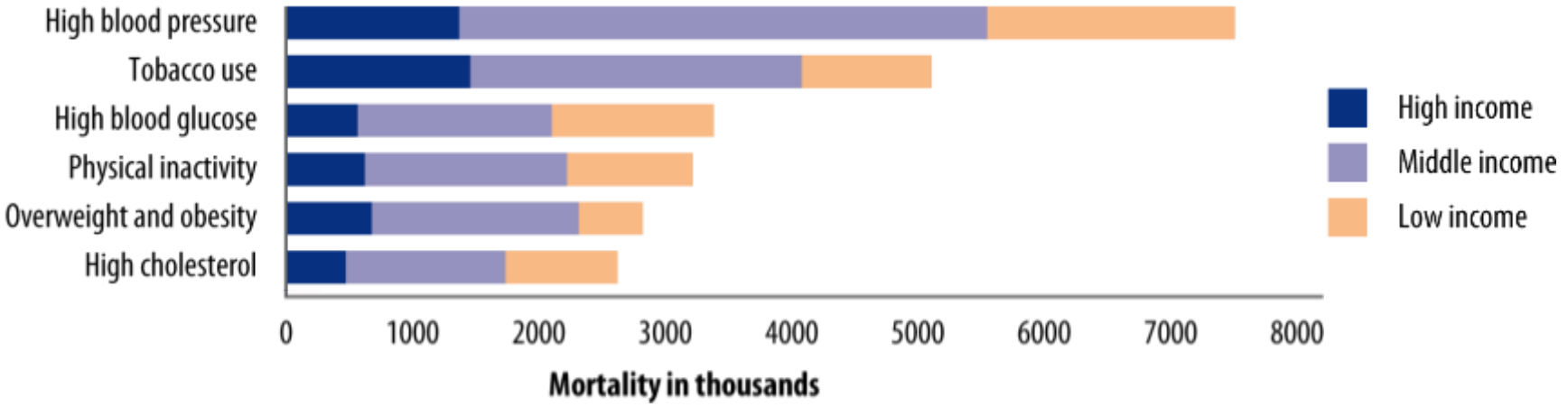


Figure 1. Deaths attributed to the six leading risk factors, by country income level, in 2004.

Guidelines for children and young people (aged 2 –18) (2)

All children and young people should be active, at a moderate to vigorous level, for at least 60 minutes every day.

Get Ireland Active
Promoting Physical Activity in Ireland

(Figure 1) Adapted from WHO, 2009
(2) DoHC & HSE, 2009

- A clear decline in physical activity (PA) with increasing age in adolescence.
- PA reductions are consistently larger in females than males (3).
- Monitoring and surveillance of population prevalence are of paramount importance (4) and vital for the progression of PA and public health (5).
- Adolescence is a critical time for PA participation where habits developed may persist into adulthood (6, 7).
- Public health objectives of promoting PA in youth are based on the assumption that PA is habitual and can become habitual, resultantly tracking into adulthood.

(3) Craggs et al., 2011, (4) Hallal et al., 2012, (5) Kohl et al., 2012
(6) Telema et al., 2006, (7) Hallal et al., 2006

Best Investments for PA:
Sports systems and programs that promote 'sport for all' and encourage participation across the life span (8).

- In adolescence, sports participation (SP) is positively correlated with overall PA levels.
- SP in childhood and adolescence has been found to be a significant predictor of participation in young adulthood (9).
- Current evidence on the contribution of variety and frequency of SP in youth to predicting future PA is unclear (10).
- There is a dearth of research investigating the potential role of the highest standard achieved (e.g. elite level) in sports, in predicting PA in later years.
- As SP tends to decline in adolescent years, longitudinal research is needed to understand the impact of sport over time.

(8) GAPA & ISPAH, 2011, (9) Perkins et al., 2004
(10) Dumith et al., 2011

The purpose of this study is;

(1) To assess tracking of PA in three cohorts of Irish youth;

(2) To assess secular PA trends;

(3) To examine predictors (sports participation at baseline) of PA (follow-up).

Methods

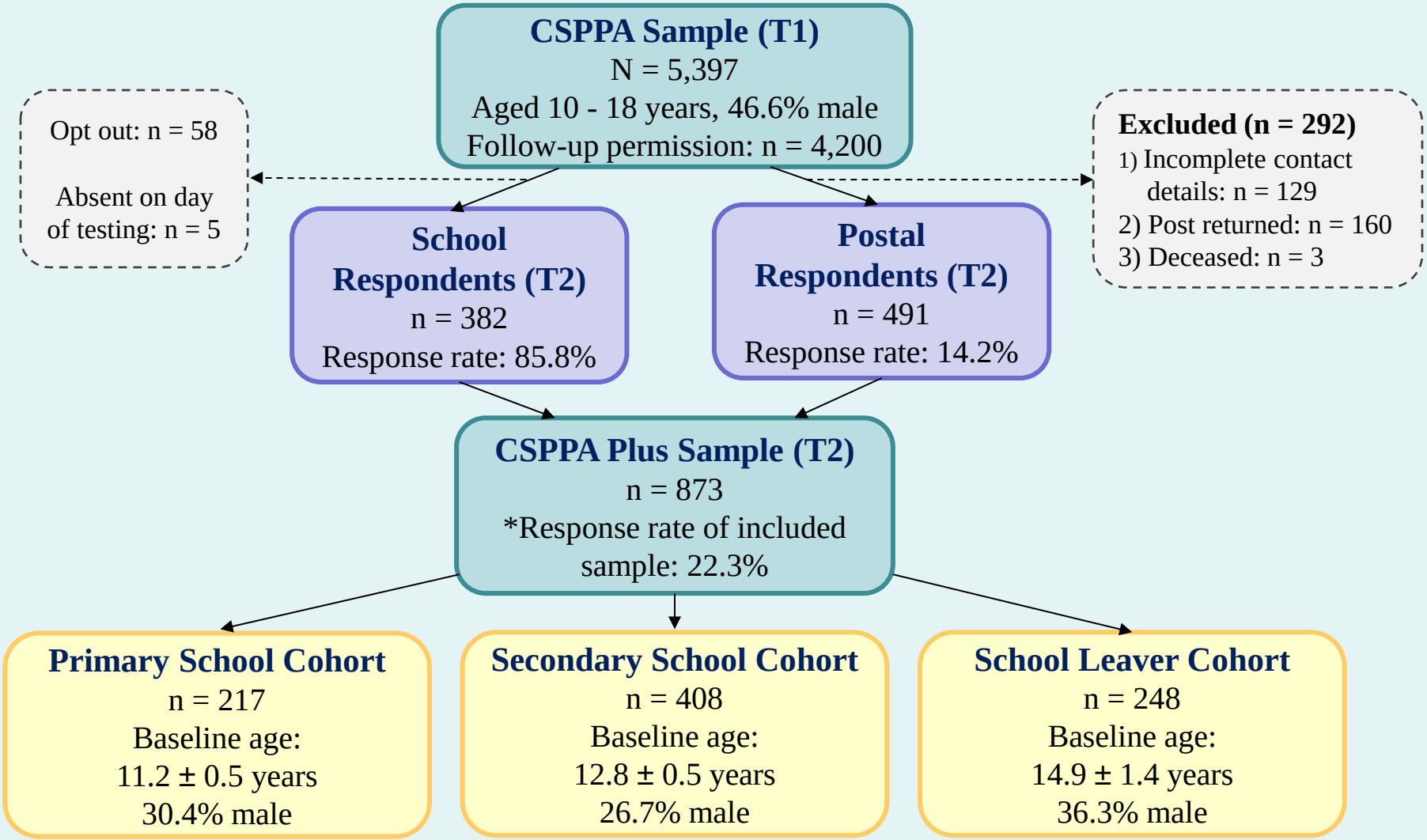


Figure 1 Flow chart of CSPPA Study participants

Measures

PACE+ questionnaire

Physical activity is any body movement.

It can be done at different levels of effort:

- **Vigorous Effort** makes your heart rate much faster and you have to breathe deeper and faster than normal. You will probably sweat.
  E.g. playing football, squash, heavy lifting, digging or fast bicycling.

- **Moderate Effort** makes your heart rate and breathing rate faster than normal. You may also sweat a little. E.g. brisk walking, jogging or vacuuming.

- Physical activity includes:
  Exercise Weight training, aerobics, jogging, dancing, etc.
  Sports Hurling, football, athletics, swimming, etc.
  General Brisk walking, washing the car, walking or cycling to school, etc.

Please try to think carefully and be as accurate as possible with your answers. For these next two questions, add up all the time you spend in physical activity each day.
Only include activities of either moderate or vigorous effort.

Q1 **During the last 7 days, on how many days were you physically active for a total of at least 60 minutes per day?** Please circle one number.

0days 1 2 3 4 5 6 7 days

Q2 **Over a typical or usual week, on how many days are you physically active for a total of at least 60 minutes per day?** Please circle one number.

0days 1 2 3 4 5 6 7 days

(11) Prochaska, Sallis & Long, 2001, (12) Bobakova et al., 2015,
Hardie Murphy et al, Under review BMC Public Health

Sports participation

- Frequency: 7 response options, recoded to 4 categories.
- Number of sports: modified SAPAC (21 items) (13)
- Sports type: individual, team-based, combination.
- *Standard achieved: basic, competitive, elite.

(13) Sallis et al., 1996

Statistical Analysis

Secular trends

› Mann-Whitney U

Tracking analyses

› Spearman rho correlations

Examination of predictors of PA

› ANCOVA analyses: adjusting for (a) age and sex, (b) age, sex and baseline PA, (c) in the number of sports analysis, sport type was also adjusted for.

› Fisher LSD for post hoc comparisons.

› Cohen's *d* for effect size.

Results

Sample

Longitudinal sample N = 873 (30.4% male).

- Social class:
  - High (44.6%)
  - Medium (36.8%)
  - Low (12.5%)
  - Unknown (6.1%)
- The secular trend for days meeting MVPA guidelines in 15 - 18 year olds between T1 and T2 was not significant.

Table 1 Physical activity levels and tracking split by cohort groups.

	T1 mean days (± *SD*)	T2 mean days (± *SD*)	PA tracking (*ρ*)	T1 meeting PAGL (%)	T2 meeting PAGL (%)
Total sample					
Total (n= 873)	4.4 ± 1.7	3.5 ± 1.8 [a]	.28 [††]	9.3	5.3 [bb]
Male (n = 265)	4.8 ± 1.6	4.2 ± 1.8 [a]	.26 [††]	13.3	7.6 [b]
Female (n = 608)	4.3 ± 1.6	3.2 ± 1.7 [a]	.26 [††]	7.5	4.3 [b]
Primary school					
Male (n = 66)	4.8 ± 1.8	4.5 ± 1.8	.23	15.2	10.6
Female (n = 151)	4.5 ± 1.6	3.7 ± 1.7 [a]	.16 [†]	10.6	7.3
Secondary school					
Male (n = 109)	5.0 ± 1.6	4.1 ± 1.5 [a]	.47 [††]	17.4	5.6 [bb]
Female (n = 299)	4.4 ± 1.6	2.9 ± 1.6 [a]	.26 [††]	7.2	3.1 [b]
School leaver					
Male (n = 90)	4.5 ± 1.5	4.0 ± 2.0	.30	6.8	7.8
Female (n = 158)	3.8 ± 1.7	3.3 ± 1.7 [a]	.36 [††]	5.1	3.8

T1 = time point 1 (2009); T2 = time point 2 (2014); PAGL = physical activity guidelines

[a] Time difference (T1 and T2) based on Wilcoxin sign rank test: $P < .01$

[b] Time difference (T1 and T2) based on McNemar chi-square: $P < .05$; [bb] $P < .01$

[†] Significance level of Spearman rho correlation $P < .05$; [††] $P < .01$

Table 2 Descriptive statistics of factors related to sports participation.

	T1			T2		
	Male	Female		Male	Female	
Sports participation frequency (%)			**			**
4+ days a week	38.1	23.4		27.0	10.6	
2-3 days a week	30.6	35.9		25.9	23.3	
1 day a week	10.6	15.5		6.5	8.8	
Less than once a week	20.8	25.2		40.7	57.3	
Number of sports (mean ± *SD*)	2.1 ± 1.8	2.0 ± 1.8		2.0 ± 1.8	1.9 ± 1.9	
Sport type (%)			**			**
Combination	11.7	18.0		8.1	4.4	
Team	54.3	29.4		39.9	17.7	
Individual	13.6	30.6		15.5	22.4	
None	20.4	22.0		36.4	55.4	
Standard achieved (%)[a]			**			**
Elite	27.6	22.4		34.9	29.7	
Competitive	60.9	53.5		55.6	46.5	
Basic	11.5	24.1		9.5	23.8	

** Sex difference based on chi-square test, $P < .01$

[a] Only includes those who participated in club sport at T1 (n = 496; male = 156; female = 340).

Table 3 Associations between PA at follow-up and baseline sports participation factors.

	df	*F*	*P*	η_p^2 [a]	Effect size [b]
ANCOVA analyses adjusting for age and sex					
Sports participation frequency	861	20.635	< .001	0.07	.61
Number of sports	855	1.857	0.09	0.01	.32
Sport type [c]	854	2.484	0.06	0.01	.30
Standard achieved	490	14.756	< .001	0.06	.75
ANCOVA analyses adjusting for age, sex and baseline PA					
Sports participation frequency	849	25.835	< .001	0.03	.40
Number of sports	844	0.781	0.59	0.01	.05
Sport type [d]	843	1.477	0.22	0.01	.17
Standard achieved	482	9.063	< .001	0.04	.60

Note: ANCOVA analyses using LSD post hoc analysis adjusting for age and sex.

[a] η_p^2 = partial eta squared

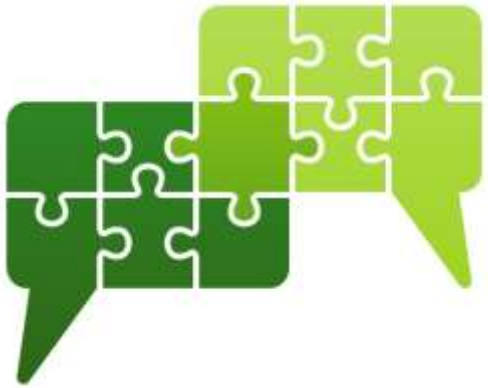
[b] Cohen's d effect size

[c] Adjusted for number of sports, age and sex.

[d] Adjusted for number of sports, age and sex and baseline PA.

Discussion

Longitudinal physical activity



- PA levels reduced from baseline to follow-up.
- Males were more active than females.
- Tracking coefficients (ρ) ranged from .16 to .47 and are comparable to those found in systematic reviews.
  E.g. in a review of European studies, ρ ranged from -.01 to .47 (14).
- In studies with a follow-up of five years or less, moderate tracking was detected (15).

(14) Craigie et al., 2011
(15) Evans et al., 2009

Sports participation predictors of physical activity

- Moderate tracking levels for SP found in both sexes in this study support the concept of SP tracking from childhood and adolescence into adulthood.
- The medium effect size of SP frequency on later PA found here illustrates the importance of promoting regular participation.
- Of concern are the declining levels of SP between T1 and T2 as potential long-term health benefits of SP are most likely attributable to SP maintenance (16).
- Participation at elite or competitive levels at baseline were associated with greater PA at T2 and merits the promotion of competitive sport.
- Gender inequity in sport.

(16) Basterfield et al., 2015

Limitations

- Tracking is represented by Spearman correlations.
- The proportion of females is significantly greater than males.
- PA is a complex behaviour, and future studies should include other PA domains as predictors of later PA.

Conclusion

- PA should be promoted in youth as tracking coefficients suggest it can continue into later life.
- Club sport plays a valuable role in sustaining PA involvement. Individuals who frequently participate in club sports, and who are involved at an elite standard, are more active five years later than those who are not.
- A gender inequality, which is highlighted by the higher proportions of males participating at elite and competitive levels than females, needs to be addressed.
- Sports club participation should be included in wider strategies that promote lifelong PA.

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References

1. World Health Organization: **Global health risks: mortality and burden of disease attributable to selected major risks.** Geneva, Switzerland: World Health Organization; 2009.
2. Department of Health and Children and Health Service Executive: **The National Guidelines on Physical Activity for Ireland.** Ireland: DoHC and HSE; 2009.
3. Craggs C, Corder K, van Sluijs EM, Griffin SJ. **Determinants of change in physical activity in children and adolescents: a systematic review.** *Am J Prev Med.* 2011;**40**(6):645-658.
4. Hallal PC, Andersen LB, Bull FC, Guthold R, Haskell W, Ekelund U: **Global physical activity levels: surveillance progress, pitfalls, and prospects**. *Lancet* 2012, **380**(9838):247-257.
5. Kohl HW, 3rd, Craig CL, Lambert EV, Inoue S, Alkandari JR, Leetongin G, et al: **The pandemic of physical inactivity: global action for public health**. *Lancet* 2012, **380**(9838):294-305.
6. Telema R, Yang XL, Hirvensalo M, Raitakari O. **Participation in organized youth sport as a predictor of adult physical activity: A 21-year longitudinal study.** *Pediatr Exerc Sci.* 2006;**18**:76-88.
7. Hallal PC, Victora CG, Azevedo MR, Wells JC. **Adolescent physical activity and health: a systematic review.** *Sports Med.* 2006;**36**:1019-1030.

References Continued

8. Global Advocacy for Physical Activity (GAPA) the Advocacy Council of the International Society for Physical Activity and Health (ISPAH). **NCD prevention: investments that work for physical activity**. *Br J Sports Med.* 2012;**46**(10):709-712.
9. Perkins DF, Jacobs JE, Barber BL, Eccles JS. **Childhood and adolescent sports participation as predictors of participation in sports and physical fitness activities during young adulthood.** *Youth & Society.* 2004;**35**(4):495-520.
10. Dumith SC, Gigante DP, Domingues MR, Kohl HW, 3rd: **Physical activity change during adolescence: a systematic review and a pooled analysis**. *Int J Epidemiol* 2011, **40**(3):685-698.
11. Prochaska JJ, Sallis JF, Long B: **A physical activity screening measure for use with adolescents in primary care**. *Arch Pediatr Adolesc Med* 2001, **155**(5):554-559.
12. Bobakova D, Hamrik Z, Badura P, Sigmundova D, Nalecz H, Kalman M: **Test-retest reliability of selected physical activity and sedentary behaviour HBSC items in the Czech Republic, Slovakia and Poland**. *Int J Public Health* 2015, **60**(1):59-67.
13. Sallis JF, Strikmiller PK, Harsha DW, Feldman HA, Ehlinger S, Stone EJ, Williston J, Woods S. **Validation of interviewer- and self-administered physical activity checklists for fifth grade students.** *Med Sci Sports Exerc.* 1996;**28**(7):840-851.
14. Craigie AM, Lake AA, Kelly SA, Adamson AJ, Mathers JC. **Tracking of obesity-related behaviours from childhood to adulthood: A systematic review.** *Maturitas.* 2011;**70**:266-284.
15. Evans JMM, Shelia CM, Kirk A, Crombie IK. **Tracking of physical activity behaviours during childhood, adolescence and young adulthood: A systematic review.** *J Epidemiol Community Health.* 2009;**63**(Suppl II):A1-A36.
16. Basterfield L, Reilly JK, Pearce MS, Parkinson KN, Adamson AJ, Reilly JJ, Vella SA. **Longitudinal associations between sports participation, body composition and physical activity from childhood to adolescence**. *J Sci Med Sport.* 2015;**18**(2):178-182.

Questions

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