Characteristics and long-term outcomes of adolescents living with perinatally acquired HIV in the IeDEA-Southern Africa Collaboration: 2004 - 2017

Priscilla Tsondai, Kate Braithewaite, Geoffrey Fatti, Carolyn Bolton, Cleophas Chimbetete, Helena Rabie, Sam Phiri, Shobna Sawry, Brian Eley, Michael A. Hobbins, Andrew Boulle, Katayoun Taghavi, Annette H. Sohn, Mary-Ann Davies

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Disclosures

Authors have no conflicts to declare

Background

- ~1.8m adolescents (10-19 years) are living with HIV across the globe
- ~ 40% live in Southern Africa

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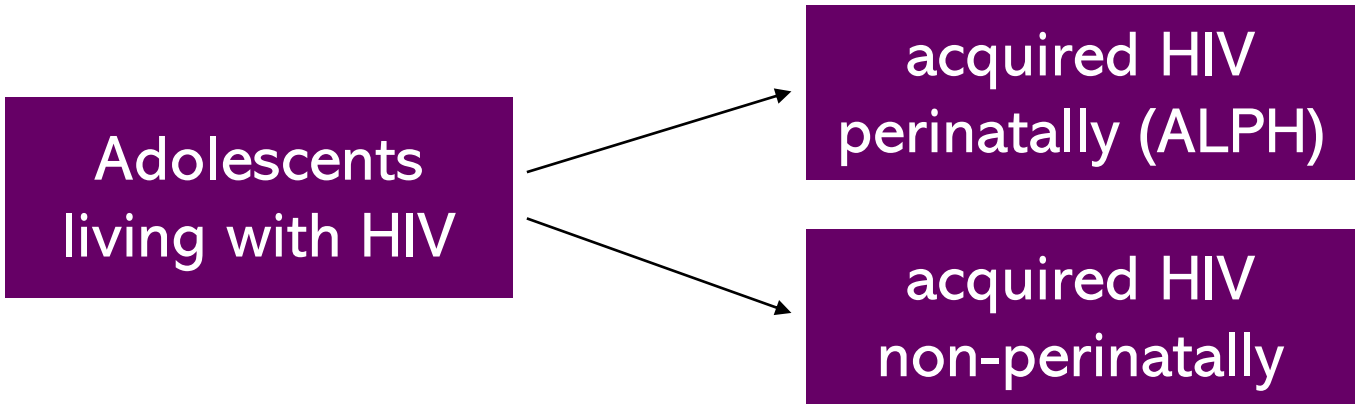

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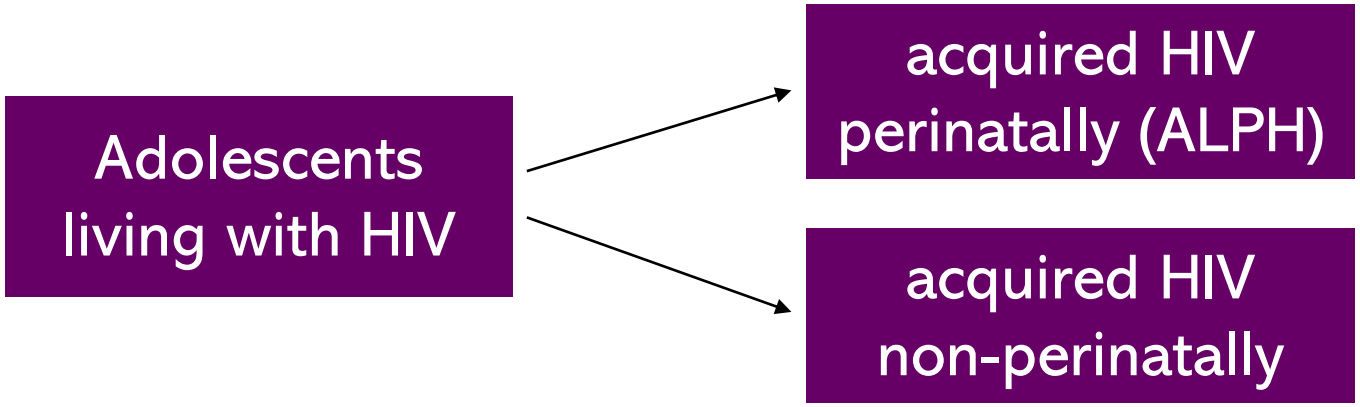

- ALPH have shown great resilience
  - exposed to HIV very early in life
  - exposed to sub-optimal ART regimens
  - limited pediatric ARV formulations
  - social circumstances

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Objective

- Describe the characteristics and long-term outcomes (mortality, transfers, lost to follow-up (LTFU), viral suppression, and anthropometric measures [weight, height and BMI]) of ALPH in care within IeDEA-SA
- Determine predictors of mortality following their 13th birthday

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Eligibility

- Patients in care within the IeDEA-SA sites (2004-2017)
- Likely perinatally infected (assumed if entered care aged ≤13 years with no documented non-perinatal HIV acquisition)
- Had ≥1 visit during adolescence (between 10–19 years of age)

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Methods

- Analysed routinely collected data from IeDEA-SA sites
- ALPH followed-up from the date of first visit to date of transfer, death, LTFU, or 22nd birthday
- LTFU - no contact in the 12 months prior to database closure
- Compared characteristics at enrolment into HIV care, at ART start, and at various ages during adolescence by age of enrolment (<10 vs. 10-13 years)
- Used the Cox Proportional Hazards regression to determine predictors of mortality after the 13th birthday

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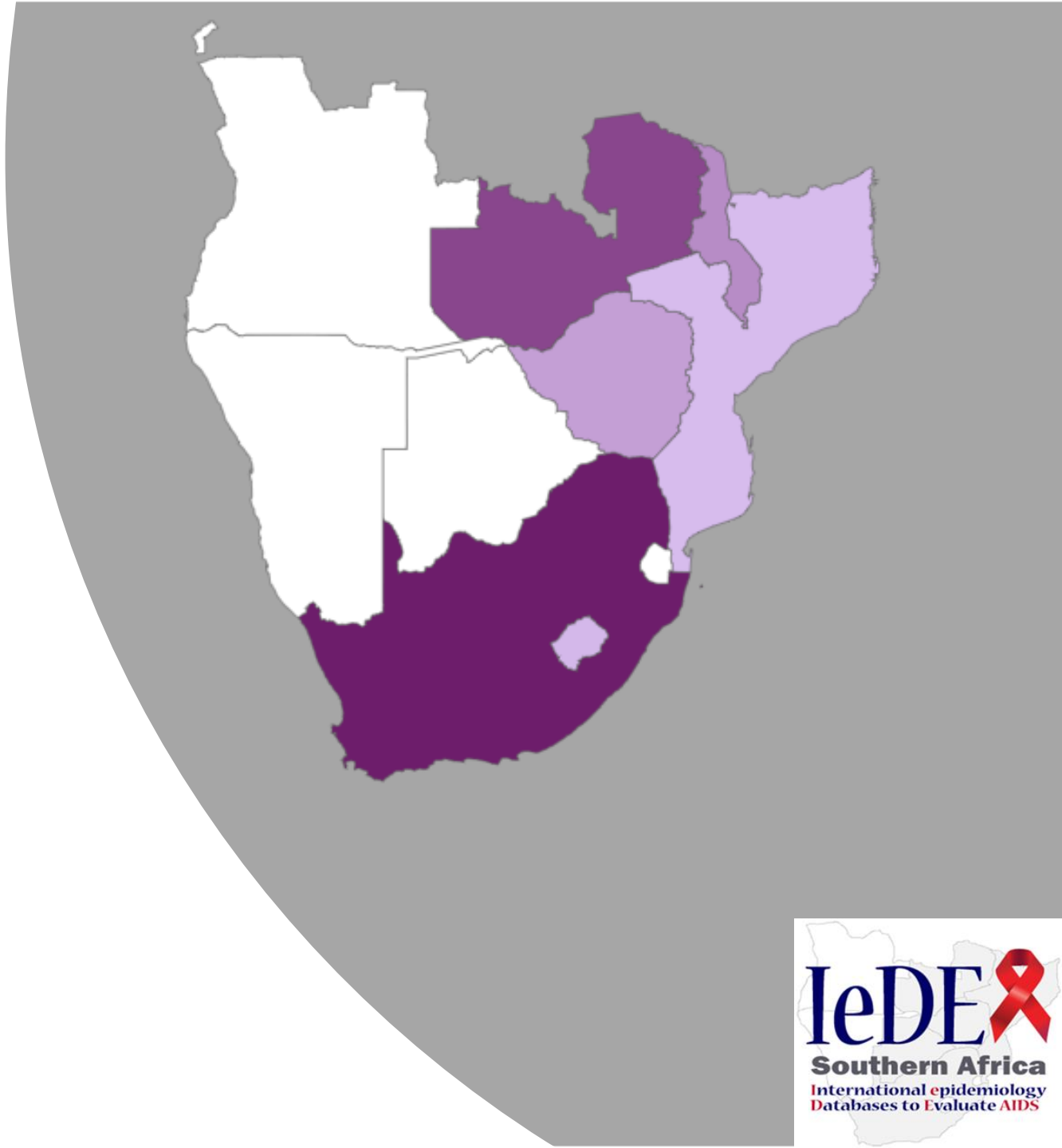
Sample

25,126 ALPH included

from 15 sites across 6 countries

- South Africa – 44%
- Zambia – 32%
- Malawi – 14%
- Zimbabwe – 8%
- Lesotho & Mozambique – 2%



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Characteristics at enrolment into HIV care

Characteristic at enrolment	Age at enrolment <10 years	Age at enrolment 10-13 years	All
Number	16 229 (65)	8897 (35)	25 126 (100)
Female, n (%)	8159 (50)	4782 (54)	12,941 (51)
Age at enrolment (years), median (IQR)	6.7 (4.4 – 8.4)	11.4 (10.6 – 12.1)	8.6 (5.8 – 10.8)
Year of enrolment, median (IQR)	2008 (2006 – 2010)	2010 (2008 – 2013)	2009 (2006 – 2011)
Severely immunosuppressed, n (%)	5778 (52)	2954 (51)	8732 (51)
CD4 percentage*, median (IQR)	16 (11 – 23)	– –	16 (11 – 23)
CD4 cell count* (cells/μL), median (IQR)	351 (175 – 606)	283 (123 – 488)	321 (148 – 553)
Weight-for-age z-score (WAZ,) median (IQR)	-1.72 (-2.68 – - 0.82)	– –	-1.72 (-2.68 – - 0.82)
Height-for-age z-score (HAZ), median (IQR)	-2.11 (-3.05 – -1.19)	-2.20 (-3.05 – -1.30)	-2.15 (-3.05 – -1.23)
BMI-for-age z-score (BAZ), median (IQR)	-0.41 (-1.34 – 0.44)	-1.07 (-2.01 – -0.27)	-0.67 (-1.62 – 0.21)

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Characteristics at ART initiation

Characteristic	Age at enrolment <10 years	Age at enrolment 10-13 years	All
Ever initiated ART, n (%)	15 883 (98)	7770 (87)	23 653 (94)
Age at ART start (years), median (IQR)	7.2 (4.8 – 8.9)	11.6 (10.8 – 12.3)	8.9 (6.1 – 10.9)
Year of ART start, median (IQR)	2008 (2006– 2011)	2010 (2008–2013)	2009 (2007–2011)
WHO clinical stage 3/4, n (%)	7119 (64)	3304 (59)	10,423 (63)
Severely immunosuppressed, n (%)	5850 (54)	2791 (56)	8641 (55)
CD4 percentage*, median (IQR)	15.0 (10.0 – 21.1)	–	15.0 (10.0 – 21.1)
CD4 cell count* (cells/μL), median (IQR)	329 (170 – 568)	251 (109 – 423)	297 (142 – 505)
HAZ, median (IQR)	-2.12 (-3.03– -1.22)	-2.24 (-3.06– -1.36)	-2.16 (-3.05– -1.27)
First line regimen			
EFV/NVP	13 512 (91)	7122 (98)	20 634 (94)

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Characteristics at entry into adolescence (age 10 years) (N=16 229)

Characteristic	Median	IQR
Duration on ART (years)	3	(1.4 – 5.3)
CD4 cell count (cells/μL)	716	(465 – 1009)

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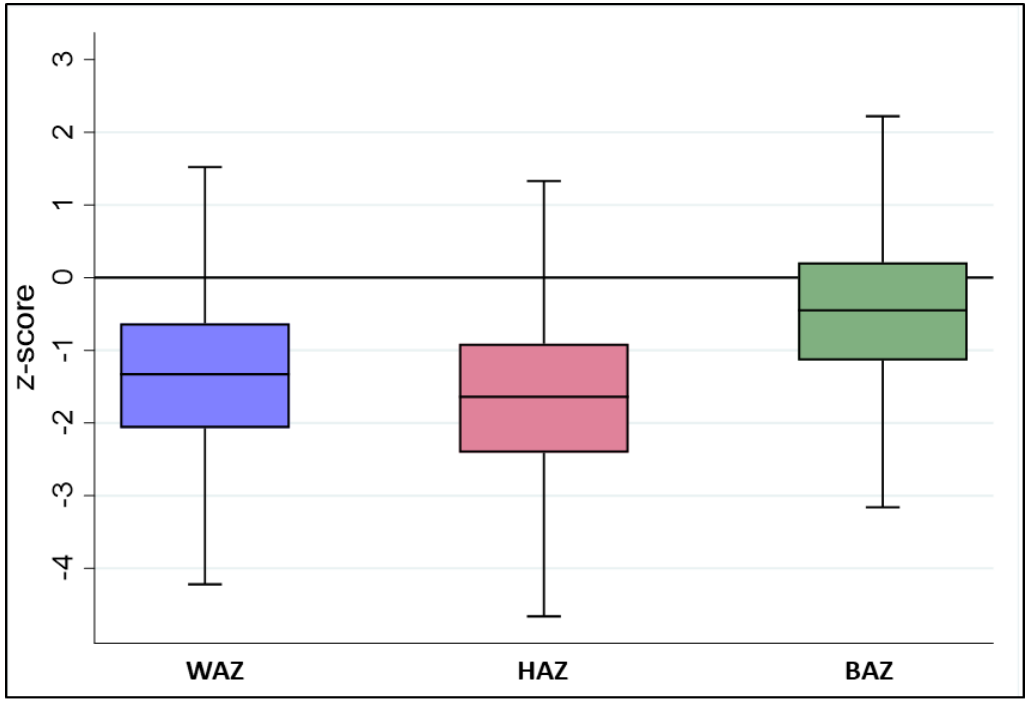
- 89% on an NNRTI-based regimen
- ~ 55% had weight and height measures
  - 38% stunted (HAZ <-2)
  - 27% underweight (WAZ <-2)



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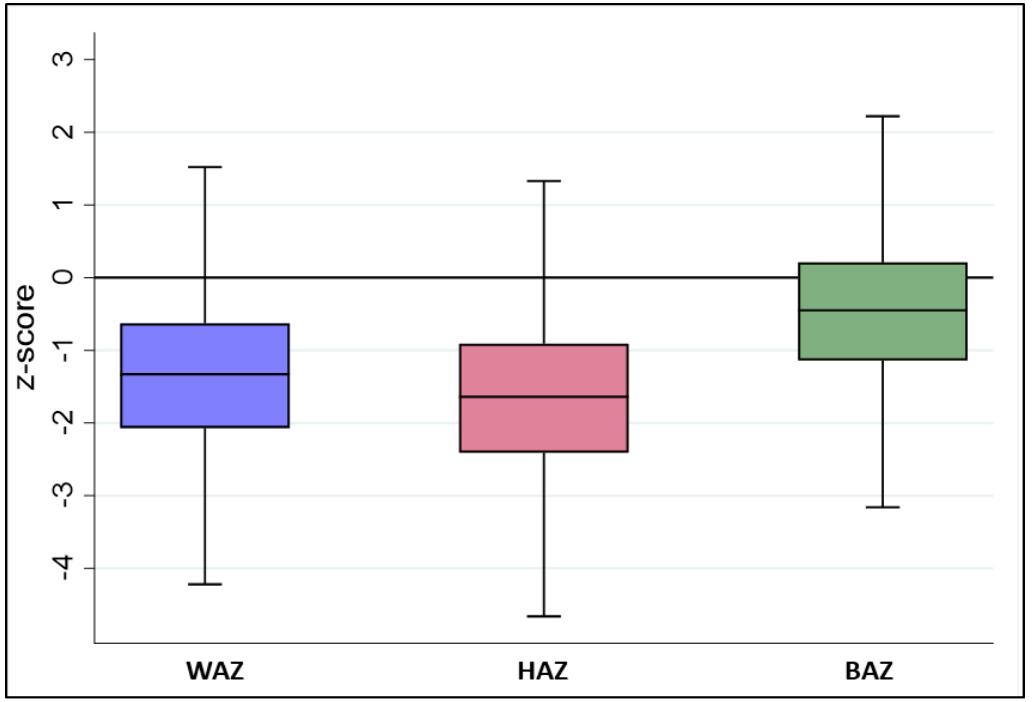

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- ~ 55% had weight and height measures
  - 38% stunted (HAZ <-2)
  - 27% underweight (WAZ <-2)
- Among those in care within sites with routine VL testing (n=7331)
  - 73% had a VL measure
  - 78% had a VL ≤400 copies/mL

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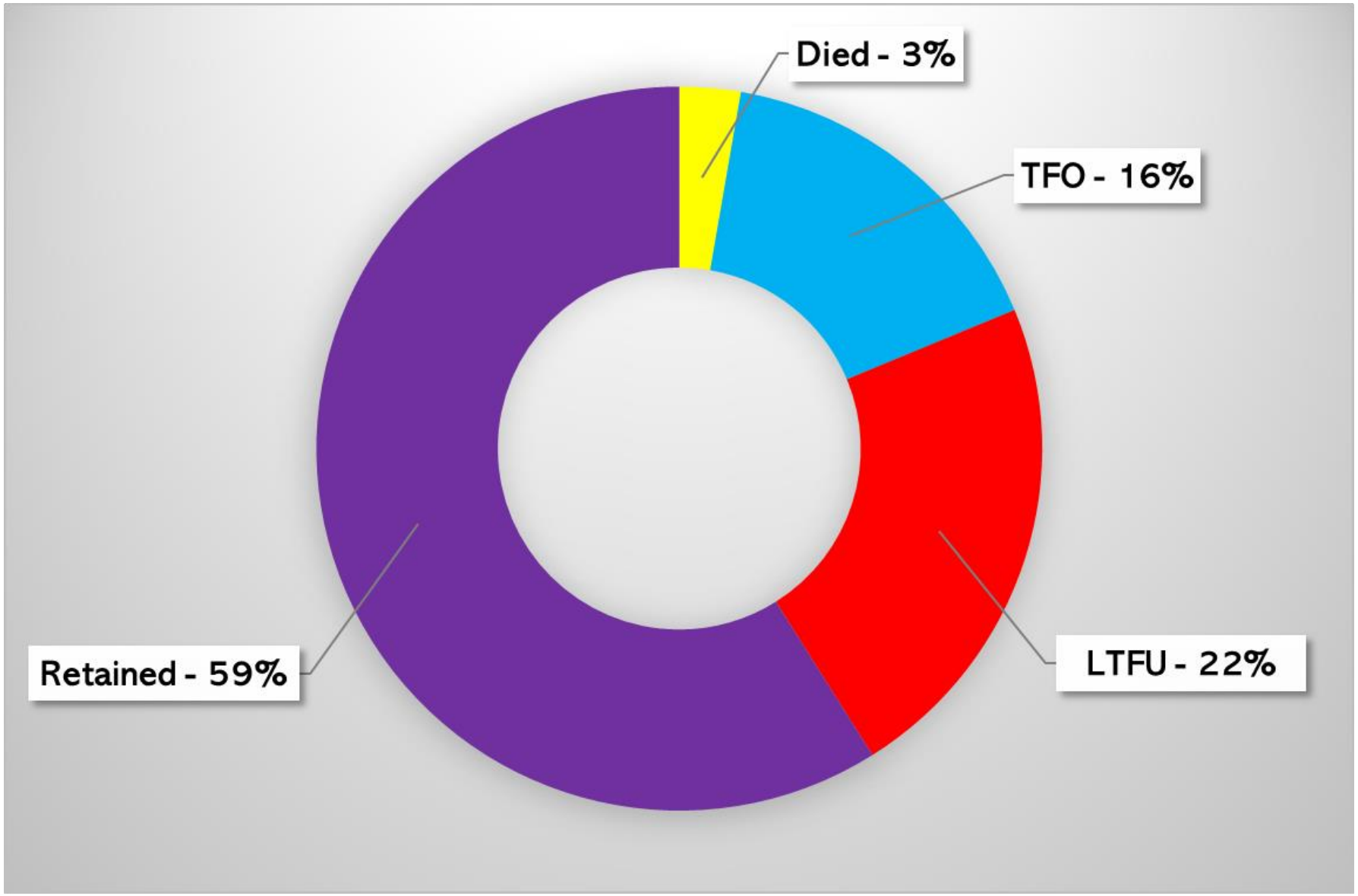
Cross-sectional outcomes at database closure



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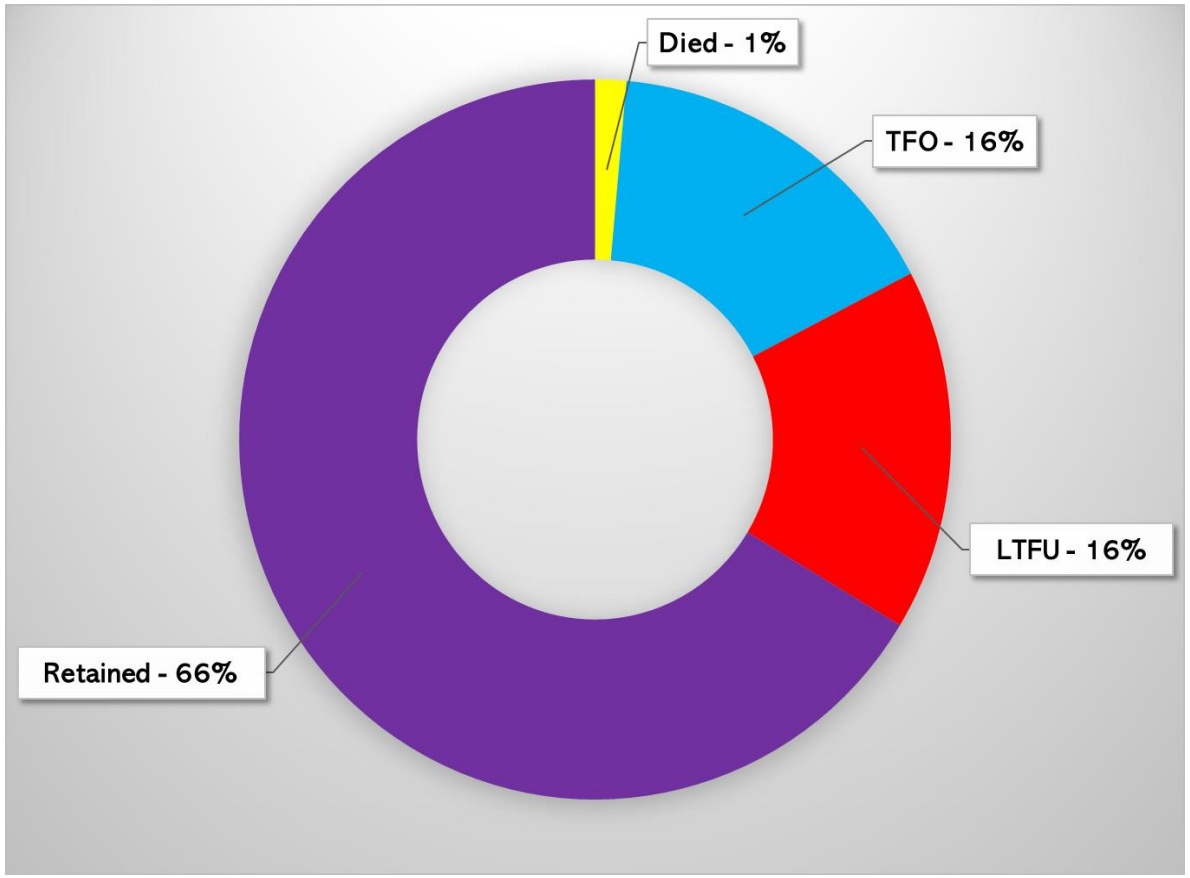
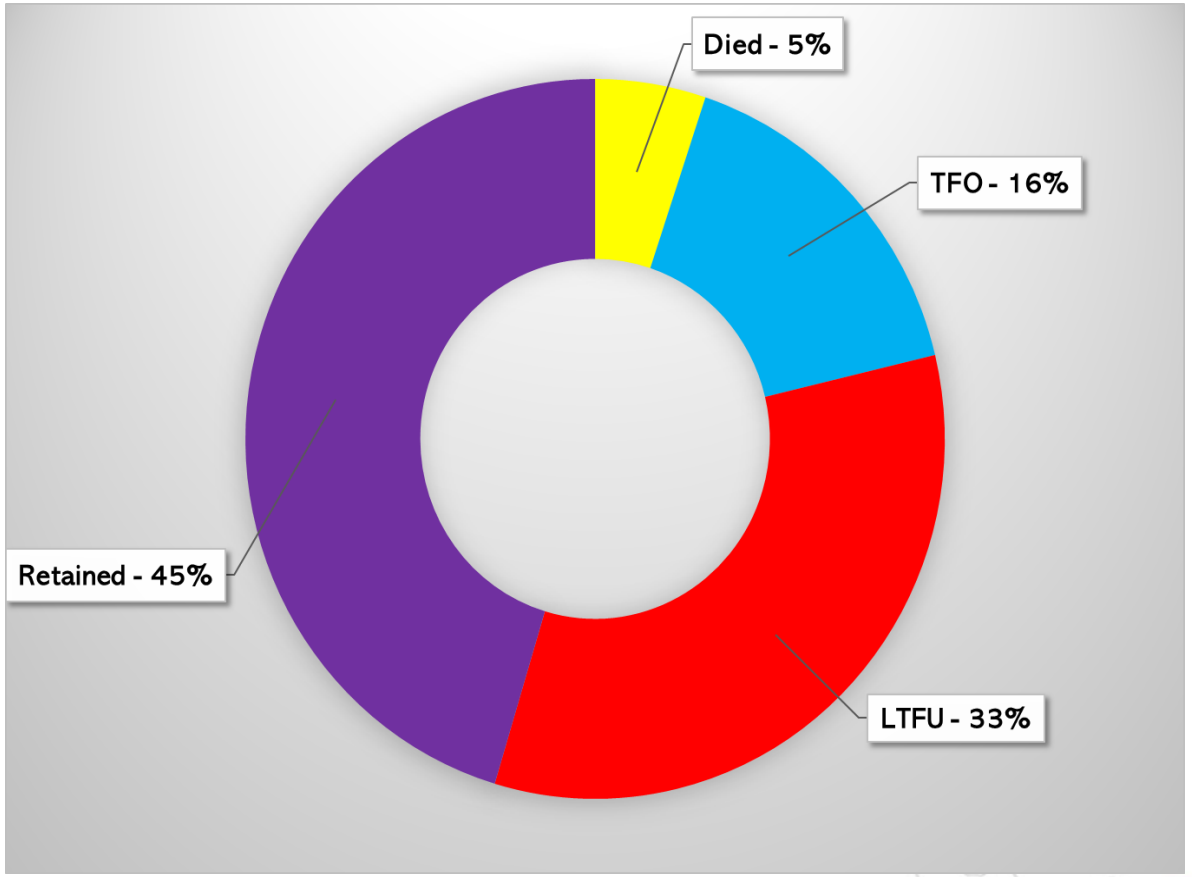


Enrolled aged 10-13 years



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ALPH age distribution wave

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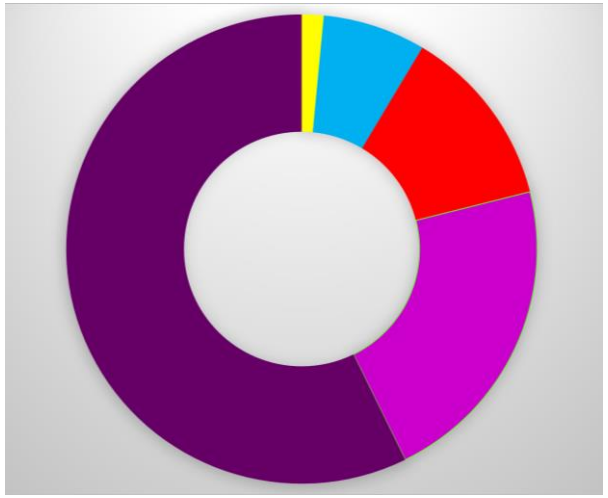
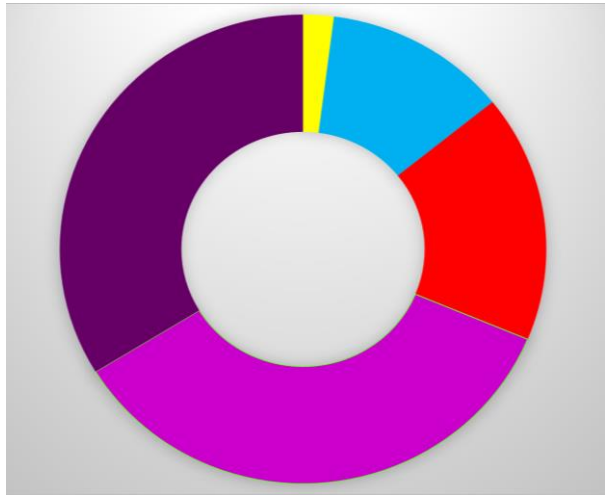
Outcome	At 13 years	At 15 years	At 18 years
Died	1.5%	2%	3%
TFO	7%	12%	15%
LTFU	12%	17%	21%
In care & < 13, 15 or 18 years	22%	35%	49%
Retained	57%	34%	13%

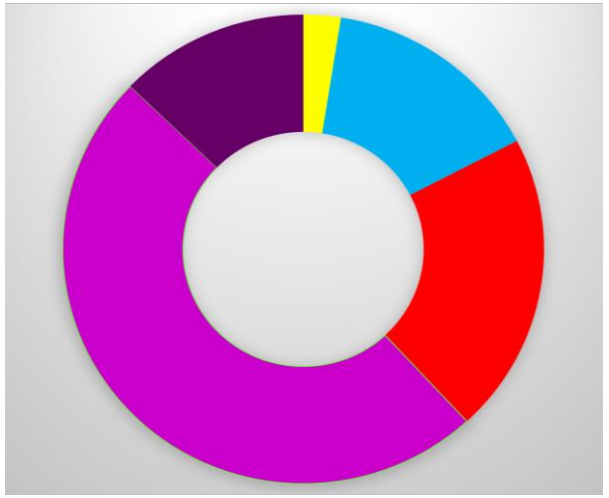
At 13 years



At 15 years



At 18 years



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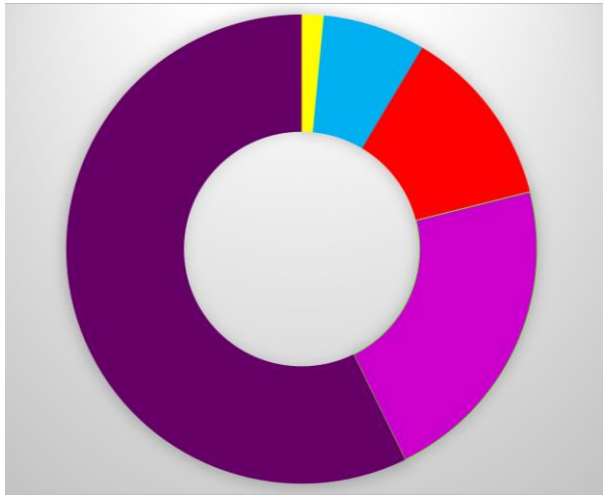
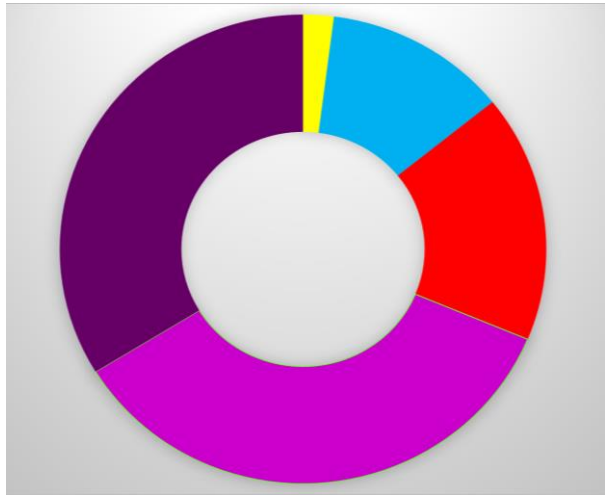
Retained	57%	34%	13%

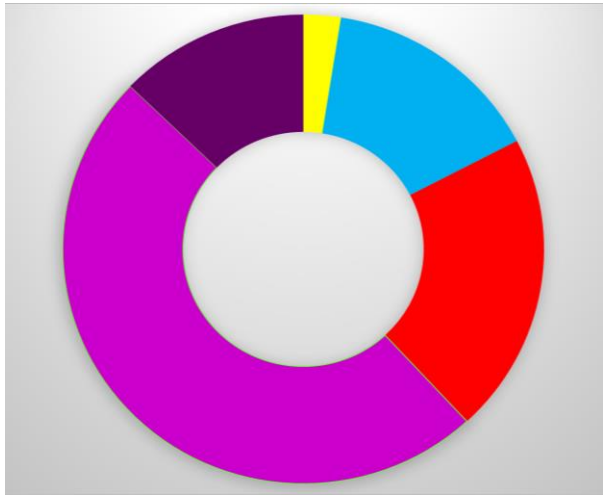
At 13 years



At 15 years



At 18 years



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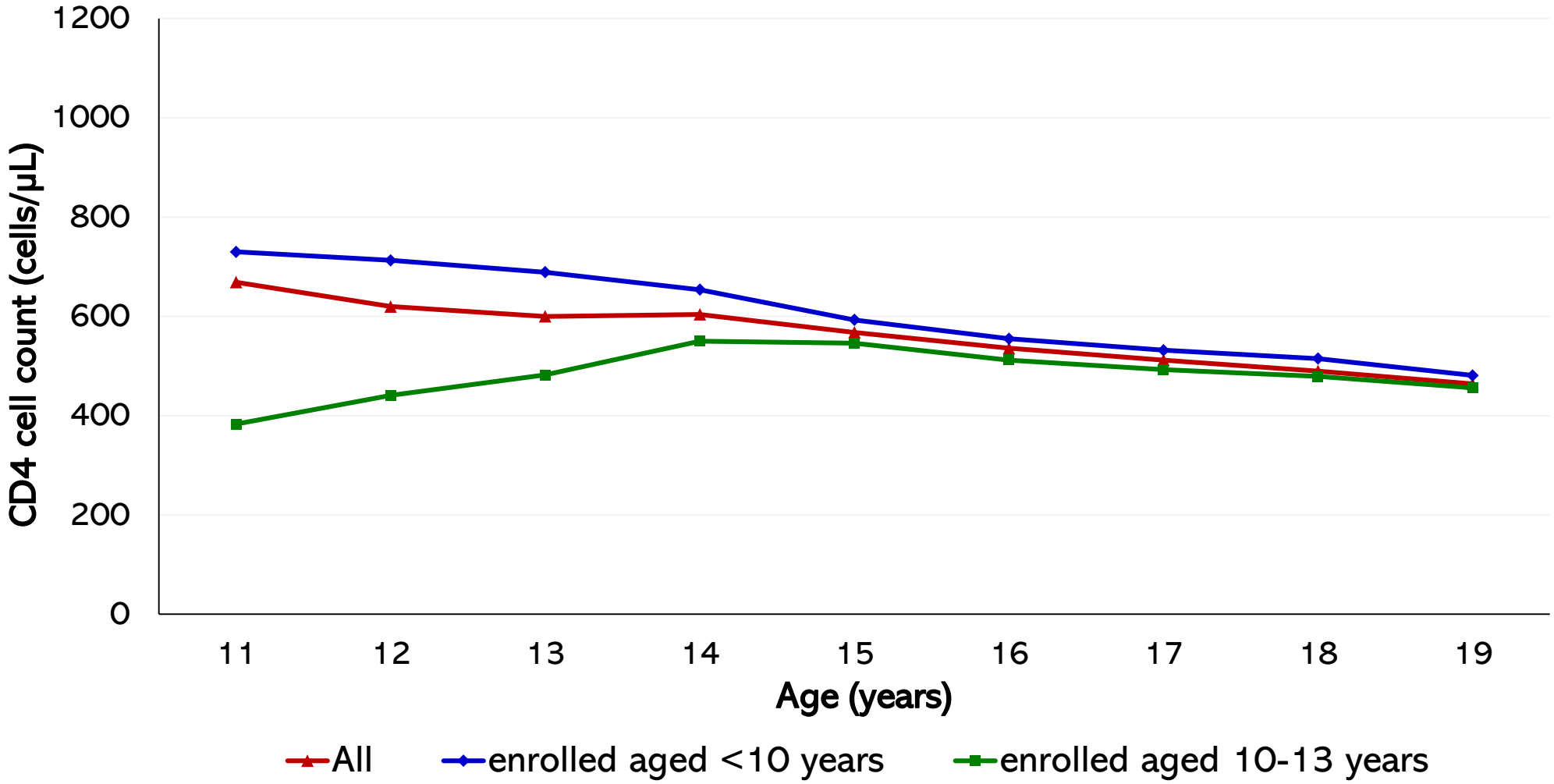
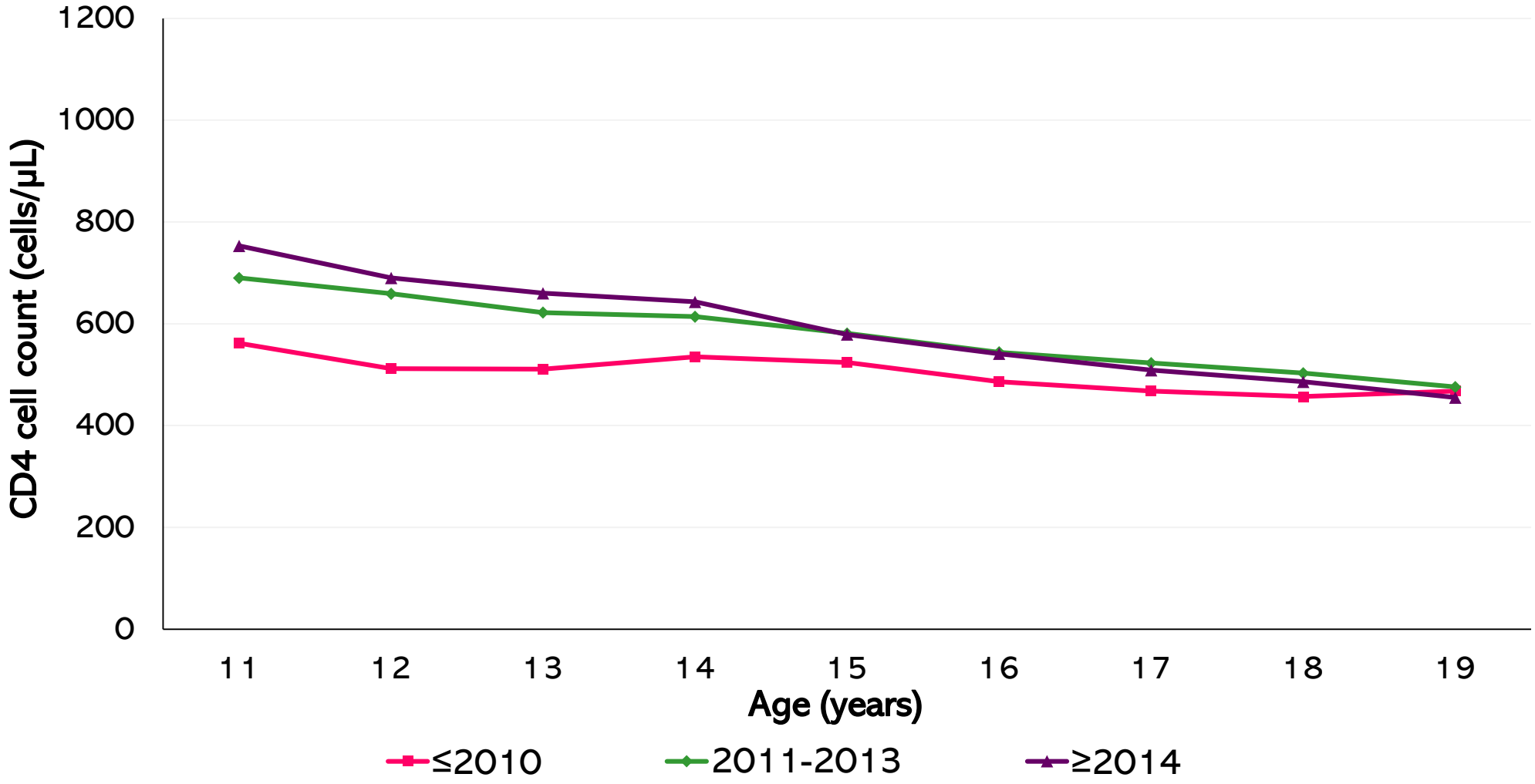
Median (IQR) CD4 cell count across various ages by age of enrolment



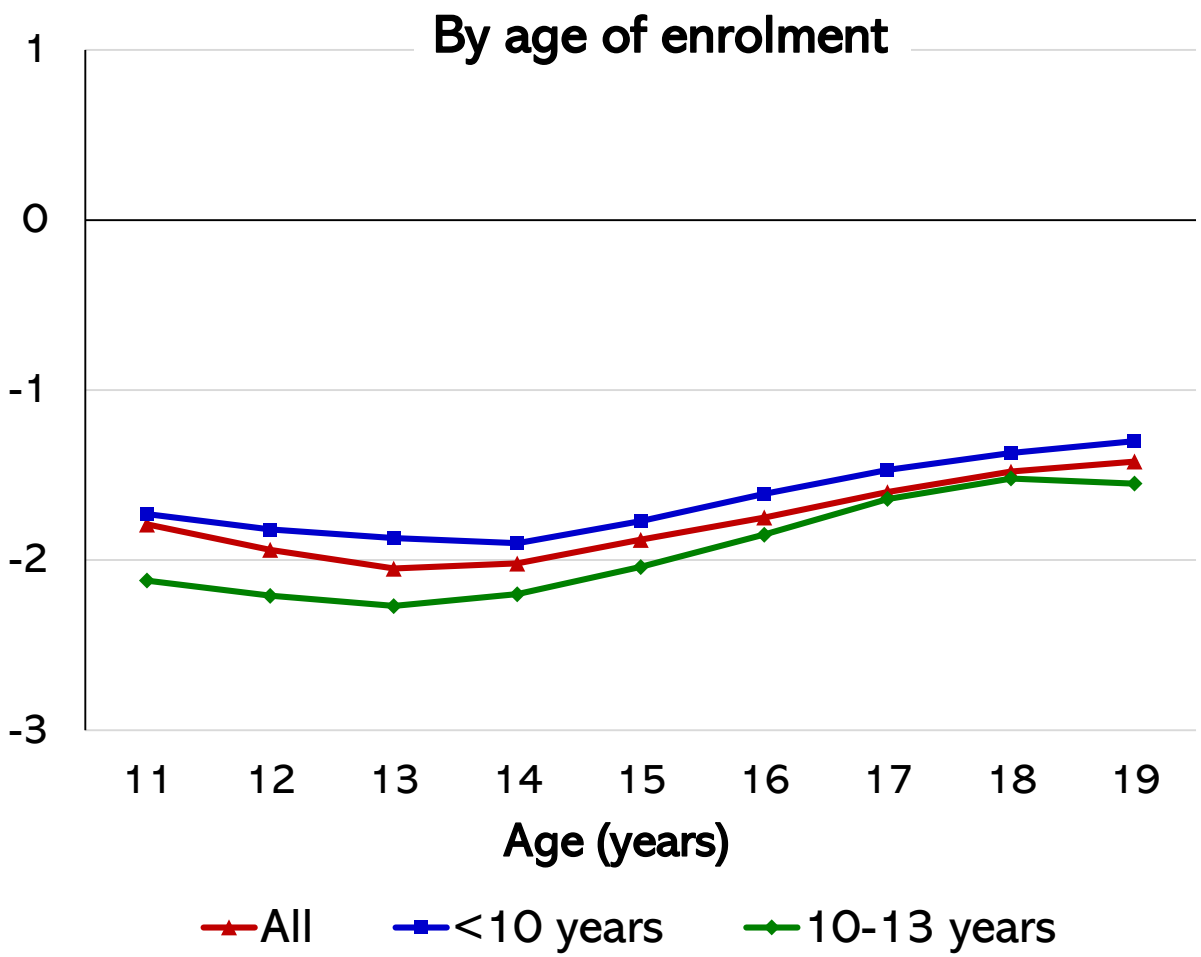
Age (years)	11	12	13	14	15	16	17	18	19
N	7906	7830	7141	5735	4453	3363	2450	1634	991

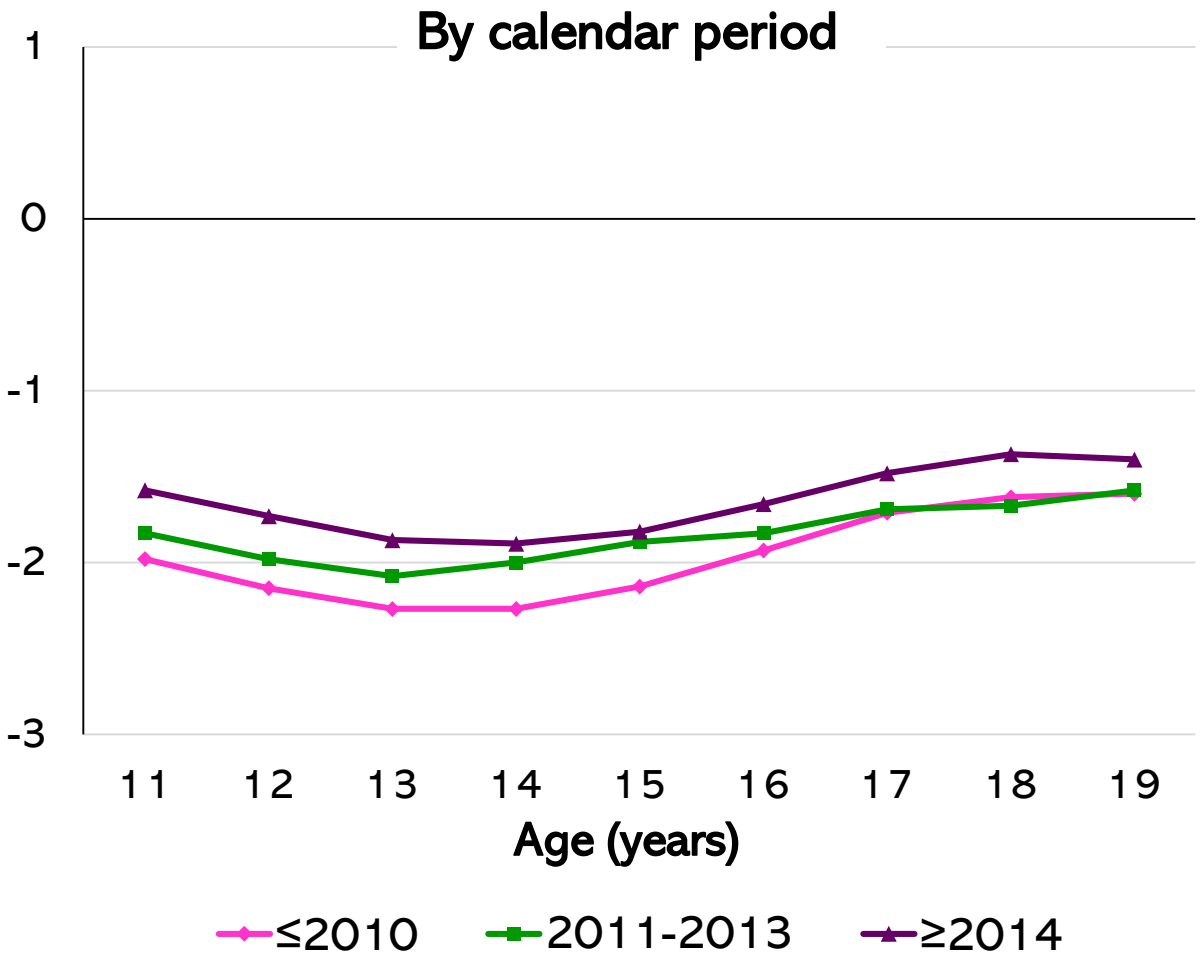
Median (IQR) CD4 cell count across various ages by calendar period



Age (years)	11	12	13	14	15	16	17	18	19
N	7906	7830	7141	5735	4453	3363	2450	1634	991

Median (IQR) HAZ across various ages





Age (years)	11	12	13	14	15	16	17	18	19
N	8171	7999	7343	5705	4509	3485	2582	1773	965

Predictors of mortality following the 13th birthday

Characteristic	Adjusted HR (95% CI)	P-value
Age at enrolment <10 years (vs. 10-13)	0.80 (0.53 – 1.22)	0.30
Female (vs. male)	1.24 (0.90 – 1.72)	0.19
Increasing calendar year of 13th birthday	0.84 (0.78 – 0.90)	<0.01
CD4 cell count (vs. <350 cell/μL)		
350 – 500	0.47 (0.30 – 0.73)	<0.01
>500	0.18 (0.12 – 0.27)	<0.01

*Also adjusted for site

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Conclusion

- ALPH have suboptimal retention, viral suppression and survival during adolescence but some outcomes improving in recent years
- ALPH enrolling into HIV care after the age of 10 years have poorer outcomes compared to those who enrolled before the age of 10 years
- ALPH identified as late enrollers need close monitoring to optimize their treatment outcomes.
- Strongest predictors of mortality after the age of 13 years were immunological status and calendar year of 13th birthday.

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