Changing Epidemiology and Survival of Adolescents Diagnosed with AIDS in New York City

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Objectives

- To describe the epidemiology of adolescents with AIDS reported to the New York City (NYC) Department of Health and Mental Hygiene (DOHMH).

- To compare survival after AIDS onset among adolescents according to:

  - period of AIDS diagnosis

  - HIV exposure categories

  - type of first AIDS-defining condition (ADC)

Methods (I):
Data Sources

- Routine HIV/AIDS Surveillance in NYC:
    - AIDS surveillance starting in 1981
    - HIV surveillance starting in 2000

- CDC-funded, Pediatric HIV/AIDS Surveillance Projects and Pediatric Spectrum of HIV Disease Project, initiated in 1989.

- NYC DOHMH Office of Vital Statistics death certificate data.

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Methods (II):
Eligibility of HIV-infected Adolescents

– First diagnosed with AIDS between 13 and 19 years of age

– ADC was diagnosed through December 31, 2001

– HIV exposure categories:

- behavioral (injecting drug user, men who have sex with men, heterosexual contact)

- perinatal (mother was HIV-infected)

- blood products (receipt of blood transfusion, blood components, or tissue)

- adolescent non-identified (HIV diagnosis between 13 and 19 years of age)

- pediatric non-identified (HIV diagnosis before 13 years of age)

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Methods (III):
Statistical Analysis

- Kaplan-Meier survival functions and log-rank tests were applied to calculate and test survival differences after AIDS diagnosis.

- The analyses were stratified by :
  - ❖ **Period of AIDS Diagnosis**
    1983-1992, 1993-1996, 1997-2001
  - ❖ **Type of First ADC**
    - Opportunistic Illness (OI)
    - Low CD4 (<200 cells/mm^3 or <14%)*

    * *In 1993, the CDC AIDS definition was expanded to include this as an ADC for persons aged 13 years or older*

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Result 1. Demographic Characteristics (%) of Adolescents Diagnosed with AIDS, by Period of AIDS Diagnosis, New York City, 1983-2001

	1983-1992 (N=100)	1993-1996 (N=156)	1997-2001 (N=252)	TOTAL (N=508)
Age at AIDS Diagnosis (%)				
13	4	12	17	13
14	3	9	19	13
15	9	10	12	11
16	12	13	7	10
17	11	14	10	11
18	22	17	18	18
19	39	25	18	24
Gender (%)				
Male	61	55	49	53 *
Female	39	45	51	47
Race/Ethnicity (%)				
White	25	10	5	11
Black	44	54	56	53 **
Hispanic	31	35	36	35
Asian/Pacific Islander	0	1	1	1
Not Identified	0	0	2	1
Alive (%)				
Yes	24	63	90	69 ***
No	76	37	10	31
TOTAL	100%	100%	100%	100%

Significant Chi-square tests for trend:

*   gender (p<0.05)

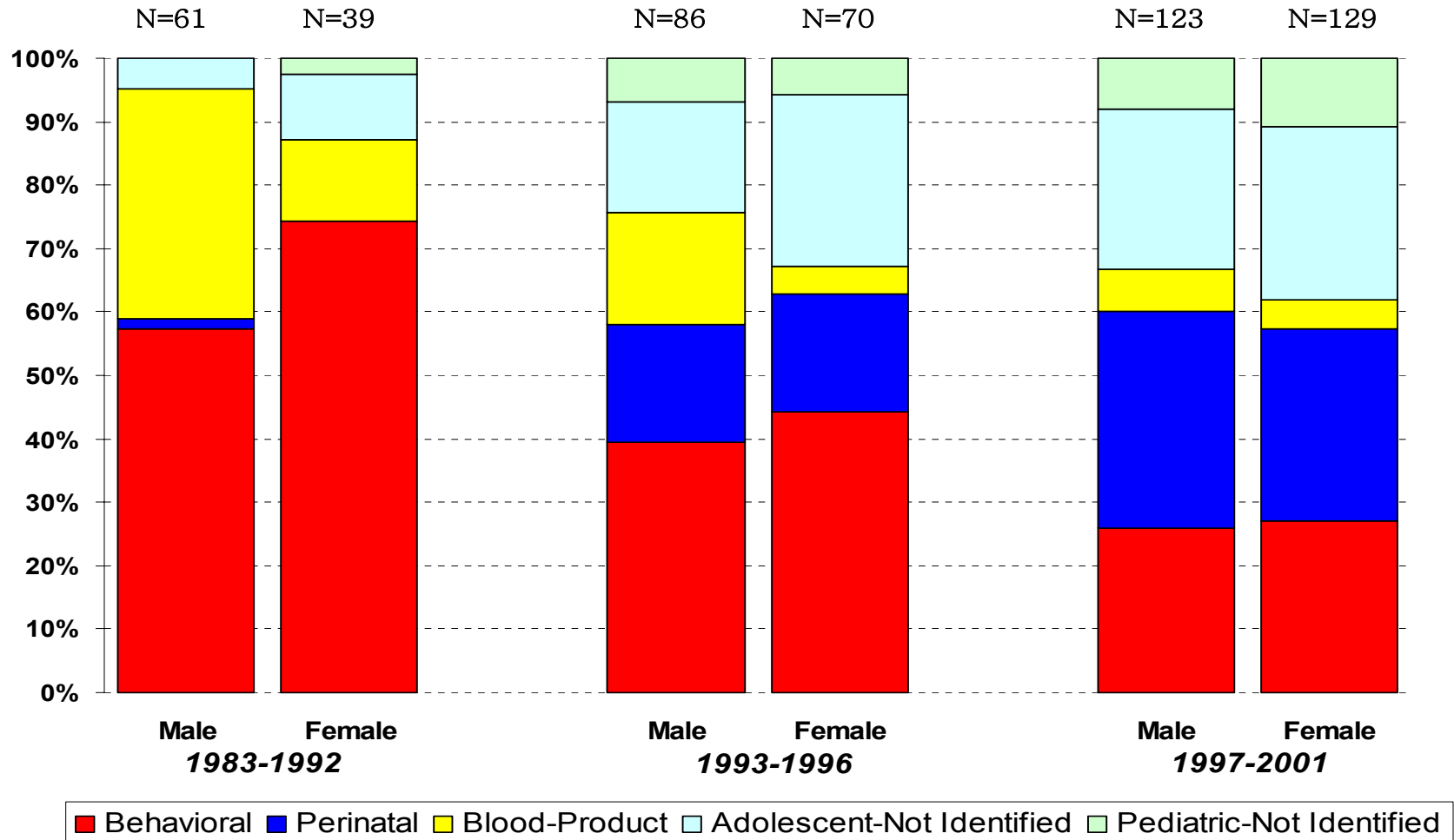**   race/ethnicity (p<0.05 for black vs. non-black)

*** vital status (p<0.0001).

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Result 2. Age at HIV Diagnosis and Time Period from HIV to AIDS Diagnosis of Adolescents Diagnosed with AIDS, by Period of AIDS Diagnosis, New York City, 1983-2001

Age at HIV Diagnosis	1983-1992 (N=100)	1993-1996 (N=156)	1997-2001 (N=252)	TOTAL (N=508)
Age at HIV Diagnosis (%)				
<13 years	2%	31%	44%	31%
13-19 years	98%	69%	56%	69%
Age at HIV Diagnosis <13 years				
Median	10.5	9.5	6.5	7
Range	9 - 12	0 - 12	1 - 12	0 - 12
Age at HIV Diagnosis >=13 years				
Median	17	17	17	17
Range	13 - 19	13 - 19	13 - 19	13 - 19
Time Period from HIV to AIDS Diagnosis				
Age at HIV Diagnosis <13 years				
Median	5.5	6	8	7
Range	4 - 7	1 - 16	1 - 15	1 - 16
Age at HIV Diagnosis >=13 years				
Median	0	0	0	0
Range	0 - 3	0 - 5	0 - 4	0 - 5

- Age at HIV diagnosis was significantly different among periods of AIDS ($p<0.0001$)
- 122 adolescents were concurrently diagnosed with HIV and AIDS: 81 (81%) in the period of 1983-1992, 15 (10%) in 1993-1996, and 26 (10%) in 1997-2001.

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Result 3. HIV Exposure Categories of Adolescents Diagnosed with AIDS, by Gender and Period of AIDS Diagnosis, New York City, 1983-2001

Legend: ■ Behavioral ■ Perinatal ☐ Blood-Product ☐ Adolescent-Not Identified ☐ Pediatric-Not Identified

- For males (1983-2001): behavioral category includes men who have sex with men (70%), injecting drug user (20%), and heterosexual contact (10%).
- For females (1983-2001): behavioral category includes injecting drug user (25%) and heterosexual contact (75%).

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Result 4. First AIDS-Defining Condition (%) among Adolescents Diagnosed with AIDS, New York City, 1983-2001

|	1983-1992 (N=100)	1993-1996 (N=156)	1997-2001 (N=252)	TOTAL (N=508)
Low CD4 (%)	*	57	78	56
Opportunistic Illnesses (%)	100	43	22	44
Pneumocystis jiroveci pneumonia**	41	8	3	12
Mycobacterium avium complex & other species disease	12	6	3	6
Chronic intestinal cryptosporidiosis	1	4	8	5
HIV encephalopathy	7	3	1	3
Wasting syndrome	6	3	1	3
Esophageal candidiasis	8	1	1	2
Cryptococcosis	6	1	0	2
Pulmonary tuberculosis	3	3	1	2
Chronic mucocutaneous herpes simplex	4	1	1	2
Other OIs	12	14	3	8

* Not Applicable   ** previously named as *Pneumocystis carinii* pneumonia

- Among 285 adolescents with low CD4, information on 48 (17%) was obtained exclusively through electronic lab reporting.
- 15% of adolescents with low CD4 had age-specific severe immunosuppression before 13 years of age.

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Result 5. Morbidity and Mortality of Adolescents Diagnosed with AIDS, New York City, 1983-2001

|	Age at AIDS (years)			Age at Death (years)			Time from AIDS Diagnosis to Death (years)			Current Age of Survivors (years)		
	N	Median	Range	N	Median	Range	N	Median	Range	N	Median	Range
Period of Diagnosis												
1983 - 1992	100	18	13 - 19	76	19	14 - 34	76	2	0 - 16	24	32.5	24 - 37
1993 - 1996	156	17	13 - 19	58	19	13 - 27	58	1	0 - 8	98	24	19 - 29
1997 - 2001	252	16	13 - 19	25	19	14 - 24	25	3	0 - 5	227	19	14 - 25
Type of First ADC												
Low CD4	285	17	13 - 19	38	19	14 - 27	38	2	0 - 8	247	20	14 - 29
OI	223	17	13 - 19	121	19	13 - 34	121	2	0 - 16	102	23.5	15 - 37
HIV Exposure Category												
Behavioral	196	18	14 - 19	76	20	14 - 34	76	1	0 - 16	120	24	18 - 37
Perinatal	111	14	13 - 18	15	17	14 - 21	15	2	0 - 6	96	18	14 - 24
Blood Products	59	17	13 - 19	38	19	13 - 27	38	2	0 - 10	21	23	19 - 29
Unknown	142	17	13 - 19	30	19	15 - 24	30	2	0 - 5	112	20	14 - 37

Result 6. Survival after AIDS Diagnosis among Adolescents with AIDS, by Period of AIDS Diagnosis, New York City, 1983-2001
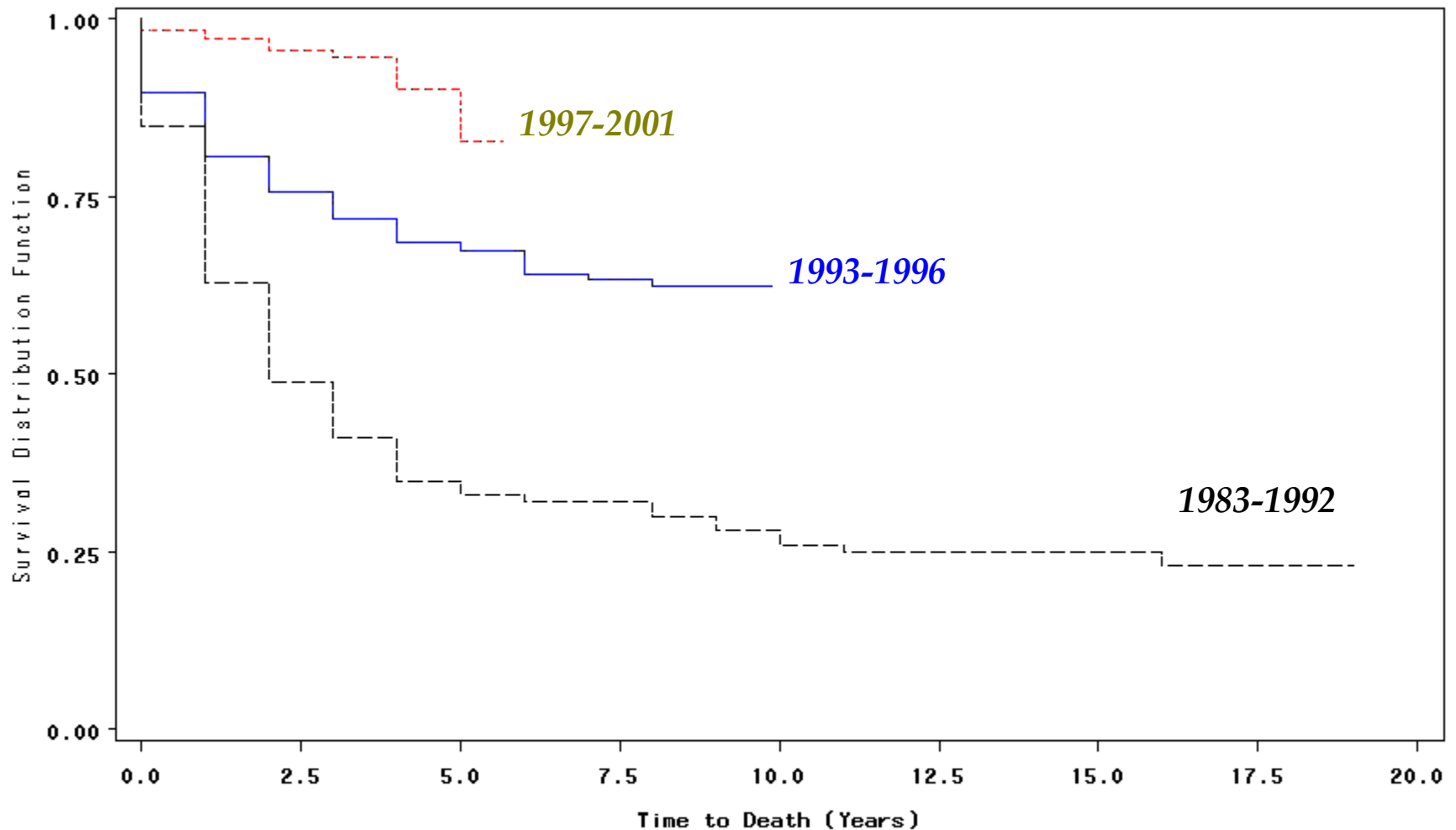
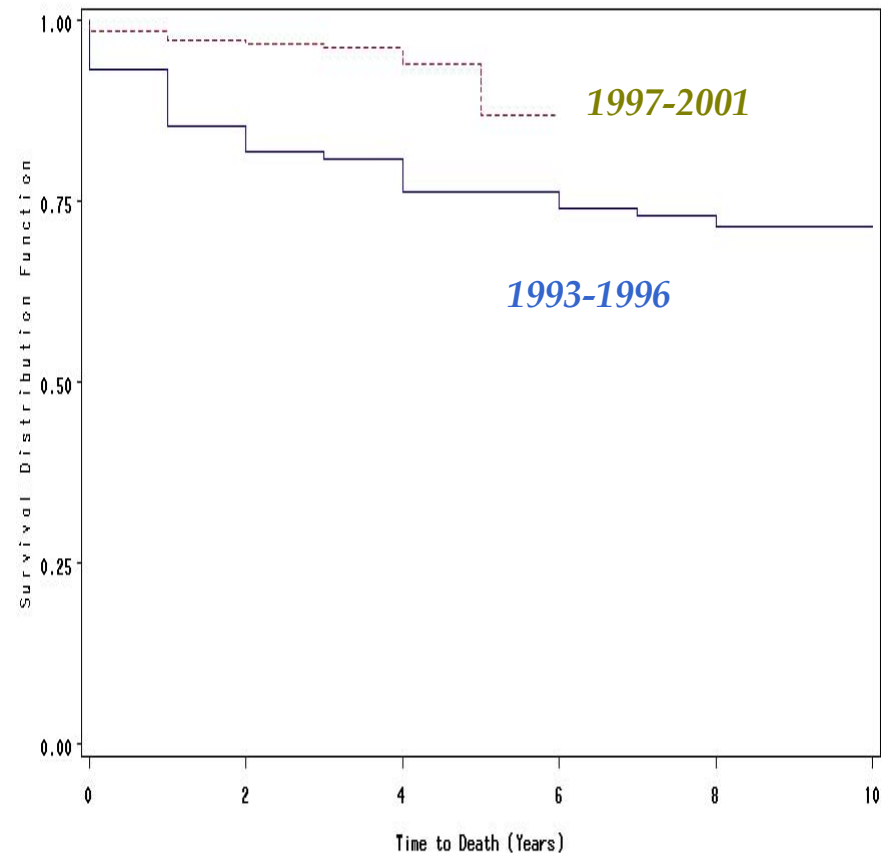Log-rank test for survival differences among periods of AIDS diagnosis: p<0.0001

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Result 7. Survival after AIDS Diagnosis among Adolescents with AIDS, by First AIDS-Defining Condition and Period of AIDS Diagnosis, New York City, 1983-2001
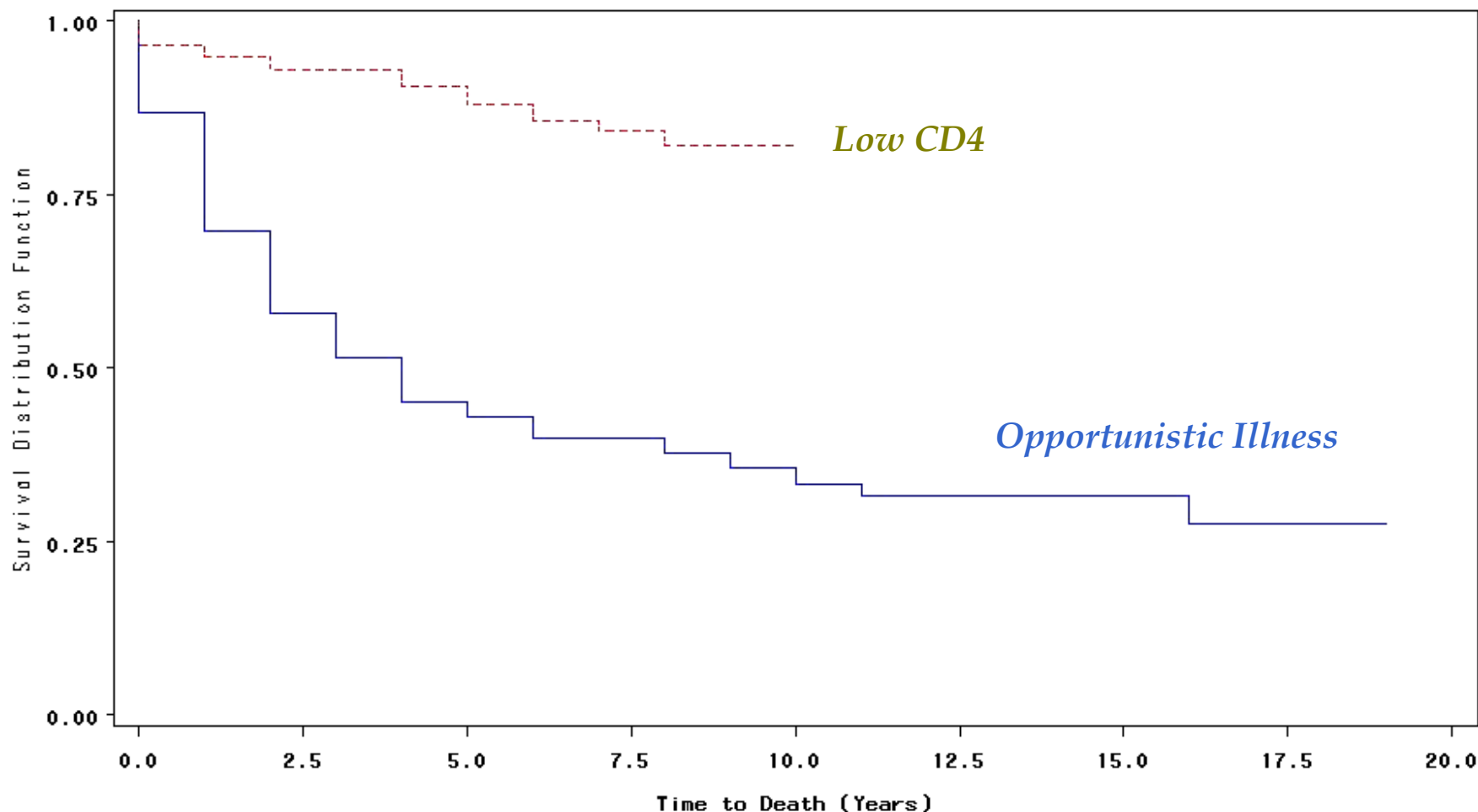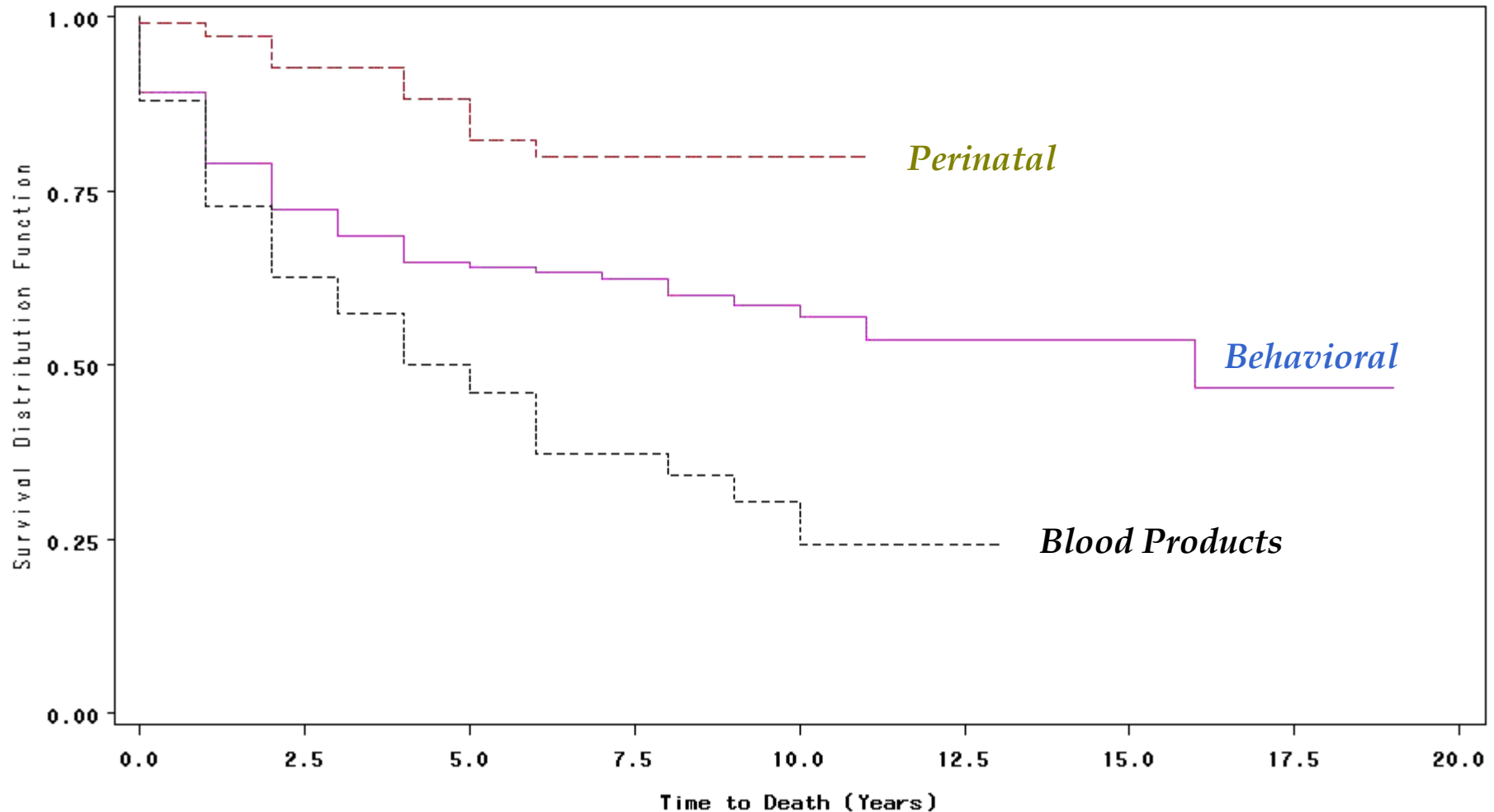
Opportunistic Illness
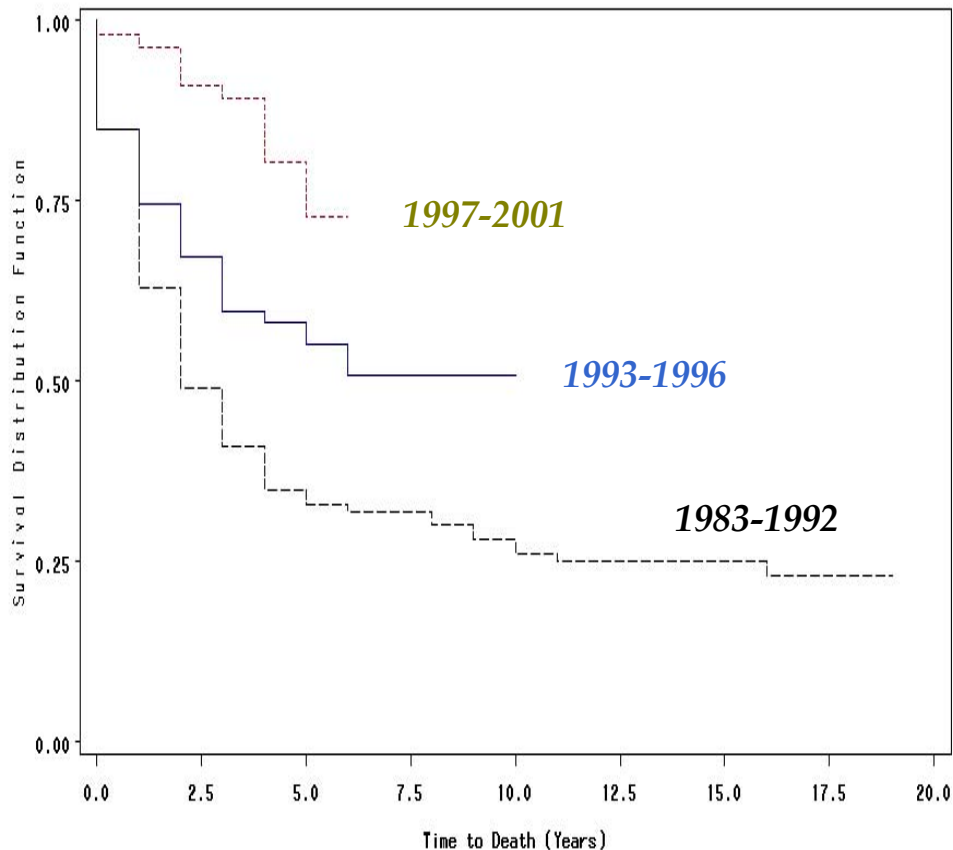
Low CD4

Log-rank test for survival differences among periods of AIDS diagnosis: p<0.0001

Log-rank test for survival differences among periods of AIDS diagnosis: p=0.001

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Result 8. Survival after AIDS Diagnosis among Adolescents with AIDS, by First AIDS-Defining Condition, New York City, 1983-2001

Log-rank test for survival differences between types of first OI: p<0.0001
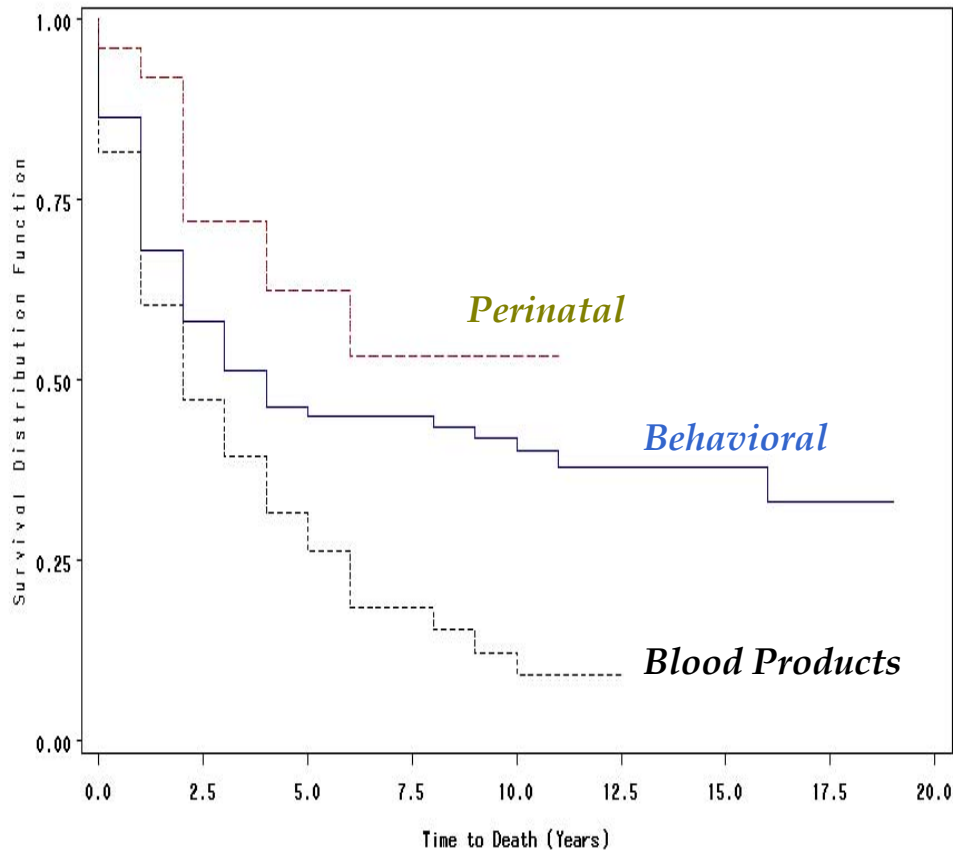
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Result 9. Survival after AIDS Diagnosis among Adolescents with AIDS, by HIV Exposure Category, New York City, 1983-2001

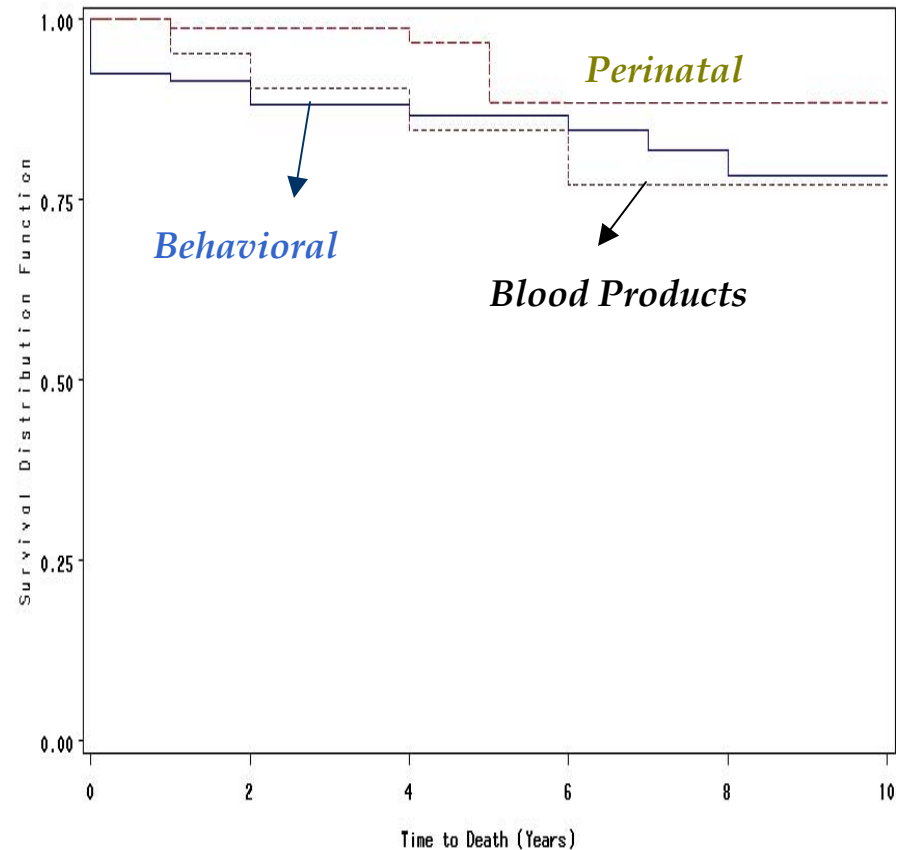Log-rank test for survival differences among HIV exposure categories: p<0.0001

Result 10. Survival after AIDS Diagnosis among Adolescents with AIDS, by First AIDS-Defining Condition and HIV Exposure Category, New York City, 1983-2001

Log-rank test for survival differences among exposure categories: p=0.0015

Log-rank test for survival differences among exposure categories: p=0.145

Summary of Findings (I)

- There were higher proportions of blacks and Hispanics than other race/ethnicity groups among adolescents with AIDS.

- The proportion of adolescent girls increased from the period of 1983-1992 to 1997-2001.

- Among HIV exposure categories, the proportion of perinatal transmission increased over time.

- From the period of 1993-1996 to 1997-2001, a higher proportion of newly diagnosed adolescent AIDS cases was due to low CD4 than an OI.

Summary of Findings (II)

- Among three periods of AIDS diagnosis, the time to death after AIDS onset was longer for adolescents diagnosed in the 1997-2001 period (median: 3 years).

- Adolescents with low CD4 as the first ADC had higher survival probability after AIDS onset than those with an OI.

- Among adolescents with an OI as the first ADC, a higher survival probability after AIDS onset was found in those who acquired HIV infection perinatally.

- Among adolescents with low CD4 as the first ADC, no survival differences after AIDS onset by HIV exposure category were found.

Conclusions

- Disparity of race/ethnicity was found among adolescents diagnosed with AIDS. Culturally sensitive strategies to prevent secondary HIV infection are needed.

- The majority of adolescent AIDS cases with a behavioral risk were concurrently diagnosed with HIV and AIDS. Routine HIV testing would have allowed for identifying and providing interventions to prevent AIDS progression.

- Survival improved among adolescents with AIDS, particularly those presenting with low CD4 as the first ADC.

- In later years, most adolescents with AIDS had no OI, allowing for an opportunity at the time of AIDS diagnosis to prevent HIV-related conditions.

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