

Improved survival in ovarian cancer, with significantly widening survival gaps of races and socioeconomic status: a period analysis, 1983-2012.

Jinna Wu MD*, Huanhuan Sun MD, PhD*, Lewei Yang MD, Yun Deng MD, Yan Yan MD, Shuncong Wang MD, Guangwei Yang MD#, and Haiqing Ma MD, PhD#

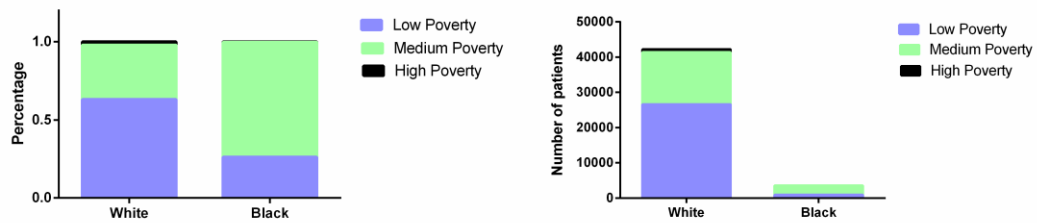
Department of Oncology, The Fifth Affiliated Hospital of Sun Yat-sen University, Zhuhai, Guangdong 519000, China

*These authors have contributed equally to this work.

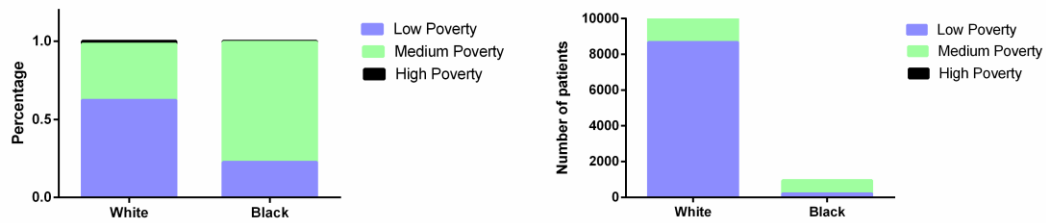
#Correspondence to: Haiqing Ma, email: mahaiqing@mail.sysu.edu.cn, and Guangwei Yang, email: yanggw@mail.sysu.edu.cn

Supplementary Figure S1

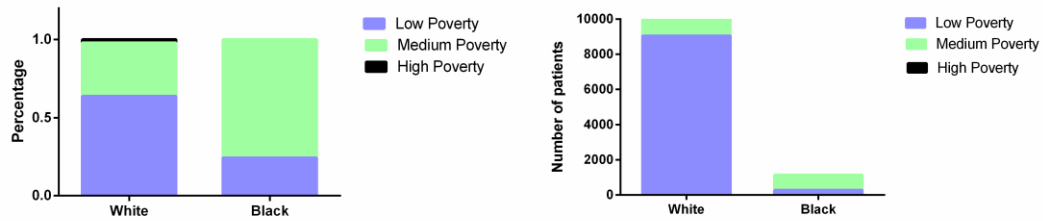
1983-2012



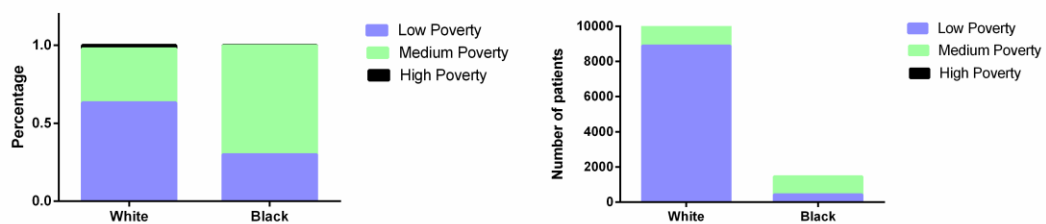
1983-1992



1993-2002



2003-2012



Supplementary Figure S1: Distribution of socioeconomic status by race for patients with ovarian cancer at 18 SEER sites between 1983 and 2012. Percentage (a) and number (b) of patients with ovarian cancer in low-poverty, medium-poverty, and high-poverty groups.

Supplementary Table S1. The incidence of ovarian cancer according to age group and decade within race and SES groups from 1983 to 2012 at the nine original SEER sites. Data are incidence per 100,000 people by year of diagnosis, with the number of patients in parentheses.

Variable		Age Group	Decade		
			1983-1992	1993-2002	2003-2012
Total		All	13.7(15699)	12.4 (16610)	10.8 (17172)
		0-19	0.6 (205)	0.6 (212)	0.6 (211)
		20-39	3.8 (1454)	3.0 (1199)	2.7 (1046)
		40-54	16.0 (3077)	14.4 (3978)	13.0 (4213)
		55-69	37.7 (5763)	33.2 (5148)	28.0 (5941)
		70+	47.6 (5200)	45.7 (6073)	40.2 (5761)
Race	white	All	14.4 (13954)	13.0 (14242)	11.4 (14068)
		0-19	0.6 (140)	0.6 (161)	0.5 (144)
		20-39	4.0 (1206)	3.1 (921)	2.7 (733)
		40-54	17.1 (2696)	15.2 (3291)	13.6 (3306)
		55-69	39.9 (5141)	35.3 (4428)	29.7 (4926)
		70+	49.4 (4771)	47.9 (5441)	42.4 (4959)
	Black	All	9.9 (950)	9.5 (1148)	9.1 (1465)
		0-19	0.9 (37)	0.4 (21)	0.5 (30)
		20-39	2.7 (124)	2.3 (125)	2.5 (139)
		40-54	9.9 (181)	9.4 (282)	9.1 (368)
		55-69	26.9 (343)	24.4 (347)	24.0 (517)
		70+	37.2 (265)	40.0 (373)	36.8 (411)
	Other	All	9.9 (795)	9.6 (1220)	8.8 (1639)
		0-19	0.9 (28)	0.8 (30)	0.8 (37)
		20-39	3.7 (124)	3.3 (153)	3.1 (174)
		40-54	12.7 (200)	14.3 (405)	13.2 (539)
		55-69	24.6 (279)	23.9 (373)	19.9 (498)
		70+	30.7 (164)	26.0 (259)	26.1 (391)
SES Low Poverty	All	14.3 (9052)	12.8 (9780)	10.8 (10253)	
	0-19	0.6 (107)	0.6 (119)	0.6 (130)	
	20-39	3.9 (799)	3.1 (679)	2.5 (546)	
	40-54	16.8 (1816)	14.7 (2346)	13.0 (2556)	
	55-69	40.0 (3357)	34.2 (3006)	27.7 (3506)	

	70+	48.7 (2973)	47.3 (3630)	40.6 (3515)
Medium Poverty	All	13.1 (6338)	12.0 (6475)	11.0 (6511)
	0-19	0.7 (95)	0.6 (85)	0.5 (74)
	20-39	3.8 (618)	3.0 (495)	3.1 (474)
	40-54	15.1 (1195)	14.3 (1562)	13.0 (1558)
	55-69	35.1 (2299)	32.0 (2020)	28.5 (2282)
	70+	46.4 (2131)	43.4 (2313)	40.0 (2123)
High Poverty	All	11.9 (307)	10.5 (350)	9.6 (398)
	0-19	0.3 (3)	0.7 (8)	0.5 (6)
	20-39	4.2 (37)	2.4 (23)	2.7 (25)
	40-54	14.6 (66)	10.4 (70)	12.3 (98)
	55-69	29.5 (106)	29.0 (37)	25.4 (148)
	70+	42.2 (95)	42.2 (127)	32.3 (121)

Supplementary Table S2. Summary data for Cox regression analysis of survival in patients with ovarian cancer from 0-years to 70+-years at 18 SEER sites.

Variable	Relative Risk (95% CI)	<i>p</i>-value
All 0-19 years		
Univariate		
Age	1.116 (1.048 – 1.188)	= 0.001
Race	1.228 (0.746 – 2.022)	= 0.417
SES	1.278 (0.849 – 1.923)	= 0.239
All 20-39 years		
Univariate		
Age	1.066 (1.056 – 1.076)	< 0.001
Race	1.161 (1.005 – 1.342)	= 0.042
SES	1.061 (0.963 – 1.169)	= 0.228
All 40-54 years		
Univariate		
Age	1.034 (1.029 – 1.039)	< 0.001
Race	1.542 (1.445 – 1.644)	< 0.001
SES	1.094 (1.051 – 1.139)	< 0.001
Multivariate		
Age	1.021 (1.016 – 1.026)	< 0.001
Race	1.530 (1.433 – 1.633)	< 0.001
SES	1.037 (0.996 – 1.080)	= 0.076
All 55-69years		
Univariate		
Age	1.041 (1.038 – 1.045)	< 0.001
Race	1.516 (1.443 – 1.592)	< 0.001
SES	1.053 (1.023 – 1.083)	< 0.001
Multivariate		
Age	1.034 (1.031 – 1.037)	< 0.001
Race	1.531 (1.456 – 1.609)	< 0.001
SES	1.001 (0.973 – 1.030)	= 0.894
All 70+ years		
Univariate		
Age	1.059 (1.056 – 1.061)	< 0.001
Race	1.218 (1.159 – 1.279)	< 0.001
SES	1.020 (0.995 – 1.047)	= 0.110
Multivariate		
Age	1.062 (1.060 – 1.064)	< 0.001
Race	1.250 (1.190 – 1.313)	< 0.001

Abbreviations: 95% CI, 95% confidence interval; SES, socioeconomic status.

Supplementary Table S3. 1-year, 5-year and 10-year relative survival rates of ovarian cancer patients according to race, age group, and calendar period from 1983 to 2012 at 18 SEER sites. Data are means \pm standard error of the mean, with number of patients in parentheses.

Decade	Age Group	Race		
		White	Black	Other
83-92	12-Mo			
	RS			
	All	70.7 \pm 0.4 (14378)	63.5 \pm 1.6 (981)***	76.7 \pm 1.5 (851)**
	0-19	97.3 \pm 1.3 (147)	92.1 \pm 4.4 (38)	96.8 \pm 3.2 (31)
	20-39	92.4 \pm 0.8 (1245)	91.6 \pm 2.5 (129)	87.5 \pm 2.8 (136)
	40-54	86.8 \pm 0.7 (2771)	81.7 \pm 2.8 (191)**	87.5 \pm 2.3 (221)
	55-69	75.5 \pm 0.6 (5280)	56.6 \pm 2.7 (346)***	77.3 \pm 2.5 (289)
	70+	49.9 \pm 0.7 (4935)	42.2 \pm 3.1 (277)	49.9 \pm 3.9 (103)
	60-Mo			
	RS			
	All	38.9 \pm 0.4	36.0 \pm 1.6	49.0 \pm 1.8***
	0-19	92.6 \pm 4.4	81.7 \pm 6.3	90.5 \pm 5.3
	20-39	75.8 \pm 1.2	78.8 \pm 3.7	70.5 \pm 4.0
	40-54	54.6 \pm 1.0	47.7 \pm 3.7	59.5 \pm 3.4
	55-69	36.3 \pm 0.7	22.4 \pm 2.4***	38.7 \pm 3.0
	70+	21.1 \pm 0.7	16.9 \pm 2.7	27.8 \pm 3.7
	120-Mo			
	RS			
	All	32.7 \pm 0.4	30.5 \pm 1.7	43.6 \pm 1.8***
	0-19	90.8 \pm 2.4	81.7 \pm 6.3	90.5 \pm 5
	20-39	70.9 \pm 1.3	75.0 \pm 4.0	68.4 \pm 4.0
40-54	46.3 \pm 1.0	38.1 \pm 3.8	53.8 \pm 3.5	
55-69	28.6 \pm 0.7	14.1 \pm 2.2***	29.7 \pm 2.9	
70+	16.7 \pm 0.8	14.8 \pm 3.0	24.3 \pm 4.1	
93-02	12-Mo			
	RS			
	All	74.4 \pm 0.3 (25883)	66.6 \pm 1.0 (2171)***	79.7 \pm 0.9 (2245)***
	0-19	95.4 \pm 1.2 (322)	100 \pm 0.0 (41)	96.2 \pm 2.7 (52)
	20-39	92.2 \pm 0.6 (1730)	87.1 \pm 2.3 (222)*	90.1 \pm 1.7 (295)
	40-54	88.7 \pm 0.4 (5987)	79.9 \pm 1.7 (542)***	87.7 \pm 1.2 (749)
	55-69	80.8 \pm 0.4(8136)	66.5 \pm 1.9(668)***	80.4 \pm 1.6(678)
	70+	56.0 \pm 0.5 (9708)	47.7 \pm 2.0 (698)***	57.3 \pm 2.4 (471)
	60-Mo			
	RS			
All	43.0 \pm 0.3	37.6 \pm 1.1***	53.2 \pm 1.1***	

	0-19	91.1 ± 1.6	95.2 ± 3.4	94.3 ± 3.2
	20-39	76.7 ± 1.0	71.3 ± 3.1	75.4 ± 2.5
	40-54	58.6 ± 0.6	48.5 ± 2.2***	58.2 ± 1.8
	55-69	42.9 ± 0.6	30.9 ± 1.9***	50.9 ± 2.0**
	70+	25.0 ± 0.5	19.8 ± 1.8*	29.3 ± 2.3
	120-Mo			
	RS			
	All	33.5 ± 0.3	31.1 ± 1.1	45.2 ± 1.1***
	0-19	91.1 ± 1.6	92.9 ± 4.1	92.4 ± 3.7
	20-39	69.0 ± 1.2	69.0 ± 3.2	72.1 ± 2.7
	40-54	47.0 ± 0.7	39.7 ± 2.2*	49.4 ± 1.9
	55-69	31.2 ± 0.6	23.0 ± 1.9**	41.0 ± 2.1***
	70+	17.5 ± 0.6	13.4 ± 1.8	20.5 ± 2.3
03-12	12-Mo			
	RS			
	All	75.7 ± 0.2 (40185)	66.2 ± 0.8 (4103)***	80.8 ± 0.6 (3974)***
	0-19	96.9 ± 0.8 (532)	96.4 ± 1.8 (112)	96.1 ± 2.2 (76)
	20-39	93.6 ± 0.5(2450)	86.4 ± 1.8 (381)***	92.5 ± 1.3 (447)
	40-54	89.5 ± 0.3(9394)	78.9 ± 1.3 (1010)***	90.1 ± 0.8(1383)
	55-69	83.0 ± 0.3 (13863)	66.5 ± 1.3 (1386)***	83.2 ± 1.1(1199)
	70+	54.9 ± 0.4(13946)	45.8 ± 1.5(1214)***	55.3 ± 1.7 (869)
	60-Mo			
	RS			
	All	45.4 ± 0.3	36.6 ± 0.9***	54.5 ± 0.9***
	0-19	92.5 ± 1.2	92.0 ± 2.8	92.5 ± 3.4
	20-39	79.2 ± 0.9	73.5 ± 2.4	80.8 ± 2.1
	40-54	61.3 ± 0.6	43.8 ± 1.8***	64.4 ± 1.5
	55-69	46.5 ± 0.5	31.6 ± 1.5***	52.0 ± 1.7*
	70+	25.2 ± 0.5	18.4 ± 1.5**	24.1 ± 1.8
	120-Mo			
	RS			
	All	35.4 ± 0.4	29.0 ± 1.1***	45.1 ± 1.3***
	0-19	90.9 ± 1.5	92.0 ± 2.8	88.8 ± 4.9
	20-39	73.4 ± 1.3	68.2 ± 3.0	74.7 ± 3.0
	40-54	48.4 ± 0.8	33.9 ± 2.3***	51.3 ± 2.3
	55-69	34.0 ± 0.7	23.0 ± 2.0***	41.9 ± 2.3*
	70+	18.2 ± 0.7	10.4 ± 2.0*	17.2 ± 2.2

Abbreviations: Mo, month; RS, relative survival; SEM, standard error of the mean.

* $p < 0.01$, ** $p < 0.001$, and *** $p < 0.0001$ for comparisons with the White group.

Supplementary Table S4. 1-year, 5-year and 10-year relative survival rates of ovarian cancer patients according to SES, age group, and calendar period from 1983 to 2012 at 18 SEER sites. Data are means \pm standard error of the mean, with number of patients in parentheses.

Decade	Age Group	SES		
		Low Poverty	Medium Poverty	High Poverty
83-92	12-Mo			
	RS			
	All	71.7 \pm 0.5 (9076)	69.3 \pm 0.6 (6820)*	67.4 \pm 2.7 (312)
	0-19	99.1 \pm 0.9 (109)	93.3 \pm 2.5 (104)	100 \pm 0.0 (3)
	20-39	92.0 \pm 1.0 (800)	91.6 \pm 1.1 (671)	94.9 \pm 3.5 (39)
	40-54	86.4 \pm 0.8 (1821)	86.8 \pm 1.0 (1296)	82.1 \pm 4.8 (66)
	55-69	76.3 \pm 0.8 (3356)	72.5 \pm 0.9 (2452)*	64.8 \pm 4.7 (106)
	70+	50.8 \pm 1.0(2990)	48.0 \pm 1.1(2297)	48.0 \pm 5.3 (98)
	60-Mo			
	RS			
	All	39.5 \pm 0.5	39.0 \pm 0.6	36.6 \pm 2.9
	0-19	91.8 \pm 2.6	88.6 \pm 3.1	100 \pm 0.0
	20-39	75.1 \pm 1.5	76.6 \pm 1.7	67.0 \pm 7.6
	40-54	54.2 \pm 1.2	55.2 \pm 1.4	49.2 \pm 6.2
	55-69	36.7 \pm 0.9	34.3 \pm 1.0	29.0 \pm 4.6
	70+	21.4 \pm 0.9	16.8 \pm 1.1*	11.7 \pm 4.3
	120-Mo			
	RS			
	All	33.0 \pm 0.6	33.3 \pm 0.6	33.3 \pm 3.0
	0-19	90.2 \pm 2.9	87.8 \pm 3.3	100 \pm 0.0
	20-39	69.9 \pm 1.7	72.5 \pm 1.8	67.0 \pm 7.6
40-54	46.2 \pm 1.2	46.7 \pm 1.4	44.2 \pm 6.3	
55-69	28.3 \pm 0.9	27.2 \pm 1.0	26.5 \pm 4.5	
70+	17.2 \pm 1.0	16.8 \pm 1.1	11.7 \pm 4.3	
93-02	12-Mo			
	RS			
	All	75.9 \pm 0.4 (12787)	73.3 \pm 0.4 (16108)***	69.6 \pm 1.3 (1398)***
	0-19	97.0 \pm 1.3 (164)	94.8 \pm 1.5 (230)	100 \pm 0.0 (21)
	20-39	94.0 \pm 0.8(899)	89.8 \pm 0.9 (1257)**	88.8 \pm 3.4 (89)
	40-54	89.4 \pm 0.6 (3086)	87.2 \pm 0.5 (3886)*	82.6 \pm 2.2 (306)**
	55-69	81.5 \pm 0.6 (3991)	78.5 \pm 0.6 (5029)**	78.7 \pm 1.9 (462)
	70+	57.6 \pm 0.8 (4647)	54.5 \pm 0.7 (5706)*	49.1 \pm 2.3 (520)**
	60-Mo			
	RS			
All	44.3 \pm 0.5	43.2 \pm 0.4	37.7 \pm 1.4***	

	0-19	92.8 ± 2.0	90.6 ± 1.9	100 ± 0.0
	20-39	77.9 ± 1.4	75.1 ± 1.2	70.0 ± 4.9
	40-54	59.3 ± 0.9	56.9 ± 0.8	53.3 ± 2.9
	55-69	44.0 ± 0.8	42.1 ± 0.7	37.2 ± 2.4*
	70+	25.2 ± 0.8	25.0 ± 0.7	20.0 ± 2.1
	120-Mo			
	RS			
	All	34.7 ± 0.5	34.4 ± 0.4	29.0 ± 1.4**
	0-19	92.3 ± 2.1	90.1 ± 2.0	100 ± 0.0
	20-39	70.5 ± 1.6	69.3 ± 1.3	60.8 ± 5.3
	40-54	48.1 ± 0.9	45.7 ± 0.8	45.3 ± 3.0
	55-69	32.3 ± 0.8	31.2 ± 0.7	24.5 ± 2.2*
	70+	16.9 ± 0.8	18.2 ± 0.7	13.4 ± 2.1
03-12	12-Mo			
	RS			
	All	77.6 ± 0.3 (18273)	74.5 ± 0.3 (26347)***	69.1 ± 0.8 (3632)***
	0-19	97.5 ± 1.0 (245)	96.2 ± 0.9 (422)	98.0 ± 2.0 (52)
	20-39	94.1 ± 0.7 (1058)	92.3 ± 0.6 (1957)	88.8 ± 2.0 (262)*
	40-54	91.1 ± 0.4 (4584)	87.5 ± 0.4 (6415)***	83.4 ± 1.3 (787)***
	55-69	84.7 ± 0.5 (6282)	80.3 ± 0.4 (8906)***	75.4 ± 1.2(1255)***
	70+	56.2 ± 0.7 (6104)	53.7 ± 0.6 (8647)*	48.7 ± 1.5 (1276)***
	60-Mo			
	RS			
	All	46.7 ± 0.4	45.3 ± 0.4	39.9 ± 1.0***
	0-19	93.5 ± 1.7	91.9 ± 1.4	91.4 ± 4.2
	20-39	79.3 ± 1.4	79.0 ± 1.0	74.4 ± 2.9
	40-54	62.0 ± 0.8	59.9 ± 0.7	51.3 ± 2.0***
	55-69	48.1 ± 0.8	44.5 ± 0.6**	41.4 ± 1.6**
	70+	25.3 ± 0.7	24.7 ± 0.6	22.0 ± 1.5
	120-Mo			
	RS			
	All	36.3 ± 0.6	35.8 ± 0.5	31.5 ± 1.2**
	0-19	92.5 ± 2.0	89.9 ± 1.8	91.4 ± 4.2
	20-39	72.5 ± 2.0	73.9 ± 1.4	67.7 ± 3.8
	40-54	48.5 ± 1.2	47.6 ± 1.0	40.5 ± 2.6*
	55-69	35.8 ± 1.1	32.6 ± 0.9	30.3 ± 2.2
	70+	17.7 ± 1.1	17.6 ± 0.9	15.6 ± 2.0

Abbreviations: Mo, month; RS, relative survival; SEM, standard error of the mean.

* $p < 0.01$, ** $p < 0.001$, and *** $p < 0.0001$ for comparisons with the White group.

Supplementary Table S5. Summary data for race distribution by SES and calendar period in patients with ovarian cancer from 1983 to 2012 at 18 SEER sites.

Decades	SES	Number	White	Black	Other
1983-2012	Total	49464	85.4%	7.2%	7.4%
	Low Poverty	29085	91.5%	3.2%	5.3%
	Medium Poverty	19324	76.4%	13.6%	10.3%
	High Poverty	1055	81.7%	0.9%	17.4%
1983-1992	Total	15697	88.9%	6.1%	5.0%
	Low Poverty	9052	95.9%	2.4%	1.7%
	Medium Poverty	6338	79.2%	11.5%	9.3%
	High Poverty	307	81.4%	2.0%	16.6%
1993-2002	Total	16605	85.7%	6.9%	7.4%
	Low Poverty	9780	92.6%	2.8%	4.6%
	Medium Poverty	6475	75.5%	13.4%	11.1%
	High Poverty	350	83.4%	0.0%	16.6%
2003-2012	Total	17162	81.9%	8.5%	9.6%
	Low Poverty	10253	86.7%	4.3%	9.0%
	Medium Poverty	6511	74.6%	15.7%	9.7%
	High Poverty	398	80.4%	0.8%	18.8%