Determinants of Breast and Cervical Cancer Disparities in Hispanic Women in the United States

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GOALS

- Review the data on breast cancer and cervical cancer in Latinas and the disparities in outcomes as compared with Non-Hispanic Whites (NHW)
- Barriers to cancer prevention and screening for these diseases among Latinas
- Increase awareness of the potential benefits of education efforts directed to young (age 18-40) Latinas

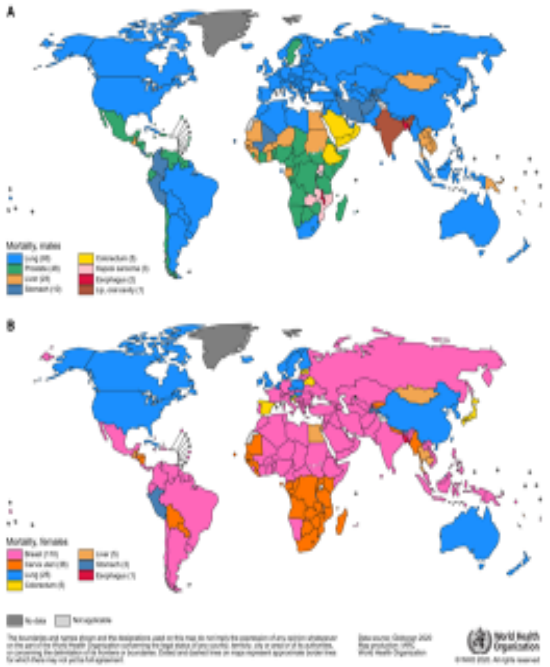
WHY DO BREAST CANCER and CERVICAL CANCER MATTER?

- #1: Breast cancer is the most common cancer in women in the USA including Latinas and the most common cause of cancer deaths in Latinas

Cervical Cancer

- #1 Cause of cancer deaths among women in Africa and several Latin American countries

Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries

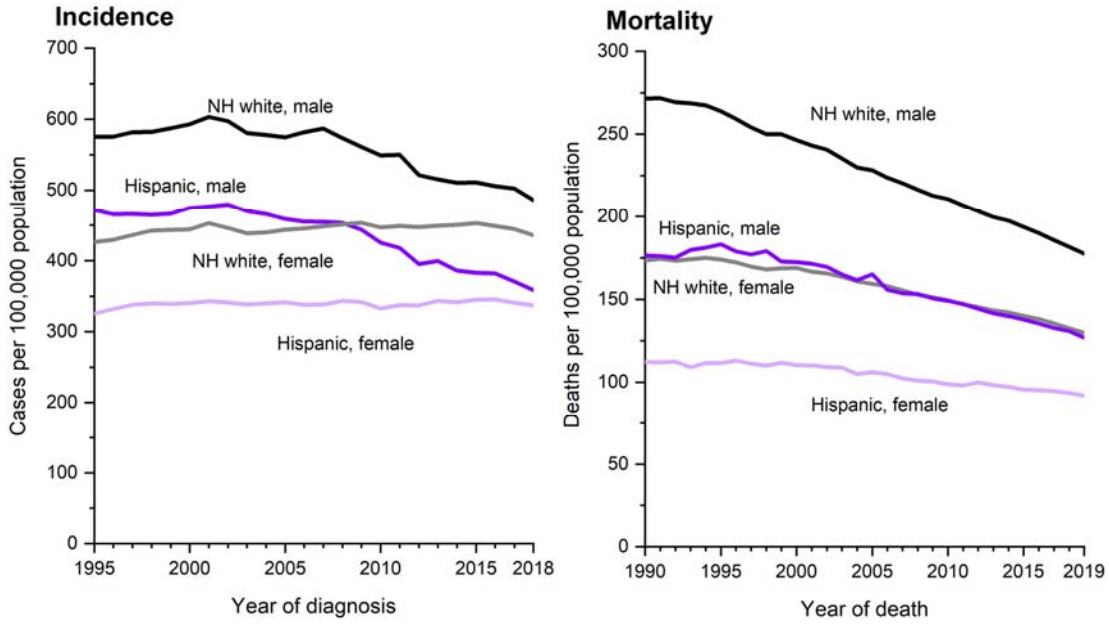


CA: A Cancer Journal for Clinicians, Volume: 71, Issue: 3, Pages: 209-249, First published: 04 February 2021, DOI: (10.3322/caac.21660)

WHY DO BREAST CANCER and CERVICAL CANCER MATTER?

- #2: Breast cancer and cervical cancer are the number 1 and 2 causes of cancer deaths in young women in their 30s in the USA (including Latinas)

Cancer statistics for the US Hispanic/Latino population, 2021

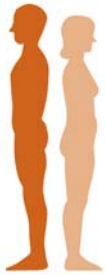


CA: A Cancer Journal for Clinicians, First published: 21 September 2021, DOI: (10.3322/caac.21695)

Cancer statistics for the US Hispanic/Latino population, 2021

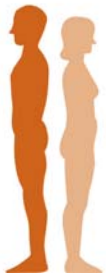
Estimated New Cases*

Males			Females		
Prostate	17,600	22%	Breast	28,100	29%
Colon & rectum	9,000	11%	Uterine corpus	7,900	8%
Lung & bronchus	6,000	7%	Colon & rectum	7,500	8%
Kidney & renal pelvis	5,900	7%	Thyroid	6,300	7%
Liver & intrahepatic bile duct	4,800	6%	Lung & bronchus	5,800	6%
Non-Hodgkin lymphoma	4,700	6%	Non-Hodgkin lymphoma	4,200	4%
Leukemia	3,700	5%	Kidney & renal pelvis	3,800	4%
Urinary bladder	3,300	4%	Leukemia	2,900	3%
Pancreas	2,800	3%	Pancreas	2,900	3%
Oral cavity & pharynx	2,500	3%	Uterine cervix	2,700	3%
All sites	80,200	100%	All sites	96,400	100%



Estimated Deaths

Males			Females		
Lung & bronchus	3,200	13%	Breast	3,100	14%
Colon & rectum	2,700	11%	Lung & bronchus	2,300	10%
Liver & intrahepatic bile duct	2,600	11%	Colon & rectum	2,000	9%
Prostate	2,400	10%	Pancreas	1,900	8%
Pancreas	1,900	8%	Liver & intrahepatic bile duct	1,500	7%
Stomach	1,200	5%	Ovary	1,200	5%
Leukemia	1,000	4%	Uterine corpus	1,200	5%
Non-Hodgkin lymphoma	1,000	4%	Stomach	1,000	4%
Kidney & renal pelvis	800	3%	Leukemia	800	4%
Brain & other nervous system	800	3%	Non-Hodgkin lymphoma	800	4%
All sites	23,800	100%	All sites	22,700	100%



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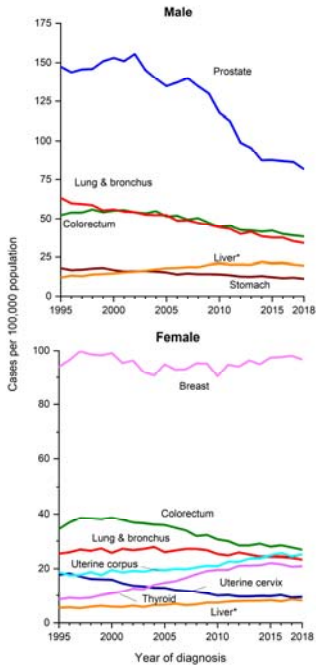
Cancer statistics for the US Hispanic/Latino population, 2021



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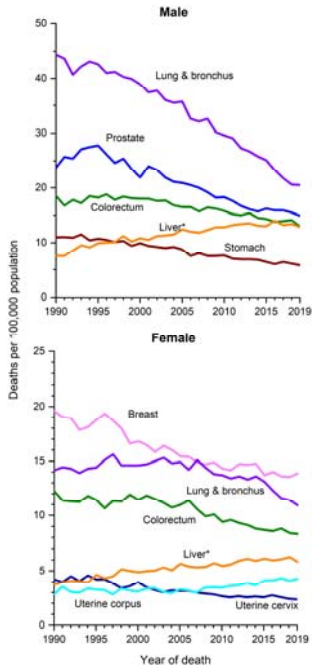


CA: A Cancer Journal for Clinicians, First published: 21 September 2021, DOI: (10.3322/caac.21695)

Breast Cancer in Latinas: Disparities

- Lower incidence and lower population-based mortality from breast cancer in Latinas compared to Non-Hispanic Whites (NHW) (ACS 2015: 128.1 vs 91.9 ; 21.9 vs 14.5)
- Higher prevalence of advanced stage, early onset, triple negative and HER2 positive breast cancers compared to NHW
- Higher death rate among Hispanic breast cancer diagnosed cases compared to NHW

Contributions of different factors on breast cancer mortality among Latinas

- Socio-economic factors: low SES, lack of insurance or under-insurance, access to screening mammography
- Environmental factors: Obesity, dietary factors (exposure to estrogen-like compounds)
- Biological factors:

Prevalence of inherited mutations in different sub-groups

Genetics effects on environmental factors

Explanation for higher prevalence of triple negative, HER2 positive breast and early onset breast cancers

Breast Cancer Res Treat (2017) 166:185–193
DOI 10.1007/s10549-017-4389-z

EPIDEMIOLOGY

Contribution of clinical and socioeconomic factors to differences in breast cancer subtype and mortality between Hispanic and non-Hispanic white women

María Elena Martínez[1,2] · Scarlett L. Gomez[3,4] · Li Tao[3] · Rosemary Cress[5] · Danielle Rodriguez[5] · Jonathan Unkart[6] · Richard Schwab[7] · Jesse N. Nodora[1,2] · Linda Cook[7] · Ian Komenaka[8] · Christopher Li[9]

Received: 27 March 2017 / Accepted: 7 July 2017 / Published online: 11 July 2017

Martinez et al: Breast Cancer Research Treatment 166: 185-193, 2017

- California Cancer Registry: 29,626 Hispanics and 99,862 NHW with invasive breast cancer dx 2004-14.
- Analyzed prevalence of different breast cancer subtypes
- Triple negative breast cancer and HER2 positive breast cancers were more common in Hispanics (HR 1.29 and 1.19 respectively).
- Hispanic women had a higher Mortality Rate ratio of 1.24
- Neighborhood SES and health insurance status accounted for most of the differences in mortality

Martinez et al: Breast Cancer Research Treatment 166: 185-193,2017

Table 1 Sociodemographic and clinical characteristics of Hispanic and non-Hispanic white women with invasive breast cancer in the California Cancer Registry, 2004–2014 ($N = 129,488$)

	NHW		Hispanic	
	n	%	*n*	%
	99,862		29,626	
Age, years				
20–39	3808	3.8	3018	10.2
40–49	15,403	15.4	7641	25.8
50–59	24,600	24.6	7965	26.9
60–69	26,926	27.0	6078	20.5
70+	29,125	29.2	4924	16.6
Mean (SD)	61.9 (13.3)		55.7 (13.4)	

Martinez et al: Breast Cancer Research Treatment 166: 185-193,2017

- Latinas had higher percentage of patients living in low SES neighborhoods: 52.7 vs 21.1%
- Latinas had higher percentage of patients with Medicaid insurance: 30.8 vs 17%
- Latinas had more advanced disease: less Stage 1: 39.8 vs 51.1%; more likely with positive nodes: 41.1% vs 31.5%; Stage 3-4: 39.2 vs 28.4%

Martinez et al: Breast Cancer Research Treatment 166: 185-193,2017

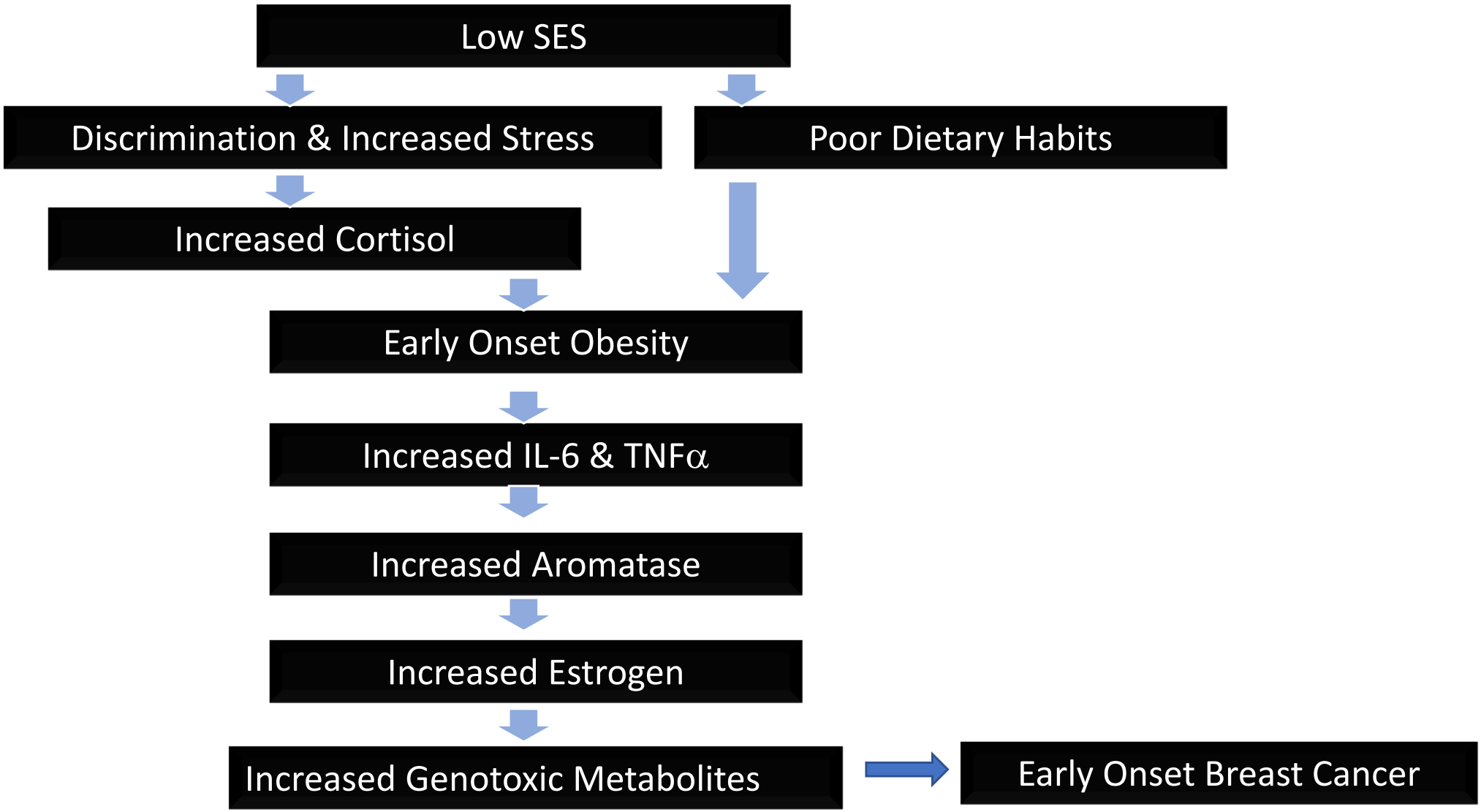
- Younger women had a higher risk of dying than older women ($p<0.001$)
- Mortality differences between Hispanics and White were greatest in the younger group (MRR 1.42 vs 1.13)

Breast Cancer in Young Women

- Age 25-40: Breast cancer is #1 cause of cancer deaths and #1 cancer in USA
- Age 25-34: Breast cancer is #2 cause of death (behind accidents) in USA
- Age 25-40: Breast cancer accounts for 23% of all cancer deaths (#1 cancer) in USA
- Age 15-39: Hispanics 3.25 RR and AA 1.65 RR compared to NHW
- Keegan et al: 5605 breast cancer women age 15-39 diagnosed 2005-09: more likely TN, HER2 positive, Stage 3-4, more Hispanics, AA, NA.

Conclusions from recent data

- Disparities are greatest in young age group (age less than 40)
- There is a need for more studies on the interplay between genetic and environmental factors
- There is a need for preventive interventions in the young age group (age less than 40)
- Emphasis on preventive interventions should be in low SES neighborhoods and uninsured/under-insured patients.


Low SES
Discrimination & Increased Stress
Poor Dietary Habits
Increased Cortisol
Early Onset Obesity
Increased IL-6 & TNFα
Increased Aromatase
Increased Estrogen
Increased Genotoxic Metabolites
Early Onset Breast Cancer

Childhood obesity

- Prevalence of obesity in US children and adolescents has tripled over the last 30 years (NHANES data).
- Prevalence is highest in non-White subsets: 30% AA, 20% Mexican American, 11% NHW (Ogden et al, JAMA 2002)
- Obesity in childhood predicts for adult obesity: Among 2400 obese 5-14 year old followed for 17 years, 83% AA vs 68% NHW were obese as adults (Obesity Res 2005)
- Low income is associated with higher obesity and higher consumption of fast foods, snacks and soft drinks.

THE JOURNAL OF PEDIATRICS • www.jpeds.com

Occurrence and Timing of Childhood Overweight and Mortality: Findings from the Third Harvard Growth Study

Aviva Must, PhD[1], Sarah M. Phillips, MPH[1], and Elena N. Naumova, PhD[1,2]

Objective To assess the mortality experience of participants in the Third Harvard Growth Study (1922-1935) who provided ≥8 years of growth data.

Study design A total of 1877 participants provided an average of 10.5 body mass index measurements between age 6 and 18 years. Based on these measurements, the participants were classified as ever overweight or ever >85th percentile for height in childhood. Age at peak height velocity was used to indicate timing of overweight relative to puberty. Relative risks of all-cause and cause-specific mortality according to measures of childhood growth were estimated using Cox proportional hazards survival analysis.

Results For women, ever being overweight in childhood increased the risks of all-cause and breast cancer death; the risk of death from ischemic heart disease was increased in men. Men with a first incidence of overweight before puberty were significantly more likely to die from ischemic heart disease; women in the same category were more likely to die from all causes and from breast cancer.

Conclusion We find evidence of long-term effects of having ever been overweight, with some evidence that incidence before puberty influences the pattern of risk. *(J Pediatr 2012;160:743-50)*.

Table I. Summary statistics for subjects with at least 8 years of childhood data

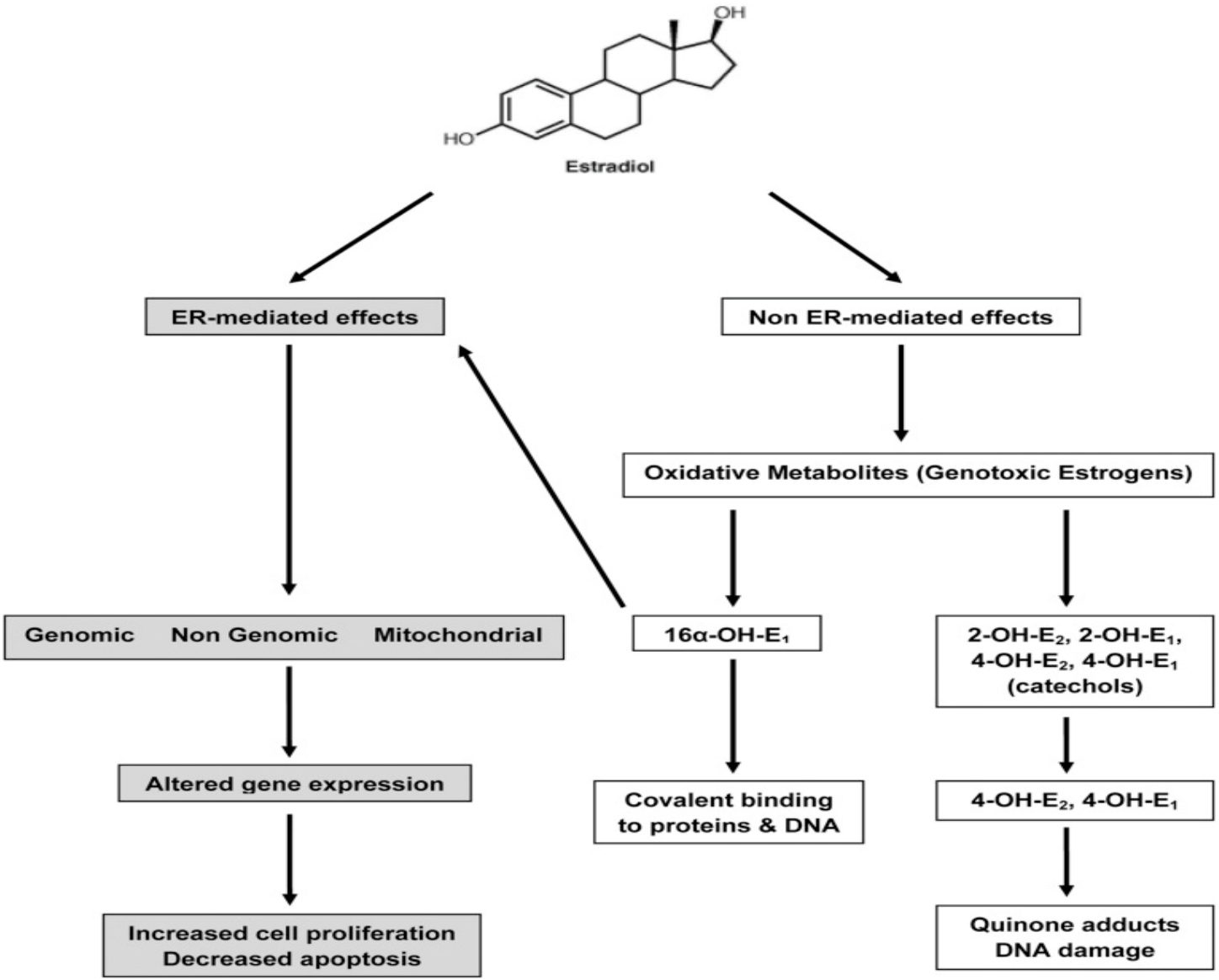
	Men (n = 1019)			Women (n = 858)		
	n	Mean (SD)	%	n	Mean (SD)	%
Childhood anthropometry						
Number of childhood measurements	10 749	10.6 (1.3)		9014	10.5 (1.3)	
Mean BMI *z*-score	1019	−0.05 (0.71)		858	−0.07 (0.78)	
Mean height-for-age *z*-score	1019	−0.82 (0.92)		858	−0.79 (0.95)	
Age at first incidence of overweight	232	8.5 (2.8)		206	9.3 (3.2)	
Age at PHV	755	14.1 (0.92)		804	12.1 (0.96)	
Age at menarche				230	12.8 (0.95)	
BMI-for-age ever >85th percentile	232	-	23	206	-	24
BMI-for-age ever >95th percentile	47	-	5	63	-	7
Height-for-age ever >85th percentile	72	-	7	59	-	7
First incidence of overweight before puberty	166	-	16	135	-	16
First incidence of overweight after puberty	19	-	2	53	-	6
Follow-up						
Midlife BMI	481	25.6 (3.1)		477	24.4 (3.8)	
Ever pregnant (total, n = 557)	-	-	-	404	-	73
Vital status						
Age at death	716	67.6 (13.5)		431	69.2 (14.4)	
Age at death from IHD	217	67.4 (10.6)		70	73.2 (8.0)	
Age at death from breast cancer	-	-		29	63.2 (13.5)	
Age at death from ovarian cancer	-	-		15	67.9 (13.6)	

Must A et al: Third Harvard Growth Study – J Pediatr 2012; 160: 743-750

Table IV. Unadjusted and adjusted RRs of mortality associated with ever overweight in childhood and timing of overweight in childhood among subset of subjects with data on midlife BMI or pregnancy

	Men			Women		
	n	Unadjusted	Adjusted*	n	Unadjusted	Adjusted*
All cause						
Ever overweight (overall)†	322	1.2 (0.92-1.5)	1.1 (0.86-1.5)	231	1.5 (1.1-2.0)‡	1.5 (1.1-2.0)‡
Never overweight in childhood	262	-	-	210	-	-
First incidence before puberty		1.2 (0.92-1.6)	1.2 (0.87-1.6)		1.5 (1.1-2.2)§	1.5 (1.04-2.2)§
First incidence after puberty		0.95 (0.39-2.3)	0.80 (0.32-2.0)		1.4 (0.88-2.3)	1.4 (0.86-2.3)
IHD						
Ever overweight (overall)†	95	1.6 (1.1-2.5)§	1.4 (0.90-2.3)	29	2.9 (1.4-6.1)‡	2.8 (1.3-6.0)‡
Never overweight in childhood	80	-	-	23	-	-
First incidence before puberty		1.6 (0.97-2.6)	1.4 (0.81-2.3)		4.3 (1.8-10.1)‡	4.5 (1.9-11.1)‡
First incidence after puberty		1.4 (0.34-5.7)	0.88 (0.20-3.8)		1.9 (0.42-8.5)	2.0 (0.44-9.1)
Breast cancer	-					
Ever overweight (overall)†		-	-	24	2.6 (1.1-5.8)§	2.6 (1.1-5.9)§
Never overweight in childhood		-	-	23	-	-
First incidence before puberty					2.7 (1.1-6.7)§	2.7 (1.1-6.7)§
First incidence after puberty					1.9 (0.43-8.3)	1.9 (0.44-8.5)
Ovarian cancer	-					
Ever overweight (overall)†		-	-	11	2.1 (0.63-7.4)	2.2 (0.64-7.6)
Never overweight in childhood		-	-	11	-	-
First incidence before puberty		-	-		0.80 (0.10-6.5)	0.81 (0.10-6.6)
First incidence after puberty		-	-		6.1 (1.6-23.5)‡	6.3 (1.6-24.3)‡

*All-cause and ischemic outcomes are adjusted for midlife BMI; breast and ovarian cancer adjusted for ever pregnant.
†Reference group for each model is never overweight.
‡$P \leq .01$.
§$P < .05$.



N Mauras et al: JCEM 2015

JNCI 2012

DOI: 10.1093/jnci/djr531
Advance Access publication on January 9, 2012.

ARTICLE

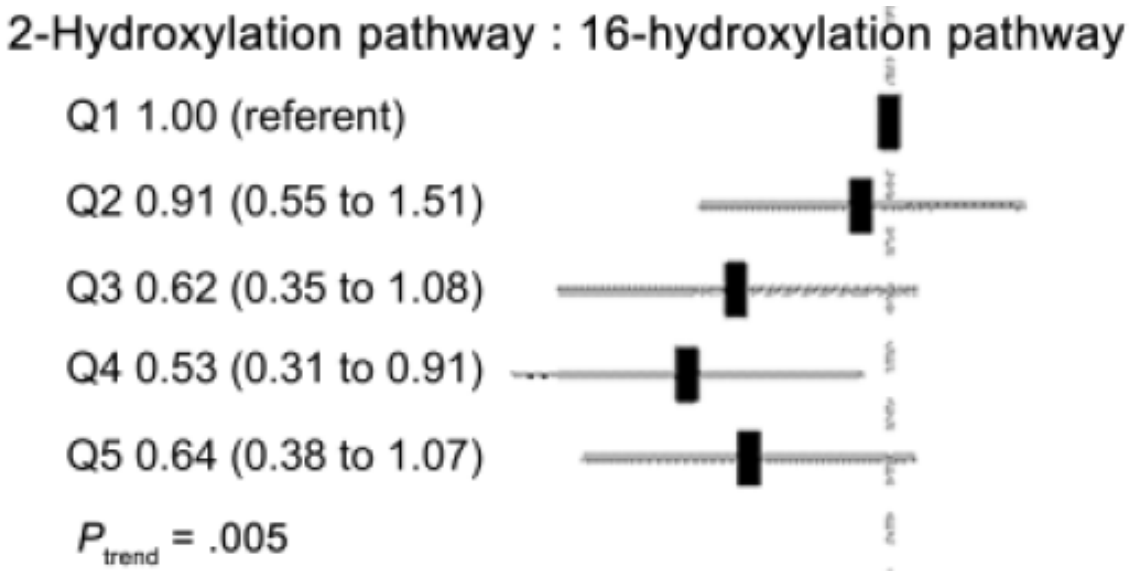
Estrogen Metabolism and Risk of Breast Cancer in Postmenopausal Women

Barbara J. Fuhrman, Catherine Schairer, Mitchell H. Gail, Jennifer Boyd-Morin, Xia Xu, Laura Y. Sue, Saundra S. Buys, Claudine Isaacs, Larry K. Keefer, Timothy D. Veenstra, Christine D. Berg, Robert N. Hoover, Regina G. Ziegler

Manuscript received January 19, 2011; revised July 16, 2011; accepted December 2, 2011.

Correspondence to: Barbara J. Fuhrman, PhD, Hormonal and Reproductive Epidemiology Branch, Division of Cancer Epidemiology and Genetics, National Cancer Institute, NIH, 6120 Executive Blvd, Rm 5100, Bethesda, MD 20892 (e-mail:fuhrmanb@mail.nih.gov).

Fuhrman et al JNCI 2012



Mauras N et al: JCEM 2012

ORIGINAL ARTICLE

Endocrine Care

Obesity without Established Comorbidities of the Metabolic Syndrome Is Associated with a Proinflammatory and Prothrombotic State, Even before the Onset of Puberty in Children

Nelly Mauras, Charles DelGiorno, Craig Kollman, Keisha Bird, Melissa Morgan, Shawn Sweeten, Prabhakaran Balagopal, and Ligeia Damaso

Nemours Children's Clinic (N.M., C.D., K.B., M.M., S.S., P.B., L.D.) and Mayo Clinic (C.D., M.M.), Jacksonville, Florida 32207; and Jaeb Center for Health Research (C.K.), Tampa, Florida 33647

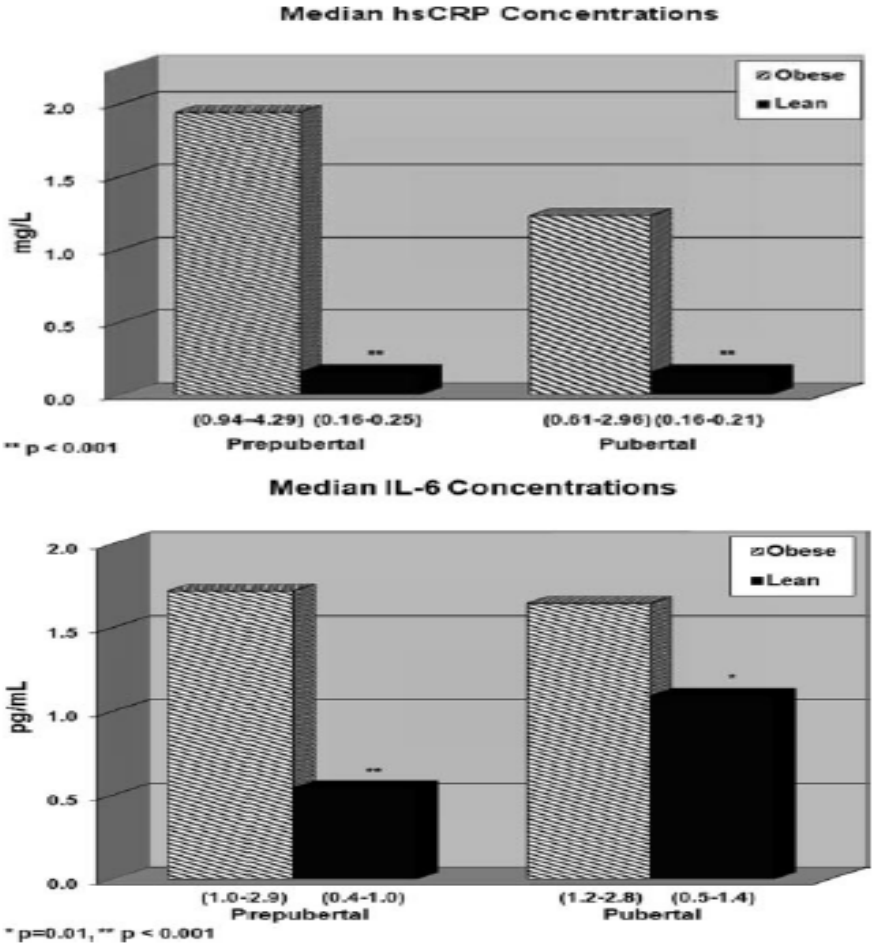


FIG. 1. Median (IQR) concentrations for hsCRP (*top panel*) and IL-6 concentrations in the group with simple obesity (*hatched bars*) and lean group (*solid bars*). The prepubertal and pubertal groups were shown as well.

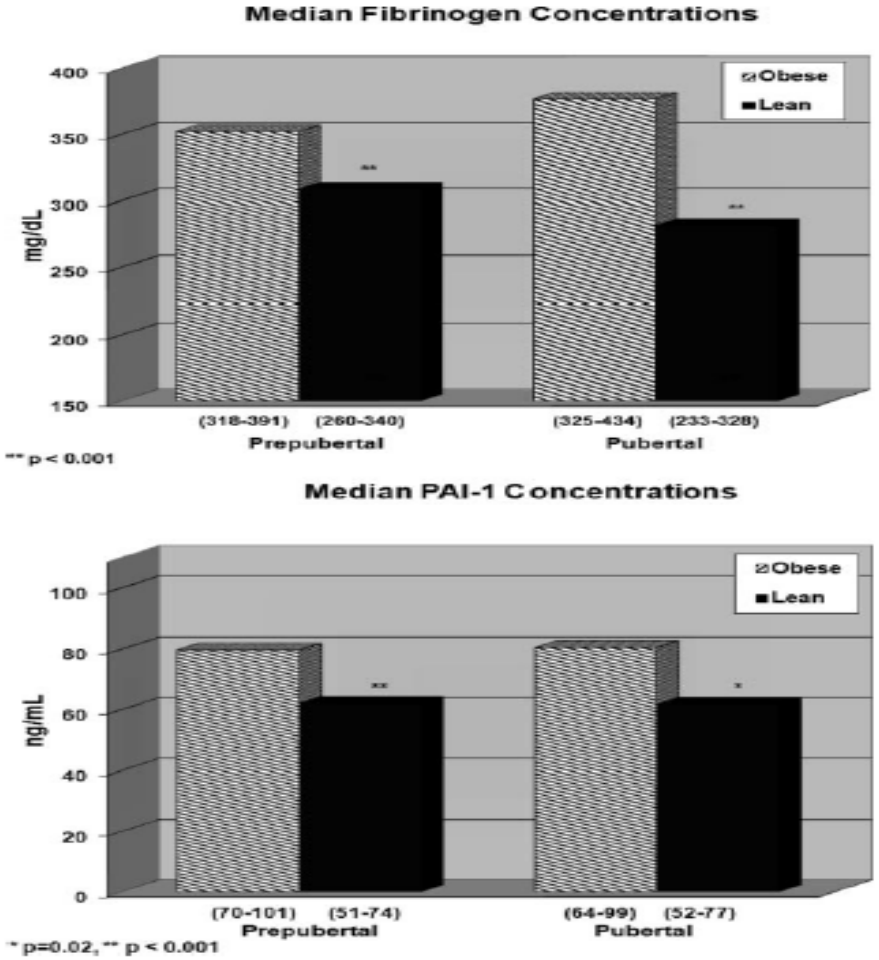
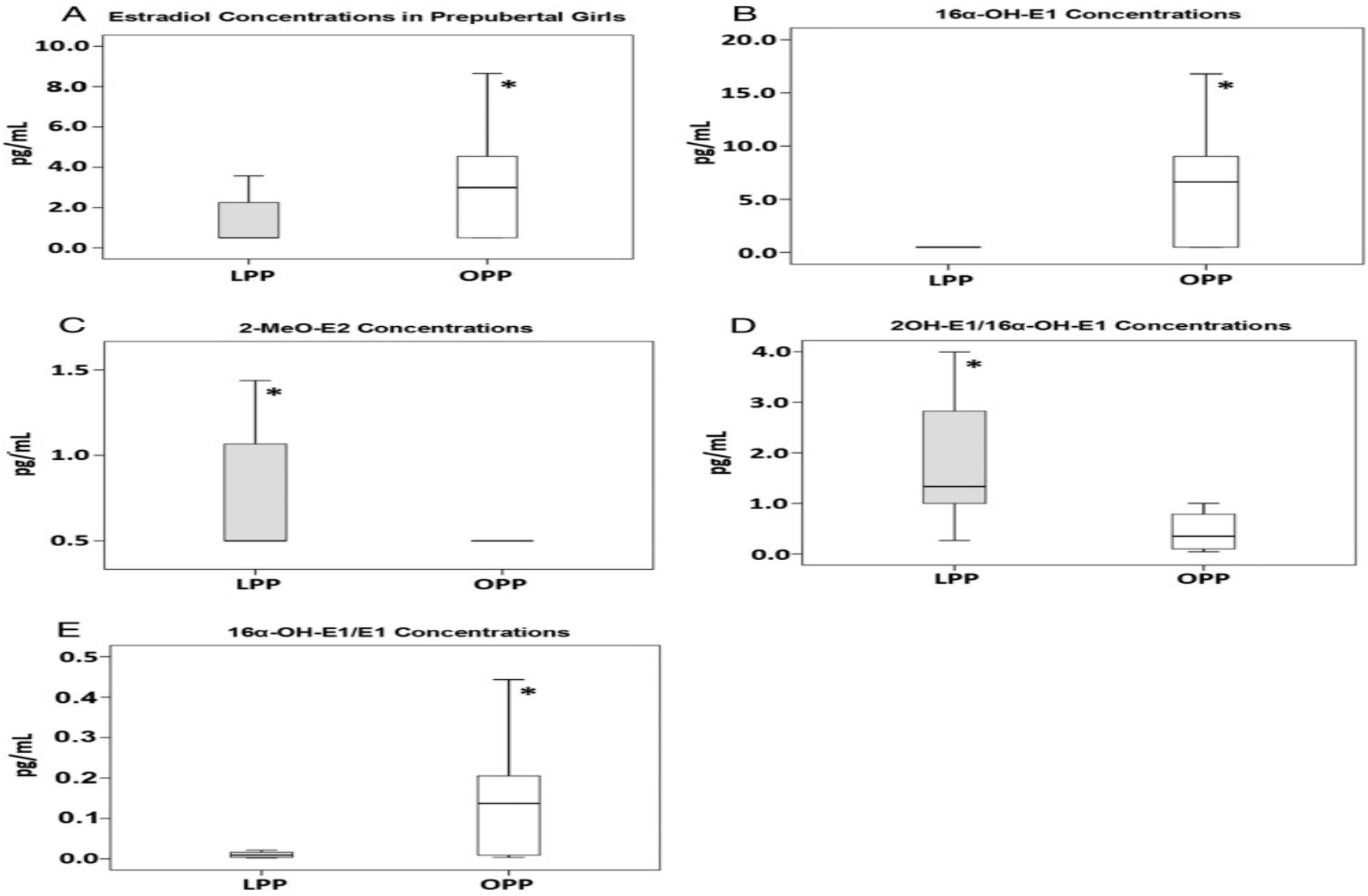
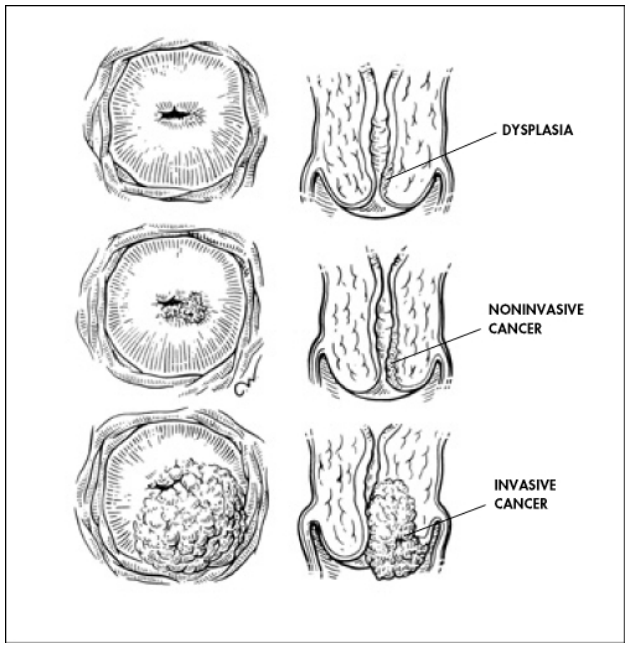


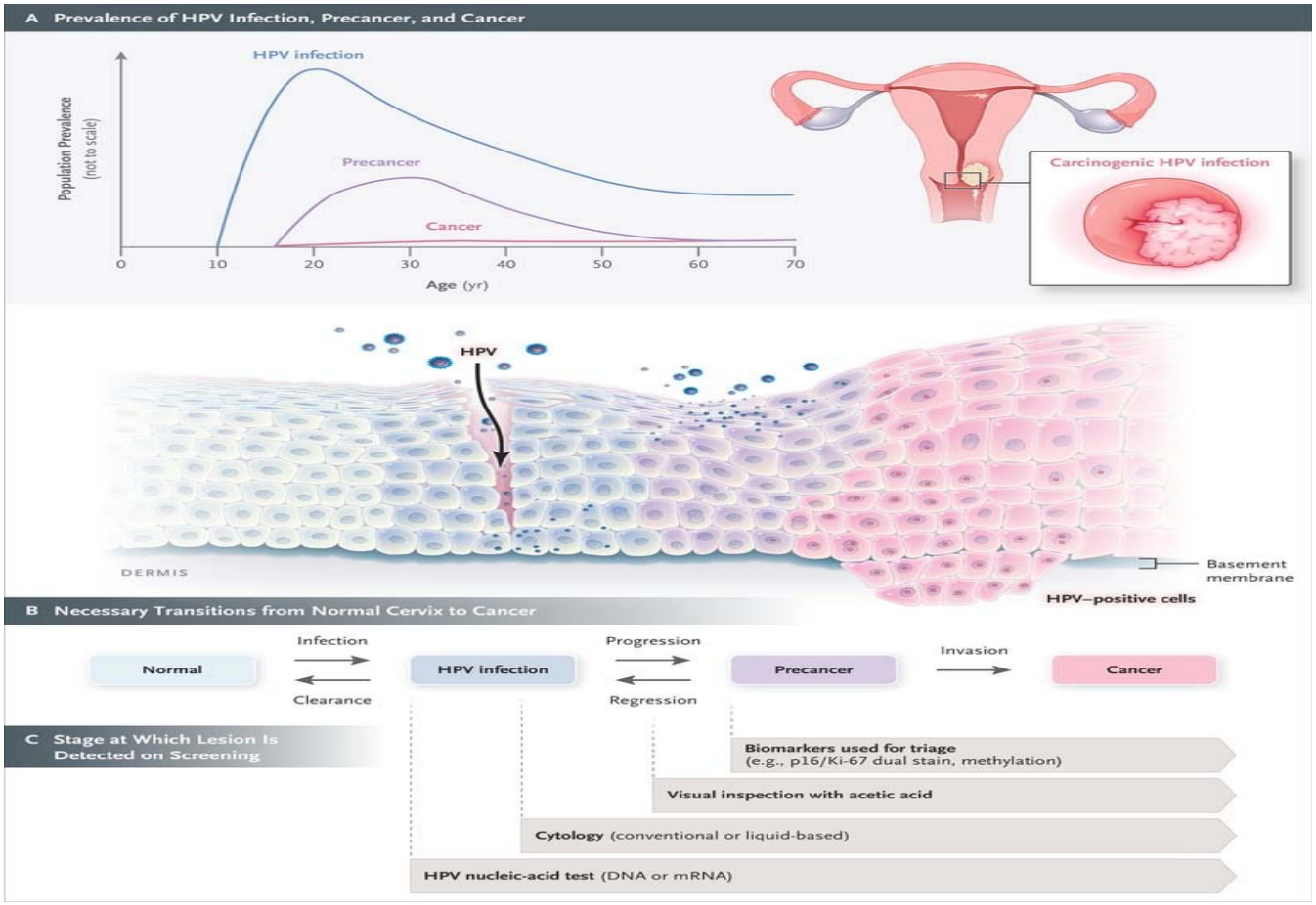
FIG. 2. Median (IQR) concentrations for fibrinogen (*top panel*) and PAI-1 concentrations (*bottom panel*) in the group with simple obesity (*hatched bars*) and lean group (*solid bars*). The prepubertal and pubertal groups were shown as well.


A
Estradiol Concentrations in Prepubertal Girls
pg/mL
10.0
8.0
6.0
4.0
2.0
0.0
*
LPP
OPP
B
16α-OH-E1 Concentrations
pg/mL
20.0
15.0
10.0
5.0
0.0
*
LPP
OPP
C
2-MeO-E2 Concentrations
pg/mL
1.5
1.0
0.5
*
LPP
OPP
D
2OH-E1/16α-OH-E1 Concentrations
pg/mL
4.0
3.0
2.0
1.0
0.0
*
LPP
OPP
E
16α-OH-E1/E1 Concentrations
pg/mL
0.5
0.4
0.3
0.2
0.1
0.0
*
LPP
OPP

Cervical Cancer



Bouvard et al: NEJM, November 11, 2021
International Agency for Research on Cancer (IARC)



Cervical Cancer in Latinas

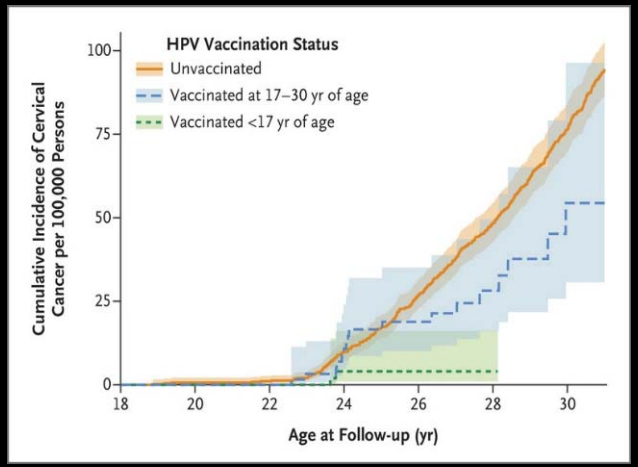
- Latinas: Incidence 34% higher and Mortality 23% higher than in NHW.
- Higher mortality in women younger than age 50
- HPV vaccination rates: Latinas adolescents: 63% vs 54% in NHW

CA: A Cancer Journal for Clinicians, First published: 21 September 2021, DOI: (10.3322/caac.21695)

Cervical Cancer

PREVENTION

- **HPV vaccination in 94% effective in preventing cervical cancer**
- **HPV vaccination is 54% effective if given ages 17-30**



J Lei et al: N Engl J Med 2020; 383:1340-1348
DOI: 10.1056/NEJMoa1917338

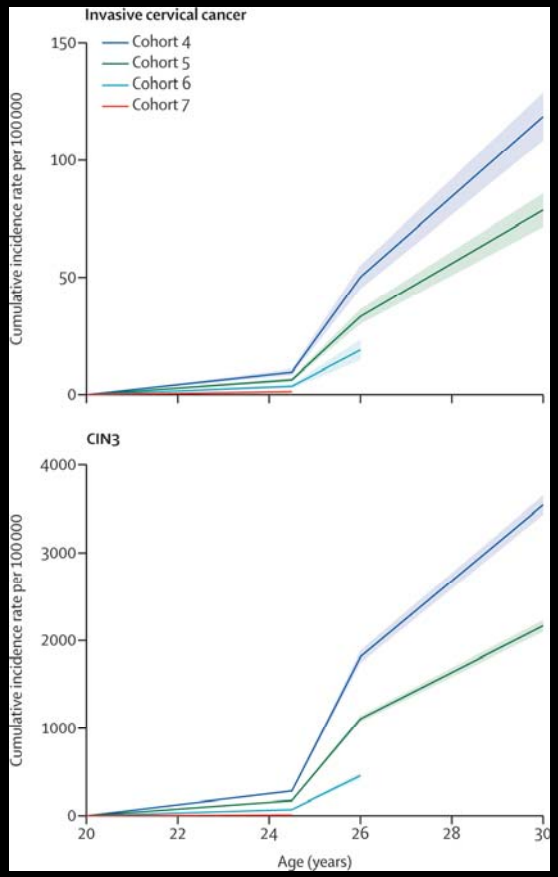
The effects of the national HPV vaccination programme in England, UK, on cervical cancer and grade 3 cervical intraepithelial neoplasia incidence: a register-based observational study

Milena Falcaro, PhD, Alejandra Castañon, PhD, Busani Ndlela, PhD, Marta Checchi, MSc, Kate Soldan, PhD, Jamie Lopez-Bernal, PhD, Lucy Elliss-Brookes, BSc, Prof Peter Sasieni

The Lancet

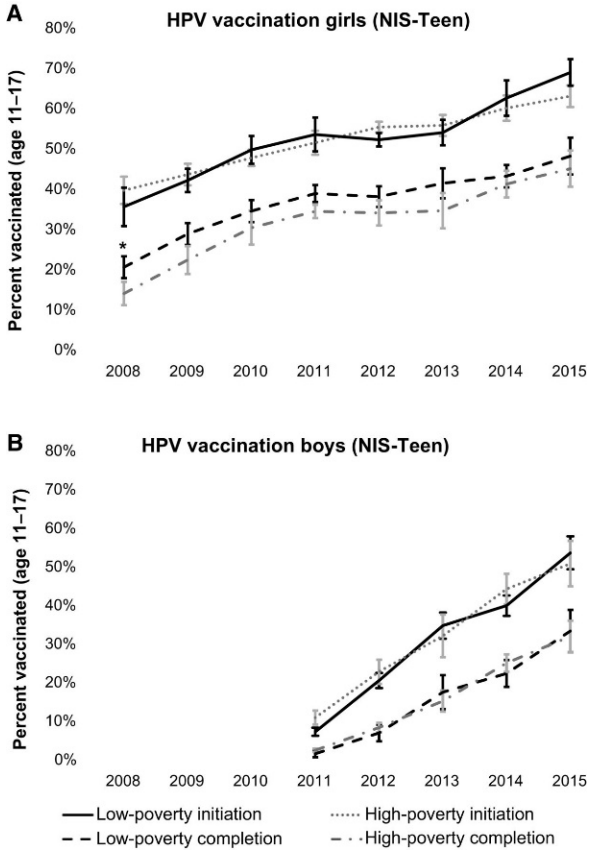
DOI: 10.1016/S0140-6736(21)02178-4

Figure 2



The Lancet DOI: (10.1016/S0140-6736(21)02178-4)

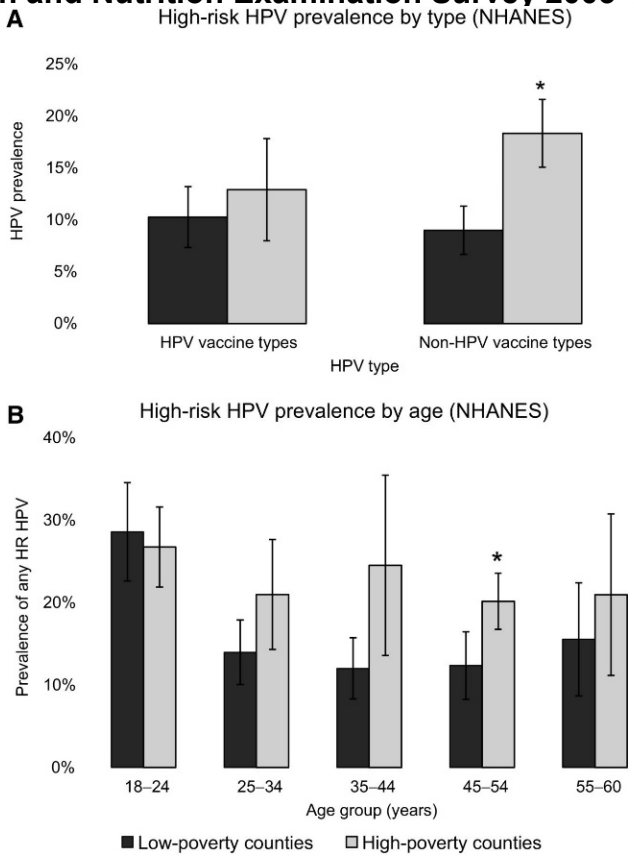
HPV vaccine initiation and completion by poverty quartile. *Different by Wald test comparing high- versus low-poverty counties (P < 0.05); error bars show 95% confidence intervals.



Jennifer C. Spencer et al. Cancer Epidemiol Biomarkers Prev 2021;30:1895-1903

AACR American Association for Cancer Research
Cancer Epidemiology, Biomarkers & Prevention

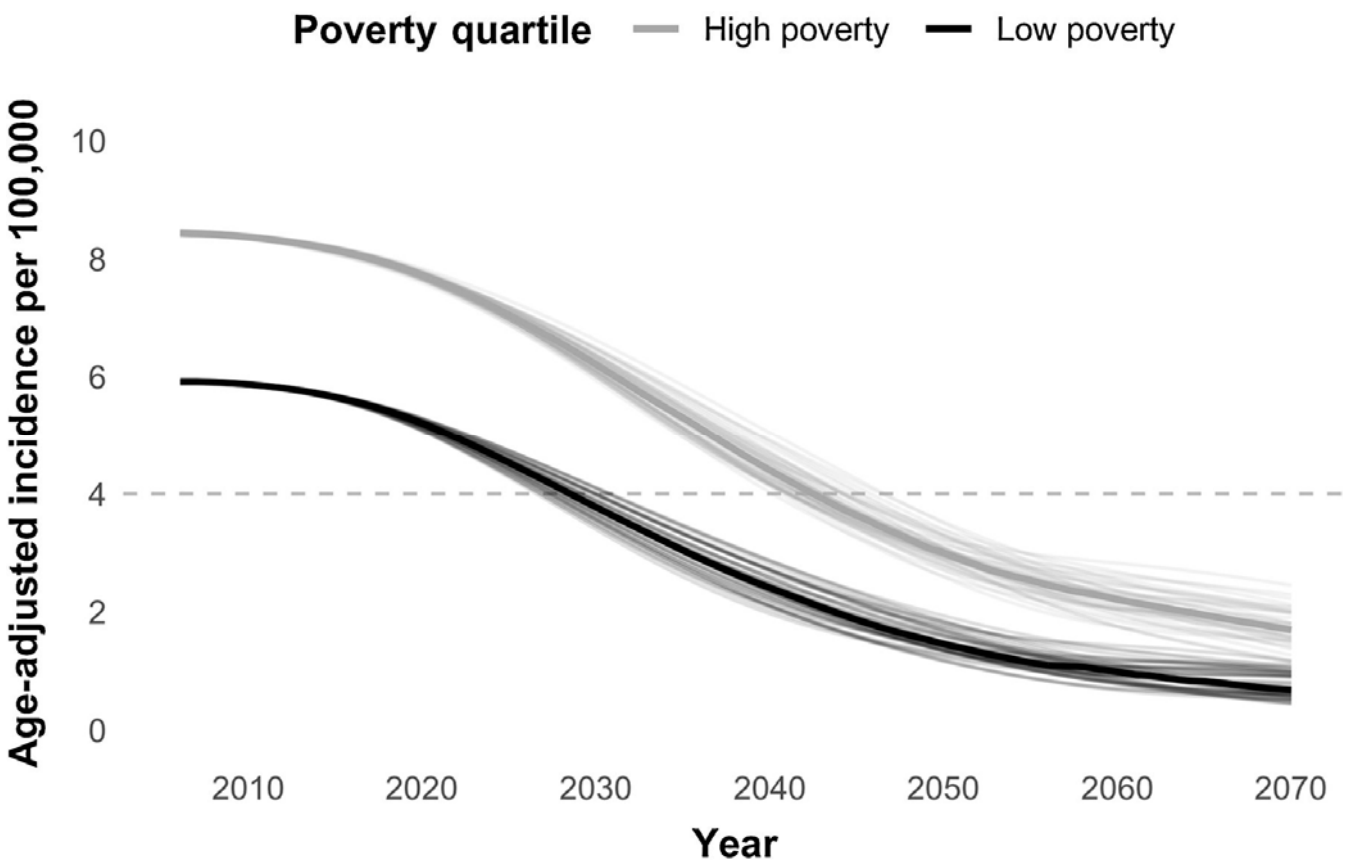
Prevalence of high-risk HPV by county poverty. *Different by Wald test comparing high- versus low-poverty counties (P < 0.05); Error bars represent 95% confidence interval; Data from National Health and Nutrition Examination Survey 2003–2006.



Jennifer C. Spencer et al. Cancer Epidemiol Biomarkers Prev 2021;30:1895-1903

AACR American Association for Cancer Research
Cancer Epidemiology, Biomarkers & Prevention

Projected cervical cancer incidence by poverty quartile.



Jennifer C. Spencer et al. Cancer Epidemiol Biomarkers Prev 2021;30:1895-1903

AACR American Association for Cancer Research
Cancer Epidemiology, Biomarkers & Prevention

Mayo Clinic Florida and Volunteers in Medicine

- Survey of their patient population (296 patients: 32.1% aware of HPV vaccinations vs 62.7% HINTS4, $p<0.0001$)
- Program to provide free HPV vaccination to their young population (age 45 or younger)
- Evaluating causes of vaccine hesitancy and effects of an education intervention

Cancer Med 2016 Nov;5(11):3346-3352. doi: 10.1002/cam4.933. Epub 2016 Oct 17

Mayo Clinic Florida and Local Hispanic Community

- Community Based Education Programs ***in* Spanish** to inform them of the available free breast cancer and cervical cancer screening programs (CDC)
- Education on breast cancer and cervical cancer screening and prevention
- **RESULTS: (296 participants, 6 education sessions)**

  Only 8% aware of CDC program

  53% spoke only Spanish

  63% were uninsured

  63% willing to change diet

  19.5% vs 13.5% Hispanics in CDC

Colon-Otero et al: Journal of Higher Education Outreach and Engagement 18 (1): p. 43, 2014

Conclusions

- Hispanic women overall have lower prevalence and mortality from breast cancer than NHW
- Breast cancer in Hispanics develops at a younger age, more likely triple negative or HER2 positive, advanced stage and with worse prognosis
- Emerging data on potential roles of stress from low SES status, childhood obesity, genotoxic estrogen metabolites, exogenous oral estrogens and genetics on early onset breast cancer
- Further studies are needed to elucidate the biological factors accounting for disparities in outcome among Latinas with breast cancer

Conclusions

- Importance of increasing awareness of screening and prevention programs for breast cancer and cervical cancer, particularly among young Latinas
- Latinas have a higher incidence and mortality from cervical cancer than NHW particularly among younger age groups
- Importance of education programs that provide improved access to HPV vaccination and cervical cancer screening for low-income Hispanic communities

Thank you for your attention.

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