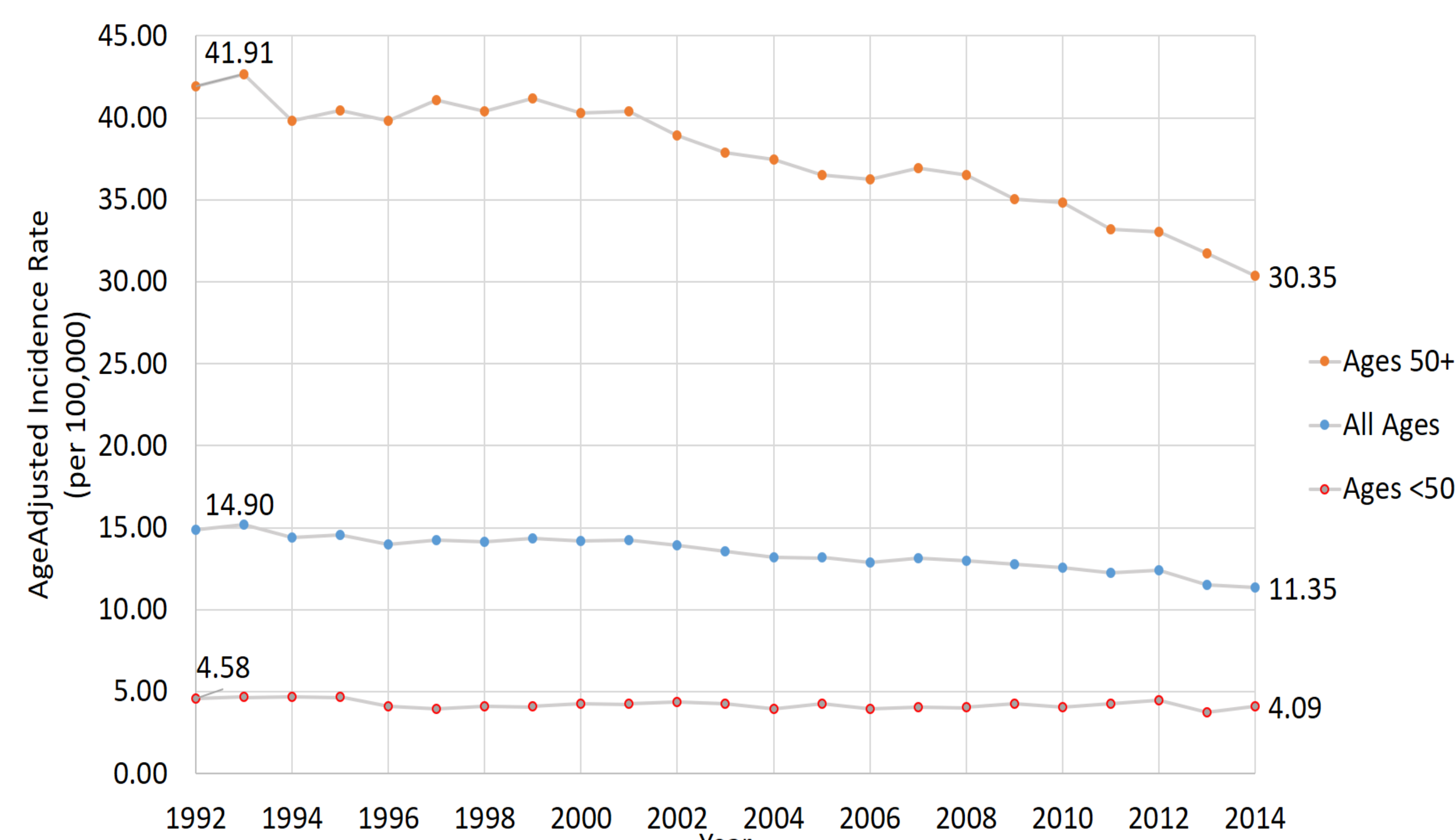




Background and Objective

- Ovarian cancer is the 4th leading cause of female cancer death in the United States.¹ According to the National Institutes of Health's Surveillance, Epidemiology, and End Results Program (SEER), its incidence has decreased over the past few decades, from 14.90 per 100,000 in 1992 to 11.35 per 100,000 in 2014 for all women combined; however, this decline is only apparent for women ages 50+, which is when most women are postmenopausal (see Figure 1).²
- There are several known ovarian cancer risk and protective factors. Many of them relate to a woman's hormone levels, including hormone therapy (HT), parity, and oral contraceptive use. However, only HT is considered to be a postmenopausal risk factor. In a cohort study conducted in Denmark by Mørch et al, they found that women who used HT had a 44% increased risk of developing ovarian cancer compared to women who did not.³ Therefore, the trend in ovarian cancer incidence over time, particularly among women ages 50+, could be explained by a decrease in HT use since it is associated with an increased risk of the disease.^{3,4}
- Purpose:** To examine trends in HT use by analyzing data from the National Health and Nutrition Examination Survey (NHANES)

Figure 1. Age-Adjusted Incidence Rates for Ovarian Cancer, By Year and Age Group



Methods

Data Source

- NHANES is a program created by the Center for Disease Control and Prevention (CDC) in the early 1960s that obtains the health and nutritional status of adults and children in the United States.⁵
- NHANES is composed of in-person questionnaires and physical examinations that are offered to a nationally representative sample of the United States every year.
- Participants complete a demographic questionnaire followed by a medical examination and additional questionnaires on topics, such as reproductive health and sexual behavior, if they qualify.

Hormone Therapy (HT) Data

- Questions regarding HT use were found in the reproductive health questionnaire of NHANES
- Example HT questions that were considered include the following:
 - Ever use female hormones?
 - Ever use hormone pills?
 - Ever use hormone pills w/ estrogen only?
 - Ever use estrogen/progestin combo pills?

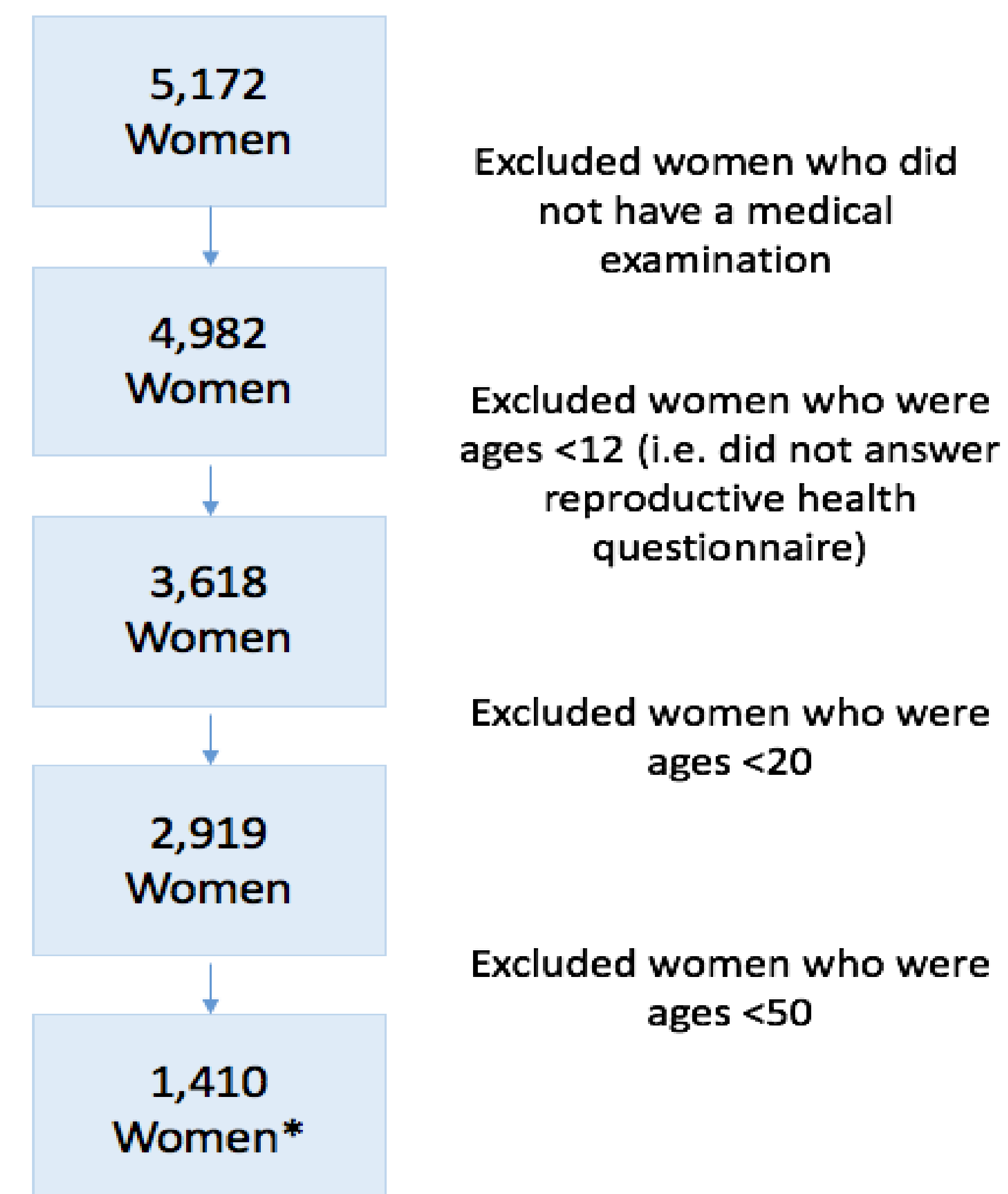
Methods (cont.)

Study Population

- Approximately 2500 women of all ages participate in NHANES each year.
- However, our final analysis only included women ages 50+ since we are interested in a risk factor specifically related to menopause.
- Figure 2 presents a detailed flowchart of our study population exclusions (numbers for 2013-2014 are presented as an example).

Analysis

- Prevalence of HT use (ever/never) was calculated by looking at the number of women that had used HT among the total number of women aged 50+ that answered the reproductive health questionnaire in NHANES.
- HT prevalence was calculated from 1999 (when the start of the decline in incidence rates for ovarian cancer was first most apparent according to SEER) to 2014 (the most recent NHANES data that were available at the time of the analysis).
- Type of HT (estrogen therapy (ET) and estrogen-progestin therapy (EPT)) were considered given that estrogen and progesterone are hypothesized to have opposite effects on risk of ovarian cancer.



*Women ages 50+ who answered the reproductive health questionnaire and completed a medical examination

Figure 2. Flowchart of Study Population Exclusions (for 2013-2014)

Results

- Overall prevalence of HT use declined from 39.16% in 1999-2000 to 30.99% in 2013-2014.
- Although more women reported ever using ET in comparison to EPT, the decline was seen in both (ET: 30.01% in 1999-2000 to 19.72% in 2013-2014, EPT: 7.59% in 1999-2000 to 5.60% in 2013-2014).
- However, there seems to be a slight increase in prevalence of HT use more recently (from 26.43% in 2011-2012 to 30.99% in 2013-2014).

Discussion

- The decrease in ovarian cancer incidence among women ages 50+ from 1999 to 2014 may be due to a decline in HT use.

Discussion (cont.)

- The decline in HT use is likely due to the Women's Health Initiative, which was a randomized trial that ended early due to evidence suggesting that the adverse health effects of HT outweighed the benefits.
- We also looked at women ages 20-49 and observed a slight decrease in HT use, which is consistent with their SEER ovarian cancer incidence trend as shown in Figure 1.

Table 1. Prevalence of Hormone Therapy Use Based on NHANES Data, 1999-2014

Year	Total # of Women*	Hormone Therapy (HT)		Estrogen Therapy (ET)		Estrogen-Progestin Therapy (EPT)	
		# of Women	%	# of Women	%	# of Women	%
1999-2000	1093	428	39.16%	328	30.01%	83	7.59%
2001-2002	1147	511	44.55%	389	33.91%	106	9.24%
2003-2004	1196	485	40.55%	352	29.43%	119	9.95%
2005-2006	1041	400	38.42%	288	27.67%	83	7.97%
2007-2008	1481	518	34.98%	378	25.52%	104	7.02%
2009-2010	1468	440	29.97%	319	21.73%	81	5.52%
2011-2012	1309	346	26.43%	247	18.87%	52	3.97%
2013-2014	1410	437	30.99%	278	19.72%	79	5.60%

*Women ages 50+ who answered the reproductive health questionnaire and completed a medical examination

Limitations

- This analysis only focused on HT, but there could be other risk and protective factors that affect development of ovarian cancer in postmenopausal women.
- The duration and recency of HT use was not considered, and these additional features are likely to affect ovarian cancer risk.
- The analyses for ET and EPT were only limited to pills and patches given the nature of the NHANES questionnaire, but there are other forms of HT, such as creams and injections.

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