

# Mimvey™ (estradiol and norethindrone acetate tablets, USP) R<sub>x</sub> only

## CARDIOVASCULAR AND OTHER RISKS

Estrogens with or without progestins should not be used for the prevention of cardiovascular disease or dementia. (See CLINICAL STUDIES and WARNINGS, Cardiovascular Disorders and Dementia.)

The estrogen plus progestin sub-study of the Women's Health Initiative (WHI) reported increased risks of myocardial infarction, stroke, invasive breast cancer, pulmonary emboli, and deep vein thrombosis in postmenopausal women (50 to 79 years of age) during 5.6 years of treatment with oral conjugated estrogens (CE 0.625 mg) combined with medroxyprogesterone acetate (MPA 2.5 mg) per day, relative to placebo. (See CLINICAL STUDIES and WARNINGS, Cardiovascular Disorders and Malignant Neoplasms, Breast Cancer.)

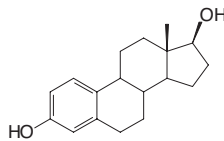
The estrogen-alone sub-study of the WHI reported increased risks of stroke and deep vein thrombosis (DVT) in postmenopausal women (50 to 79 years of age) during 6.8 years and 7.1 years, respectively, of treatment with oral conjugated estrogens (CE 0.625 mg) per day, relative to placebo. (See CLINICAL STUDIES and WARNINGS, Cardiovascular Disorders.)

The Women's Health Initiative Memory Study (WHIMS), a sub-study of the WHI study, reported increased risk of developing probable dementia in postmenopausal women 65 years of age or older during 4 years of treatment with CE 0.625 mg combined with MPA 2.5 mg and during 5.2 years of treatment with CE 0.625 mg alone, relative to placebo. It is unknown whether this finding applies to younger postmenopausal women. (See CLINICAL STUDIES, WARNINGS, Dementia and PRECAUTIONS, Geriatric Use.) Other doses of oral conjugated estrogens with medroxyprogesterone acetate, and other combinations and dosage forms of estrogens and progestins were not studied in the WHI clinical trials and, in the absence of comparable data, these risks should be assumed to be similar. Because of these trials, estrogens with or without progestins should be prescribed at the lowest effective doses and for the shortest duration consistent with treatment goals and risks for the individual woman.

## DESCRIPTION

Mimvey (estradiol and norethindrone acetate) 1 mg/0.5 mg is a single tablet for oral administration containing 1 mg of estradiol and 0.5 mg of norethindrone acetate and the following inactive ingredients: lactose, colloidal silicon dioxide, copovidone, hypromellose, magnesium stearate, polyethylene glycol, polysorbate 80, starch and titanium dioxide.

Estradiol (E<sub>2</sub>) is a white or almost white crystalline powder. Its chemical name is *estra-1, 3, 5 (10)-triene-3, 17 $\alpha$ -diol hemihydrate*. The structural formula is as follows:

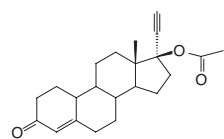


Estradiol

C<sub>18</sub>H<sub>24</sub>O<sub>2</sub>, 172 H<sub>2</sub>O

Molecular Weight: 281.4

Norethindrone acetate (NETA) is a white or yellowish-white crystalline powder. Its chemical name is *17 $\alpha$ -acetoxy-19-nor-17 $\alpha$ -pregn-4-en-20-yn-3-one*. The structural formula of NETA is as follows:



Norethindrone Acetate

C<sub>22</sub>H<sub>28</sub>O<sub>3</sub>

Molecular Weight: 340.5

## CLINICAL PHARMACOLOGY

Endogenous estrogens are largely responsible for the development and maintenance of the female reproductive system and secondary sexual characteristics. Although circulating estrogens exist in a dynamic equilibrium of metabolic interconversions, estradiol is the principal intracellular human estrogen and is substantially more potent than its metabolites, estrone and estradiol, at the receptor level.

The primary source of estrogen in normally cycling adult women is the ovarian follicle, which secretes 70 to 500 mcg of estradiol daily, depending on the phase of the menstrual cycle. After menopause, most endogenous estrogen is produced by conversion of androstenedione, secreted by the adrenal cortex, to estrone by peripheral tissues. Thus, estrone and the sulfate-conjugated form, estrone sulfate, are the most abundant circulating estrogens in postmenopausal women.

Estrogens act through binding to nuclear receptors in estrogen-responsive tissues. To date, two estrogen receptors have been identified. These vary in proportion from tissue to tissue.

Circulating estrogens modulate the pituitary secretion of the gonadotropins, luteinizing hormone (LH), and follicle-stimulating hormone (FSH) through a negative feedback mechanism. Estrogens act to reduce the elevated levels of these hormones seen in postmenopausal women.

Progestin compounds enhance cellular differentiation and generally oppose the actions of estrogens by decreasing estrogen receptor levels, increasing local metabolism of estrogens to less active metabolites, or inducing gene products that blunt cellular responses to estrogen. Progestins exert their effects in target cells by binding to specific progesterone receptors that interact with progesterone response elements in target genes. Progesterone receptors have been identified in the female reproductive tract, breast, pituitary, hypothalamus, and central nervous system. Progestins produce similar endometrial changes to those of the naturally occurring hormone progesterone.

## PHARMACOKINETICS

### A. Absorption

Estradiol is well absorbed through the gastrointestinal tract. Following oral administration of estradiol and norethindrone acetate tablets, peak plasma estradiol concentrations are reached slowly within 5 to 8 hours. When given orally, estradiol is extensively metabolized (first-pass effect) to estrone sulfate, with smaller amounts of other conjugated and unconjugated estrogens. After oral administration, norethindrone acetate is rapidly absorbed and transformed to norethindrone. It undergoes first-pass metabolism in the liver and other enteric organs, and reaches a peak plasma concentration within 0.5 to 1.5 hours after the administration of estradiol and norethindrone acetate tablets. The oral bioavailability of estradiol and norethindrone following administration of estradiol and norethindrone acetate 1 mg/0.5 mg when compared to a combination oral solution is 53% and 100%, respectively. Administration of estradiol and norethindrone acetate 1 mg/0.5 mg with food did not modify the bioavailability of estradiol, although increases in AUC<sub>0-72</sub> of 19% and decreases in C<sub>max</sub> of 36% for norethindrone were seen.

The pharmacokinetic parameters of estradiol (E<sub>2</sub>), estrone (E<sub>1</sub>), and norethindrone (NET) following oral administration of 1 estradiol and norethindrone acetate 1 mg/0.5 mg or 2 estradiol and norethindrone acetate 0.5 mg/0.1 mg tablet(s) to healthy postmenopausal women are summarized in Table 1.

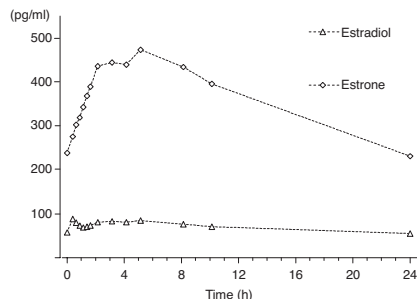
**TABLE 1**  
**PHARMACOKINETIC PARAMETERS AFTER ADMINISTRATION OF 1 TABLET OF ESTRADIOL AND NORETHINDRONE ACETATE 1 MG/0.5 MG OR 2 TABLETS OF ESTRADIOL AND NORETHINDRONE ACETATE 0.5 MG/0.1 MG TO HEALTHY POSTMENOPAUSAL WOMEN**

	1 x Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n=24) Mean <sup>a</sup> (%CV) <sup>b</sup>	2 x Estradiol and Norethindrone Acetate 0.5 mg/0.1 mg (n=24) Mean <sup>a</sup> (%CV) <sup>b</sup>
Estradiol <sup>c</sup> (E <sub>2</sub> ) AUC <sub>0-72</sub> (pg/mL * h) C <sub>max</sub> (pg/mL) t <sub>max</sub> (h): median (range) t <sub>1/2</sub> (h) <sup>d</sup>	766.5 (48) 26.8 (36) 6.0 (0.5-16.0) 14.0 <sup>e</sup> (29)	697.3 (53) 26.5 (37) 6.5 (0.5-16.0) 14.5 <sup>e</sup> (27)
Estrone <sup>c</sup> (E <sub>1</sub> ) AUC <sub>0-72</sub> (pg/mL * h) C <sub>max</sub> (pg/mL) t <sub>max</sub> (h): median (range) t <sub>1/2</sub> (h) <sup>d</sup>	4469.1 (47) 195.5 (38) 6.02 (1.0-9.0) 10.7 (44) <sup>a</sup>	4506.4 (44) 199.5 (30) 6.0 (2.0-9.0) 11.8 (25) <sup>a</sup>
Norethindrone (NET) AUC <sub>0-72</sub> (pg/mL * h) C <sub>max</sub> (pg/mL) t <sub>max</sub> (h): median (range) t <sub>1/2</sub> (h) <sup>d</sup>	21043 (41) 5249.5 (47) 9.8 (0.7-1.25) 0.7 (32) <sup>b</sup>	8407 (43) 2375.4 (41) 0.8 (0.7-1.3) 11.4 (36) <sup>b</sup>

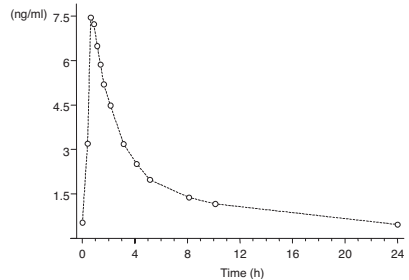
AUC = area under the curve, 0 – last quantifiable sample  
C<sub>max</sub> = maximum plasma concentration  
t<sub>max</sub> = time at maximum plasma concentration  
t<sub>1/2</sub> = half-life  
<sup>a</sup>geometric mean; <sup>b</sup>geometric % coefficient of variation; <sup>c</sup>baseline unadjusted data; <sup>d</sup>baseline unadjusted data; <sup>e</sup>n=18; <sup>f</sup>n=16; <sup>g</sup>n=13; <sup>h</sup>n=22; <sup>i</sup>n=21

Following continuous dosing with once-daily administration of estradiol and norethindrone acetate 1 mg/0.5 mg, serum levels of estradiol, estrone, and norethindrone reached steady-state within two weeks with an accumulation of 33 to 47% above levels following single dose administration. Unadjusted circulating levels of E<sub>2</sub>, E<sub>1</sub>, and NET during estradiol and norethindrone acetate 1 mg/0.5 mg treatment at steady-state (dosing at time 0) are provided in Figures 1a and 1b.

**Figure 1a**  
**Levels of Estradiol and Estrone at Steady-State During Continuous Dosing with Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n=24)**



**Figure 1b**  
**Levels of Norethindrone at Steady-State During Continuous Dosing with Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n=24)**



### B. Distribution

The distribution of exogenous estrogens is similar to that of endogenous estrogens. Estrogens are widely distributed in the body and are generally found in higher concentrations in the sex hormone target organs. Estradiol circulates in the blood bound to sex-hormone-binding globulin (SHBG) (37%) and to albumin (61%), while only approximately 1 to 2% is unbound. Norethindrone also binds to a similar extent to SHBG (36%) and to albumin (61%).

### C. Metabolism

**Estradiol**  
Exogenous estrogens are metabolized in the same manner as endogenous estrogens. Circulating estrogens exist in a dynamic equilibrium of metabolic interconversions. These transformations take place mainly in the liver. Estradiol is converted reversibly to estrone, and both can be converted to estril, which is the major urinary metabolite. Estrogens also undergo enterohepatic recirculation via sulfate and glucuronide conjugation in the liver, biliary secretion of conjugates into the intestine, and hydrolysis in the intestine followed by reabsorption. In postmenopausal women, a significant proportion of the circulating estrogens exist as sulfate conjugates, especially estrone sulfate, which serves as a circulating reservoir for the formation of more active estrogens.

## Norethindrone Acetate

The most important metabolites of norethindrone are isomers of 5 $\alpha$ -dihydro-norethindrone and tetrahydro-norethindrone, which are excreted mainly in the urine as sulfate or glucuronide conjugates.

### D. Excretion

Estradiol, estrone, and estril are excreted in the urine along with glucuronide and sulfate conjugates. The half-life of estradiol following single dose administration of estradiol and norethindrone acetate 1 mg/0.5 mg is 12 to 14 hours. The terminal half-life of norethindrone is about 8 to 11 hours.

### E. Special Populations

No pharmacokinetic studies were conducted in special populations, including patients with renal or hepatic impairment.

### F. Drug Interactions

Co-administration of estradiol with norethindrone acetate did not elicit any apparent influence on the pharmacokinetics of norethindrone. Similarly, no relevant interaction of norethindrone on the pharmacokinetics of estradiol was found within the NETA dose range investigated in a single dose study.

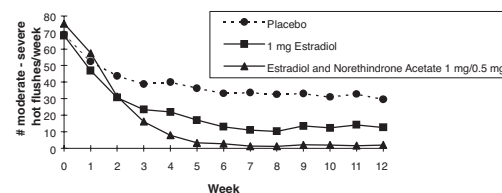
*In vitro* and *in vivo* studies have shown that estrogens are metabolized partially by cytochrome P450 3A4 (CYP3A4). Therefore, inducers or inhibitors of CYP3A4 may affect estrogen drug metabolism. Inducers of CYP3A4 such as St. John's Wort preparations (Hypericum perforatum), phenobarbital, carbamazepine, and rifampin may reduce plasma concentrations of estrogens, possibly resulting in a decrease in therapeutic effects and/or changes in the uterine bleeding profile. Inhibitors of CYP3A4 such as erythromycin, clarithromycin, ketoconazole, itraconazole, ritonavir and grapefruit juice may increase plasma concentrations of estrogens and result in side effects.

## CLINICAL STUDIES

### Effects on Vasomotor Symptoms

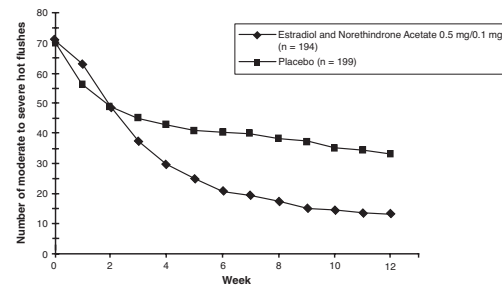
In a 12-week randomized clinical trial involving 92 subjects, estradiol and norethindrone acetate 1 mg/0.5 mg was compared to 1 mg of estradiol and to placebo. The mean number and intensity of hot flashes were significantly reduced from baseline to week 4 and 12 in both the estradiol and norethindrone acetate 1 mg/0.5 mg and the 1 mg estradiol group compared to placebo (see Figure 2).

**Figure 2**  
**Mean Weekly Number of Moderate and Severe Hot Flashes in a 12-Week Study**



In a study conducted in Europe a total of 577 postmenopausal women were randomly assigned to either estradiol and norethindrone acetate 0.5 mg/0.1 mg, 0.5 mg E<sub>2</sub>/0.25 mg NETA, or placebo for 24 weeks of treatment. The mean number and severity of hot flashes were significantly reduced at week 4 and week 12 in the estradiol and norethindrone acetate 0.5 mg/0.1 mg (see Figure 3) and 0.5 mg E<sub>2</sub>/0.25 mg NETA groups compared to placebo.

**Figure 3**  
**Mean Number of Moderate to Severe Hot Flashes for Weeks 0 Through 12**



### Effects on the Endometrium

Estradiol and norethindrone acetate 1 mg/0.5 mg reduced the incidence of estrogen-induced endometrial hyperplasia at 1 year in a randomized, controlled clinical trial. This trial enrolled 1,176 subjects who were randomized to one of 4 arms: 1 mg estradiol unopposed (n=296), 1 mg E<sub>2</sub> + 0.1 mg NETA (n=294), 1 mg E<sub>2</sub> + 0.25 mg NETA (n=291), and estradiol and norethindrone acetate 1 mg/0.5 mg (n=295). At the end of the study, endometrial biopsy results were available for 988 subjects. The results of the 1 mg estradiol unopposed arm compared to estradiol and norethindrone acetate 1 mg/0.5 mg are shown in Table 2.

**TABLE 2**  
**INCIDENCE OF ENDOMETRIAL HYPERPLASIA WITH UNOPPOSED ESTRADIOL AND ESTRADIOL AND NORETHINDRONE ACETATE 1 MG/0.5 MG IN A 12-MONTH STUDY**

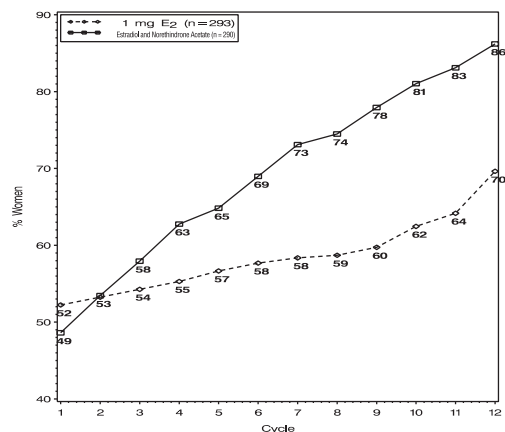
	1 mg E <sub>2</sub> (n=296)	Estradiol and Norethindrone Acetate 1 mg E <sub>2</sub> /0.50 mg NETA (n=295)	1 mg E <sub>2</sub> /0.25 mg NETA (n=291)	1 mg E <sub>2</sub> /0.1 mg NETA (n=294)
No. of subjects with histological evaluation at the end of the study	247	247	251	249
No. (%) of subjects with endometrial hyperplasia at the end of the study	36 (14.6%)	1 (0.4%)	1 (0.4%)	2 (0.8%)

### Effects on Uterine Bleeding or Spotting

During the initial months of therapy, irregular bleeding or spotting occurred with estradiol and norethindrone acetate 1 mg/0.5 mg treatment. However, bleeding tended to decrease over time, and after 12 months of treatment with estradiol and norethindrone acetate 1 mg/0.5 mg, about 86% of women were

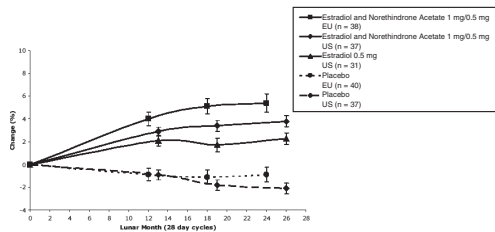
amenorrheic (see Figure 4).

**Figure 4**  
Patients Treated with Estradiol and Norethindrone Acetate 1 mg/0.5 mg with Cumulative Amenorrhea over Time Percentage of Women with no Bleeding or Spotting at any Cycle Through Cycle 13 Intent to Treat Population, LOCF



**Note:** The percentage of patients who were amenorrheic in a given cycle and through cycle 13 is shown. If data were missing, the bleeding value from the last reported day was carried forward (LOCF). In the clinical trial with estradiol and norethindrone acetate 0.5 mg/0.1 mg, 88% of women were amenorrheic after 6 months of treatment (See Figure 5).

**Figure 6**  
Percentage Change in Bone Mineral Density (BMD) ± SEM of the Lumbar Spine (L1-L4) for Estradiol and Norethindrone Acetate 1 mg/0.5 mg and Estradiol 0.5 mg\* (Intent to Treat Analysis with Last Observation Carried Forward)



\*While estradiol and norethindrone acetate 0.5 mg/0.1 mg was not directly studied in these trials, the US trial showed that addition of NETA to estradiol enhances the effect on BMD, therefore the BMD changes expected from treatment with estradiol and norethindrone acetate 0.5 mg/0.1 mg should be at least as great as observed with estradiol 0.5 mg.

**Effect on Bone Turnover**

Estradiol and norethindrone acetate 1 mg/0.5 mg reduced serum and urine markers of bone turnover with a marked decrease in bone resorption markers (e.g., urinary pyridinoline crosslinks Type 1 collagen telopeptide, pyridinoline, deoxypyridinoline) and to a lesser extent in bone formation markers (e.g., serum osteocalcin, bone-specific alkaline phosphatase, C-terminal propeptide of type 1 collagen). The suppression of bone turnover markers was evident by 3 months and persisted throughout the 24-month treatment period. Treatment with 0.5 mg estradiol decreased biochemical markers of bone resorption (urinary pyridinoline, urinary deoxypyridinoline) and bone formation (bone-specific alkaline phosphatase) compared to placebo. These decreases occurred by 6 months of treatment after which the levels were maintained throughout the 24 months.

**Women's Health Initiative Studies**

The WHI enrolled a total of 27,000 predominantly healthy postmenopausal women in two sub-studies to assess the risks and benefits of either the use of oral conjugated estrogens (CE 0.625 mg per day) alone or the use of oral conjugated estrogens (CE 0.625 mg) plus medroxyprogesterone acetate (MPA 2.5 mg per day) compared to placebo in the prevention of certain chronic diseases. The primary endpoint was the incidence of coronary heart disease (CHD) (nonfatal myocardial infarction (MI), silent MI and CHD death), with invasive breast cancer as the primary adverse outcome studied. A "global index" included the earliest occurrence of CHD, invasive breast cancer, stroke, pulmonary embolism (PE), endometrial cancer, colorectal cancer, hip fracture, or death due to other cause. The study did not evaluate the effects of CE or CE/MPA on menopausal symptoms. The estrogen-plus-progestin sub-study was stopped early. According to the predefined stopping rule, after an average follow-up of 5.2 years of treatment, the increased risk of breast cancer and cardiovascular events exceeded the specified benefits included in the "global index." The absolute excess risk of events included in the "global index" was 19 per 10,000 women-years (RR 1.15, 95% nCI 1.03-1.28).

For those outcomes included in the WHI "global index," that reached statistical significance after 5.6 years of follow-up, the absolute excess risks per 10,000 women-years in the group treated with CE/MPA were six more CHD events, seven more strokes, ten more PEs, and eight more invasive breast cancers, while the absolute risk reductions per 10,000 women-years were seven fewer colorectal cancers and five fewer hip fractures. (See BOXED WARNINGS, WARNINGS, and PRECAUTIONS.) Results of the estrogen-plus-progestin sub-study, which included 16,608 women (average age of 63 years, range 50 to 79; 83.9% White, 6.8% Black, 5.4% Hispanic, 3.9% Other) are presented in Table 4 below:

**TABLE 4**  
RELATIVE AND ABSOLUTE RISK SEEN IN THE ESTROGEN-PLUS-PROGESTINSUB-STUDY OF WHI AT AN AVERAGE OF 5.6 YEARS\*

Event	Relative Risk CE/MPA vs. Placebo (95% nCI) <sup>b</sup>	CE/MPA	Placebo
		n = 8,506	n = 8,102
		Absolute Risk per 10,000 Women-Years	
CHD events	1.24 (1.00-1.54)	39	33
Non-fatal MI	1.28 (1.00-1.63)	31	25
CHD death <sup>c</sup>	1.10 (0.70-1.75)	8	8
All strokes	1.31 (1.02-1.68)	31	24
Ischemic stroke	1.44 (1.09-1.90)	26	18
Deep vein thrombosis	1.95 (1.43-2.67)	26	13
Pulmonary embolism	2.13 (1.45-3.11)	18	8
Invasive breast cancer <sup>e</sup>	1.24 (1.01-1.54)	41	33
Invasive colorectal cancer	0.56 (0.38-0.81)	9	16
Endometrial cancer	0.81 (0.48-1.36)	6	7
Cervical cancer	1.44 (0.47-4.42)	2	1
Hip fracture	0.67 (0.47-0.96)	11	16
Vertebral fractures	0.65 (0.46-0.92)	11	17
Lower arm/wrist fractures	0.71 (0.59-0.85)	44	62
Total fractures	0.76 (0.69-0.83)	152	199

\*Results are based on centrally adjudicated data. Mortality data was not part

of the adjudicated data; however, data at 5.2 years of follow-up showed no difference between the groups in terms of all-cause mortality (RR 0.98, 95% nCI 0.82-1.18).

<sup>b</sup>Nominal confidence intervals unadjusted for multiple looks and multiple comparisons.

<sup>c</sup>Includes metastatic and non-metastatic breast cancer, with the exception of *in situ* breast cancer.

The estrogen-alone sub-study was also stopped early because an increased risk of stroke was observed, and it was deemed that no further information would be obtained regarding the risks and benefits of estrogen alone in premenopausal primary endpoints. Results of the estrogen-alone sub-study, which included 10,739 women (average age of 63 years, range 50 to 79; 75.3% White, 15.1% Black, 6.1% Hispanic, 3.6% Other), after an average follow-up of 6.8 years are presented in Table 5 below.

**TABLE 5**  
RELATIVE AND ABSOLUTE RISK SEEN IN THE ESTROGEN-ALONE SUB-STUDY OF WHI<sup>a</sup>

Event	Relative Risk CE vs. Placebo (95% nCI) <sup>b</sup>	CE	Placebo
		n = 5,310	n = 5,249
		Absolute Risk per 10,000 Women-Years	
CHD events <sup>b</sup>	0.95 (0.79-1.16)	53	56
Non-fatal MI <sup>b</sup>	0.91 (0.73-1.14)	40	43
CHD death <sup>c</sup>	1.01 (0.71-1.43)	16	16
Stroke <sup>e</sup>	1.39 (1.10-1.77)	44	32
Deep vein thrombosis <sup>b,d</sup>	1.47 (1.06-2.06)	23	15
Pulmonary embolism <sup>b</sup>	1.37 (0.90-2.07)	14	10
Invasive breast cancer <sup>b</sup>	0.80 (0.62-1.04)	28	34
Colorectal cancer <sup>e</sup>	1.08 (0.75-1.55)	17	16
Hip fracture <sup>e</sup>	0.61 (0.41-0.91)	11	17
Vertebral fractures <sup>c,d</sup>	0.62 (0.42-0.93)	11	17
Total fractures	0.70 (0.63-0.79)	139	195
Death due to other causes <sup>c,e</sup>	1.08 (0.88-1.32)	53	50
Overall mortality <sup>c,d</sup>	1.04 (0.88-1.22)	81	78
Global Index <sup>c,f</sup>	1.01 (0.91-1.12)	192	190

<sup>a</sup>Nominal confidence intervals unadjusted for multiple looks and multiple comparisons.

<sup>b</sup>Results are based on centrally adjudicated data for an average follow-up of 7.1 years.

<sup>c</sup>Results are based on an average follow-up of 6.8 years.

<sup>d</sup>Not included in Global Index.

<sup>e</sup>All deaths, except from breast or colorectal cancer, definite/probable CHD, PE or cerebrovascular disease.

<sup>f</sup>A subset of the events was combined in a "global index," defined as the earliest occurrence of CHD events, invasive breast cancer, stroke, pulmonary embolism, colorectal cancer, hip fracture, or death due to other causes.

For those outcomes included in the WHI "global index" that reached statistical significance, the absolute excess risk per 10,000 women-years in the group treated with estrogen-alone was 12 more strokes, while the absolute risk reduction per 10,000 women-years was six fewer hip fractures. The absolute excess risk of events included in the "global index" was a non-significant two events per 10,000 women-years. There was no difference between the groups in terms of all-cause mortality. (See BOXED WARNINGS, WARNINGS, and PRECAUTIONS.)

Final adjudicated results for CHD events from the estrogen-alone sub-study, after an average follow-up of 7.1 years, reported no overall difference for primary CHD events (nonfatal MI, silent MI and CHD death) in women receiving CE alone compared with placebo (see Table 5).

**Women's Health Initiative Memory Study**

The estrogen plus progestin Women's Health Initiative Memory Study (WHIMS) sub-study of WHI enrolled 4,532 predominantly healthy postmenopausal women 65 years of age and older (47%, age 65 to 69 years, 35%, age 70 to 74 years, 18%, 75 years of age and older) to evaluate the effects of CE 0.625 mg plus MPA 2.5 mg daily on the incidence of probable dementia (primary outcome) compared with placebo.

After an average follow-up of four years, 40 women in the estrogen-plus-progestin group (45 per 10,000 women-years) and 21 in the placebo group (22 per 10,000 women-years) were diagnosed with probable dementia. The relative risk of probable dementia in the hormone therapy group was 2.05 (95% CI, 1.21-3.48) compared to placebo. It is unknown whether these findings apply to younger postmenopausal women. (See BOXED WARNINGS, WARNINGS, Dementia, and PRECAUTIONS, Geriatric Use.)

The estrogen-alone WHIMS, a sub-study of the WHI study, enrolled 2,947 predominantly healthy postmenopausal women 65 years of age and older (45%, age 65 to 69 years, 36%, age 70 to 74 years, 19%, 75 years of age and older) to evaluate the effects of conjugated estrogens (CE 0.625 mg) on the incidence of probable dementia (primary outcome) compared with placebo.

After an average follow-up of 5.2 years, 28 women in the estrogen-alone group (37 per 10,000 women-years) and 19 in the placebo group (25 per 10,000 women-years) were diagnosed with probable dementia. The relative risk of probable dementia in the estrogen-alone group was 1.49 (95% CI 0.83-2.66) compared to placebo.

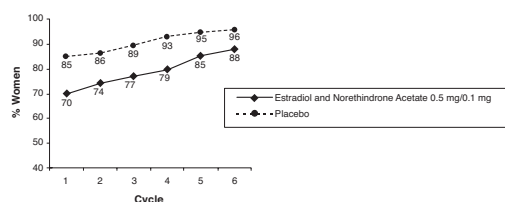
When data from the two populations were pooled as planned in the WHIMS protocol, the reported overall relative risk for probable dementia was 1.76 (95% CI 1.19-2.60). Differences between groups became apparent in the first year of treatment. It is unknown whether these findings apply to younger postmenopausal women. (See BOXED WARNINGS, WARNINGS, Dementia, and PRECAUTIONS, Geriatric Use.)

**INDICATIONS AND USAGE**

Mimvey (estradiol and norethindrone acetate tablets, USP) 1 mg/0.5 mg are indicated in women who have a uterus for the:

1. Treatment of moderate to severe vasomotor symptoms associated with menopause.
2. Prevention of postmenopausal osteoporosis. When prescribing solely for the prevention of postmenopausal osteoporosis, therapy should only be considered for women at significant risk of osteoporosis and non-estrogen medications should be carefully considered.

**Figure 5**  
Patients Treated with Estradiol and Norethindrone Acetate 0.5 mg/0.1 mg with Cumulative Amenorrhea over Time Percentage of Women with no Bleeding or Spotting at any Cycle Through Cycle 6, Intent to Treat Population, LOCF



**Effects on Bone Mineral Density**

The results of two randomized, multi-center, calcium-supplemented (500 to 1000 mg/day), placebo-controlled, 2 year clinical trials have shown that estradiol and norethindrone acetate 1 mg/0.5 mg and estradiol 0.5 mg are effective in preventing bone loss in postmenopausal women. While estradiol and norethindrone acetate 0.5 mg/0.1 mg was not directly studied in these trials, the US trial showed that addition of NETA to estradiol enhances the effect on BMD, therefore the BMD changes expected from treatment with estradiol and norethindrone acetate 0.5 mg/0.1 mg should be at least as great as observed with estradiol 0.5 mg. A total of 462 postmenopausal women with intact uteri and baseline BMD values for lumbar spine within 2 standard deviations of the mean in healthy young women were enrolled. In a US trial, 327 postmenopausal women (mean time from menopause 2.5 to 3.1 years) with a mean age of 53 years were randomized to 7 groups (0.25 mg, 0.5 mg, and 1 mg of estradiol alone, 1 mg estradiol with 0.25 mg norethindrone acetate, 1 mg estradiol with 0.5 mg norethindrone acetate, and 2 mg estradiol with 1 mg norethindrone acetate, and placebo). In a European trial (EU trial), 135 postmenopausal women (mean time from menopause 8.4 to 9.3 years) with a mean age of 58 years were randomized to 1 mg estradiol with 0.25 mg norethindrone acetate, 1 mg estradiol with 0.5 mg norethindrone acetate, and placebo. Approximately 58% and 67% of the randomized subjects in the two clinical trials, respectively, completed the two clinical trials. BMD was measured using dual-energy x-ray absorptiometry (DEXA). A summary of the results comparing estradiol and norethindrone acetate 1 mg/0.5 mg and estradiol 0.5 mg to placebo from the two prevention trials is shown in Table 3.

**TABLE 3**  
PERCENTAGE CHANGE (MEAN ± SD) IN BONE MINERAL DENSITY (BMD) FOR ESTRADIOL AND NORETHINDRONE ACETATE 1 MG/0.5 MG AND 0.5 MG E<sub>2</sub><sup>†</sup> (Intent to Treat Analysis, Last Observation Carried Forward)

	US Trial		EU Trial		
	Placebo (n=37)	0.5 mg E <sub>2</sub> <sup>†</sup> (n=31)	Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n=37)	Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n=38)	
Lumbar spine	-2.1 ± 2.9	2.3 ± 2.8 *	3.8 ± 3.0 *	-0.9 ± 4.0	5.4 ± 4.8 *
Femoral neck	-2.3 ± 3.4	0.3 ± 2.9 **	1.8 ± 4.1 *	-1.0 ± 4.6	0.7 ± 6.1
Femoral trochanter	-2.0 ± 4.3	1.7 ± 4.1 ***	3.7 ± 4.3 *	0.8 ± 6.9	6.3 ± 7.6 *

US = United States, EU = European

<sup>†</sup>While estradiol and norethindrone acetate 0.5 mg/0.1 mg was not directly studied in these trials, the US trial showed that addition of NETA to estradiol enhances the effect on BMD, therefore the BMD changes expected from treatment with estradiol and norethindrone acetate 0.5 mg/0.1 mg should be at least as great as observed with estradiol 0.5 mg.

\* Significantly (p<0.001) different from placebo

\*\* Significantly (p<0.007) different from placebo

\*\*\* Significantly (p<0.002) different from placebo

The overall difference in mean percentage change in BMD at the lumbar spine in the US trial (1000 mg/day calcium) between estradiol and norethindrone acetate 1 mg/0.5 mg and placebo was 5.9% and between estradiol 0.5 mg and placebo was 4.4%. In the European trial (500 mg/day calcium), the overall difference in mean percentage change in BMD at the lumbar spine was 6.3%. Estradiol and norethindrone acetate 1 mg/0.5 mg and estradiol 0.5 mg also increased BMD at the femoral neck and femoral trochanter compared to placebo. The increase in lumbar spine BMD in the US and European clinical trials for estradiol and norethindrone acetate 1 mg/0.5 mg and estradiol 0.5 mg is displayed in Figure 6.

The mainstays for decreasing the risk of postmenopausal osteoporosis are weight bearing exercise, adequate calcium and vitamin D intake, and when indicated, pharmacologic therapy. Postmenopausal women require an average of 1500 mg/day of elemental calcium. Therefore, when not contraindicated, calcium supplementation may be helpful for women with suboptimal dietary intake. Vitamin D supplementation of 400 to 800 IU/day may also be required to ensure adequate daily intake in postmenopausal women.

Mimvey is also indicated in women who have a uterus for the:

3. Treatment of moderate to severe symptoms of vulvar and vaginal atrophy associated with menopause. When used solely for the treatment of symptoms of vulvar and vaginal atrophy, topical vaginal products should be considered.

#### CONTRAINDICATIONS

Mimvey (estradiol and norethindrone acetate tablets, USP) should not be used in women with any of the following conditions:

1. Undiagnosed abnormal genital bleeding.
2. Known, suspected, or history of cancer of the breast.
3. Known or suspected estrogen-dependent neoplasia.
4. Active deep vein thrombosis, pulmonary embolism, or history of these conditions.
5. Active or recent (e.g., within the past year) arterial thromboembolic disease (e.g., stroke, myocardial infarction).
6. Liver dysfunction or disease.
7. Known hypersensitivity to the ingredients of estradiol and norethindrone acetate 1 mg/0.5 mg or estradiol and norethindrone acetate 0.5 mg/0.1 mg.
8. Known or suspected pregnancy. There is no indication for estradiol and norethindrone acetate in pregnancy. There appears to be little or no increased risk of birth defects in children born to women who have used estrogens and progestins from oral contraceptives inadvertently during early pregnancy. (See PRECAUTIONS.)

#### WARNINGS

See BOXED WARNINGS.

##### 1. Cardiovascular Disorders

Estrogen-plus-progestin therapy has been associated with an increased risk of myocardial infarction as well as stroke, venous thrombosis and pulmonary embolism.

Estrogen-alone therapy has been associated with an increased risk of stroke and deep vein thrombosis (DVT). Should any of these events occur or be suspected, estrogens should be discontinued immediately.

Risk factors for arterial vascular disease (e.g., hypertension, diabetes mellitus, tobacco use, hypercholesterolemia, and obesity) and/or venous thromboembolism (e.g., personal history or family history of VTE, obesity, and systemic lupus erythematosus) should be managed appropriately.

##### a. Stroke

In the estrogen plus progestin sub-study of the Women's Health Initiative (WHI), a statistically significant increased risk of stroke was reported in women receiving CE/MPA 0.625 mg/2.5 mg daily compared to woman receiving placebo (31 vs. 24 per 10,000 women-years). The increase in risk was demonstrated after the first year and persisted. (See CLINICAL STUDIES.)

In the estrogen-alone sub-study of the WHI, a statistically significant increased risk of stroke was reported in women receiving CE 0.625 mg daily compared to women receiving placebo (44 vs. 32 per 10,000 women-years). The increase in risk was demonstrated in year one and persisted.

##### b. Coronary Heart Disease

In the estrogen-plus-progestin sub-study of WHI, no statistically significant increase in CHD events (defined as non-fatal, MI, silent MI, or death, due to CHD) was reported in women receiving CE/MPA compared to women receiving placebo (39 vs. 33 per 10,000 women-years). An increase in relative risk was demonstrated in year one, and a trend toward decreasing relative risk was reported in years 2 through 5. (See CLINICAL STUDIES.)

In the estrogen-alone sub-study of WHI, no overall effect on coronary disease (CHD) events was reported in women receiving estrogen alone compared to placebo. (See CLINICAL STUDIES.)

In postmenopausal women with documented heart disease (n=2,763, average age 66.7 years), a controlled clinical trial of secondary prevention of cardiovascular disease (Heart and Estrogen/Progestin Replacement Study (HERS)) treatment with CE/MPA (0.625 mg/2.5 mg per day) demonstrated no cardiovascular benefit. During an average follow-up of 4.1 years, treatment with CE/MPA did not reduce the overall rate of CHD events in postmenopausal women with established coronary heart disease. There were more CHD events in the CE/MPA-treated group than in the placebo group in year 1, but not during the subsequent years. Participation in an open-label extension of the original HERS trial (HERS II) was agreed to by 2,321 women. Average follow-up in HERS II was an additional 2.7 years, for a total of 6.8 years overall. Rates of CHD events were comparable among women in the CE/MPA group and the placebo group in HERS, HERS II, and overall.

Large doses of estrogen (5 mg conjugated estrogens per day), comparable to those used to treat cancer of the prostate and breast, have been shown in a large prospective clinical trial in men to increase the risk of nonfatal myocardial infarction, pulmonary embolism, and thrombophlebitis.

##### c. Venous Thromboembolism

In the estrogen-plus-progestin sub-study of the Women's Health Initiative (WHI), a statistically significant 2-fold greater rate of VTE (DVT and pulmonary embolism [PE]) was reported in women receiving CE/MPA compared to women receiving placebo (35 vs. 17 per 10,000 women-years). Statistically significant increases in risk for both DVT (26 vs. 13 per 10,000 women-years) and PE (18 vs. 8 per 10,000 women-years) were also demonstrated. The increase in VTE risk was demonstrated during the first year and persisted. (See CLINICAL STUDIES.) In the estrogen-alone sub-study of WHI, the risk of VTE was reported to be increased for women taking conjugated estrogens (30 vs. 22 per 10,000 women-years), although only the increased risk of DVT reached statistical significance (23 vs. 15 per 10,000 women-years). The increase in VTE risk was demonstrated during the first two years.

If feasible, estrogens should be discontinued at least 4 to 6 weeks before surgery of the type associated with an increased risk of thromboembolism, or during periods of prolonged immobilization.

##### 2. Malignant Neoplasms

###### a. Breast Cancer

In some studies, the use of estrogens and progestins by postmenopausal women has been reported to increase the risk of breast cancer. The most important randomized clinical trial providing information about this issue is the CE/MPA sub-study of the WHI study (see CLINICAL STUDIES). The results from observational studies are generally consistent with those of the WHI clinical trial. Observational studies have also reported an increased risk of breast cancer for estrogen-plus-progestin combination therapy, and a smaller increased risk for estrogen-alone therapy, after several years of use. For both findings, the excess risk increased with duration of use, and appeared to return to baseline over about five years after stopping treatment (only the observational studies have substantial data on risk after stopping). In these studies, the risk of breast cancer was greater, and became apparent earlier, with estrogen-plus-progestin combination therapy as compared to estrogen-alone therapy. However, these studies have not found significant variation in the risk of breast cancer among different estrogens or among different estrogen-plus-progestin combinations, doses, or routes of administration.

In the estrogen-plus-progestin sub-study, after a mean follow-up of 5.6 years, the WHI sub-study reported an increased risk of breast cancer. In this sub-study, prior use of estrogen alone or estrogen-plus-progestin combination hormone therapy was reported by 26% of the women. The relative risk of invasive breast cancer was 1.24 (95% nCI 1.01-1.54), and the absolute risk was 41 vs. 33 cases per 10,000 women-years, for estrogen plus progestin compared with placebo, respectively. Among women who reported prior use of hormone therapy, the relative risk of invasive breast cancer was 1.86, and the absolute risk was 46

vs. 25 cases per 10,000 women-years, for estrogen plus progestin compared with placebo. Among women who reported no prior use of hormone therapy, the relative risk of invasive breast cancer was 1.09, and the absolute risk was 40 vs. 36 cases per 10,000 women-years of estrogen plus progestin compared with placebo. In the WHI trial, invasive breast cancers were larger and diagnosed at a more advanced stage in the estrogen-plus-progestin group compared with the placebo group. Metastatic disease was rare, with no apparent difference between the two groups. Other prognostic factors, such as histologic subtype, grade and hormone receptor status did not differ between the groups.

In the estrogen-alone sub-study of WHI, after an average of 7.1 years of follow-up, CE (0.625 mg daily) was not associated with an increased risk of invasive breast cancer (RR 0.80, 95% nCI 0.62-1.04).

In a one-year trial among 1,176 women who received either unopposed 1 mg estradiol or a combination of 1 mg estradiol plus one of three different doses of NETA (0.1, 0.25, and 0.5 mg), seven new cases of breast cancer were diagnosed, two of which occurred among the group of 295 women treated with estradiol and norethindrone acetate 1 mg/0.5 mg and two of which occurred among the group of 294 women treated with 1 mg estradiol/0.1 mg NETA.

The use of estrogen alone and estrogen plus progestin has been reported to result in an increase in abnormal mammograms requiring further evaluation. All women should receive yearly breast examinations by a healthcare provider and perform monthly breast self-examinations. In addition, mammography examinations should be scheduled based on patient age, risk factors, and prior mammogram results.

###### b. Endometrial Cancer

The use of unopposed estrogens in women with intact uteri has been associated with an increased risk of endometrial cancer. The reported endometrial cancer risk among unopposed estrogen users is about 2 to 12 fold greater than in nonusers, and appears dependent on duration of treatment and on estrogen dose. Most studies show no significant increased risk associated with use of estrogens for less than one year. The greatest risk appears associated with prolonged use, with an increased risk of 15- to 24-fold for five to ten years or more. This risk has been shown to persist for at least 8 to 15 years after estrogen therapy is discontinued.

Clinical surveillance of all women taking estrogen/progestin combinations is important. Adequate diagnostic measures, including endometrial sampling when indicated, should be undertaken to rule out malignancy in all cases of undiagnosed persistent or recurring abnormal vaginal bleeding. There is no evidence that the use of natural estrogens results in a different endometrial risk profile than synthetic estrogens of equivalent estrogen dose. Adding a progestin to estrogen therapy has been shown to reduce the risk of endometrial hyperplasia, which may be a precursor to endometrial cancer. Endometrial hyperplasia (a possible precursor of endometrial cancer) has been reported to occur in approximately 1% or less with estradiol and norethindrone acetate in one large clinical trial.

##### 3. Dementia

In the estrogen-plus-progestin Women's Health Initiative Memory Study (WHIMS), a sub-study of WHI, a population of 4,532 postmenopausal women aged 65 to 79 years was randomized to CE/MPA (0.625 mg/2.5 mg daily) or placebo. In the estrogen-alone WHIMS sub-study, a population of 2,947 hysterectomized women, aged 65 to 79 years, was randomized to CE (0.625 mg daily) or placebo.

In the estrogen-plus-progestin sub-study, after an average follow-up of four years, 40 women in the estrogen-plus-progestin group and 21 women in the placebo group were diagnosed with probable dementia. The relative risk of probable dementia for estrogen plus progestin vs. placebo was 2.05 (95% CI 1.21-3.48). The absolute risk of probable dementia for CE/MPA vs. placebo was 45 vs. 22 cases per 10,000 women-years.

In the estrogen-alone sub-study, after an average follow-up of 5.2 years, 28 women in the estrogen-alone group and 19 women in the placebo group were diagnosed with probable dementia. The relative risk of probable dementia for CE alone vs. placebo was 1.49 (95% CI 0.83-2.66). The absolute risk of probable dementia for CE alone vs. placebo was 37 vs. 25 cases per 10,000 women-years.

When data from the two populations were pooled as planned in the WHIMS protocol, the reported overall relative risk of probable dementia was 1.76 (95% CI 1.19-2.60). Since both sub-studies were conducted in women ages 65 to 79, it is unknown whether these findings apply to younger postmenopausal women. (See BOXED WARNINGS and PRECAUTIONS, Geriatric Use.)

##### 4. Gallbladder Disease

A two- to four-fold increase in the risk of gallbladder disease requiring surgery in postmenopausal women receiving estrogens has been reported.

##### 5. Hypercalcemia

Estrogen administration may lead to severe hypercalcemia in patients with breast cancer and bone metastases. If hypercalcemia occurs, use of the drug should be stopped and appropriate measures taken to reduce the serum calcium level.

##### 6. Visual Abnormalities

Retinal vascular thrombosis has been reported in patients receiving estrogens. Discontinue medication pending examination if there is a sudden partial or complete loss of vision, or a sudden onset of proptosis, diplopia, or migraine. If examination reveals papilledema or retinal vascular lesions, estrogens should be permanently discontinued.

#### PRECAUTIONS

##### A. General

###### 1. Addition of a Progestin when a Woman has not had a Hysterectomy

Studies of the addition of a progestin for 10 or more days of a cycle of estrogen administration, or daily with estrogen in a continuous regimen, have reported a lowered incidence of endometrial hyperplasia than would be induced by estrogen treatment alone. Endometrial hyperplasia may be a precursor to endometrial cancer.

There are, however, possible risks that may be associated with the use of progestins with estrogens compared to estrogen-alone treatment. These include a possible increased risk of breast cancer.

###### 2. Elevated Blood Pressure

In a small number of case reports, substantial increases in blood pressure have been attributed to idiosyncratic reactions to estrogens. In a large, randomized, placebo-controlled clinical trial, a generalized effect of estrogens on blood pressure was not seen. Blood pressure should be monitored at regular intervals with estrogen use.

###### 3. Hypertriglyceridemia

In patients with preexisting hypertriglyceridemia, estrogen therapy may be associated with elevations of plasma triglycerides leading to pancreatitis and other complications.

###### 4. Impaired Liver Function and Past History of Cholestatic Jaundice

Estrogens may be poorly metabolized in patients with impaired liver function. For patients with a history of cholestatic jaundice associated with past estrogen use or with pregnancy, caution should be exercised, and in the case of recurrence, medication should be discontinued.

###### 5. Hypothyroidism

Estrogen administration leads to increased thyroid-binding globulin (TBG) levels. Patients with normal thyroid function can compensate for the increased TBG by making more thyroid hormone, thus maintaining free T<sub>4</sub> and T<sub>3</sub> serum concentrations in the normal range. Patients dependent on thyroid hormone replacement therapy who are also receiving estrogen may require increased doses of their thyroid replacement therapy. These patients should have their thyroid function monitored to maintain their free thyroid hormone levels in an acceptable range.

###### 6. Fluid Retention

Estrogens may cause some degree of fluid retention. Because of this, patients who have conditions that might be influenced by this factor, such as a cardiac or renal dysfunction, warrant careful observation when estrogens are

prescribed.

###### 7. Hypocalcemia

Estrogens should be used with caution in individuals with severe hypocalcemia.

###### 8. Ovarian Cancer

The estrogen-plus-progestin sub-study of WHI reported that after an average follow-up of 5.6 years, the relative risk for ovarian cancer for estrogen plus progestin vs. placebo was 1.58 (95% CI 0.77-3.24), but was not statistically significant. The absolute risk for estrogen plus progestin vs. placebo was 4.2 vs. 2.7 cases per 10,000 women-years. In some epidemiologic studies, the use of estrogen-only products, in particular for 10 or more years, has been associated with an increased risk of ovarian cancer. Other epidemiologic studies have not found these associations.

###### 9. Exacerbation of Endometriosis

Endometriosis may be exacerbated with administration of estrogens. Malignant transformation of residual endometrial implants has been reported in women treated post-hysterectomy with estrogen-alone therapy. For patients known to have residual endometriosis post-hysterectomy, the addition of progestin should be considered.

###### 10. Exacerbation of Other Conditions

Estrogens may cause an exacerbation of asthma, diabetes mellitus, epilepsy, migraine or porphyria, systemic lupus erythematosus, and hepatic hemangiomas and should be used with caution in women with these conditions.

##### B. Patient Information

Physicians are advised to discuss the contents of the Patient Information leaflet with patients for whom they prescribe Estradiol and Norethindrone Acetate Tablets 1 mg/0.5 mg.

##### C. Laboratory Tests

Estrogen administration should be initiated at the lowest dose approved for the indication and then guided by clinical response, rather than by serum hormone levels (e.g., estradiol, FSH).

##### D. Drug/Laboratory Test Interactions

1. Accelerated prothrombin time, partial thromboplastin time, and platelet aggregation time; increased platelet count; increased factors II, VII antigen, VIII coagulant activity, IX, X, XII, VII-X complex, and beta-thromboglobulin; decreased levels of anti-factor Xa and antithrombin III, decreased antithrombin III activity, increased levels of fibrinogen and fibrinogen activity; increased plasminogen antigen and activity.
2. Increased thyroid-binding globulin (TBG) levels leading to increased circulating total thyroid hormone levels as measured by protein-bound iodine (PBI), T<sub>4</sub> levels (by column or by radioimmunoassay), or T<sub>3</sub> levels by radioimmunoassay. T<sub>3</sub> resin uptake is decreased, reflecting the elevated TBG. Free T<sub>4</sub> and free T<sub>3</sub> concentrations are unaltered. Patients on thyroid replacement therapy may require higher doses of thyroid hormone.
3. Other binding proteins may be elevated in serum (i.e., corticosteroid binding globulin (CBG), SHBG) leading to increased total circulating corticosteroids and sex steroids, respectively. Free hormone concentrations may be decreased. Other plasma proteins may be increased (angiotensinogen/rennin substrate, alpha-1 antitrypsin, ceruloplasmin).
4. Increased plasma HDL and HDL<sub>2</sub> cholesterol sub-fraction concentration, reduced LDL cholesterol concentration, increased triglyceride levels.
5. Impaired glucose tolerance.
6. Reduced response to metyrapone test.

##### E. Carcinogenesis, Mutagenesis, Impairment of Fertility

Long-term continuous administration of estrogen, with or without progestin, in women with or without a uterus, has shown an increased risk of endometrial cancer, breast cancer, and ovarian cancer. (See BOXED WARNINGS, WARNINGS, and PRECAUTIONS.)

Long-term continuous administration of natural and synthetic estrogens in certain animal species increases the frequency of carcinomas of the breast, uterus, cervix, vagina, testis, and liver.

##### F. Pregnancy

Estradiol and norethindrone acetate should not be used during pregnancy. (See CONTRAINDICATIONS.)

##### G. Nursing Mothers

Estrogen administration to nursing mothers has been shown to decrease the quantity and quality of breast milk. Detectable amounts of estrogens have been identified in the milk of mothers receiving this drug. Caution should be exercised when estradiol and norethindrone acetate is administered to a nursing mother.

##### H. Pediatric Use

Estradiol and norethindrone acetate is not indicated in children.

##### I. Geriatric Use

Clinical studies of estradiol and norethindrone acetate did not include sufficient number of subjects aged 65 and over to determine if they responded differently from younger subjects.

Of the total number of subjects in the estrogen-plus-progestin sub-study of the Women's Health Initiative (WHI) study, 44% (n=7,320) were 65 to 74 years of age, while 6.6% (n=1,095) were 75 years and over. There was a higher relative risk (CE/MPA vs. placebo) of non-fatal stroke and invasive breast cancer in women 75 and over compared to women less than 75 years of age. In women greater than 75, the increased risk of non-fatal stroke and invasive breast cancer observed in the estrogen-plus-progestin combination group compared to the placebo group was 75 vs. 24 per 10,000 women-years and 52 vs. 12 per 10,000 women-years, respectively.

In the estrogen-plus-progestin Women's Health Initiative Memory Study (WHIMS), a sub-study of WHI, a population of 4,532 hysterectomized women, aged 65 to 79 years, was randomized to CE/MPA (0.625 mg/2.5 mg daily) or placebo. In the estrogen-plus-progestin group, after an average follow-up of four years, the relative risk (CE/MPA vs. placebo) of probable dementia was 2.05 (95% CI 1.21-3.48). The absolute risk of developing probable dementia with CE/MPA was 45 vs. 22 cases per 10,000 women-years with placebo.

Of the total number of subjects in the estrogen-alone sub-study of WHI, 46% (n=4,943) were 65 years and over, while 7.1% (n=767) were 75 years and over. There was a higher relative risk (CE vs. placebo) of stroke in women less than 75 years of age compared to women 75 years and over. In the estrogen-alone WHIMS sub-study, a population of 2,947 hysterectomized women, aged 65 to 79 years, was randomized to CE (0.625 mg daily) or placebo. After an average follow-up of 5.2 years, the relative risk (CE vs. placebo) of probable dementia was 1.49 (95% CI 0.83-2.66). The absolute risk of developing probable dementia with estrogen alone was 37 vs. 25 cases per 10,000 women-years with placebo.

Seventy-nine percent of the cases of probable dementia occurred in women that were older than 70 for the CE-alone group, and 82 percent of the cases of probable dementia occurred in women who were older than 70 in the CE/MPA group. The most common classification of probable dementia in both the treatment groups and placebo groups was Alzheimer's disease.

When data from the two populations were pooled as planned in the WHIMS protocol, the reported overall relative risk for probable dementia was 1.76 (95% CI 1.19-2.60). Since both sub-studies were conducted in women aged 65 to 79 years, it is unknown whether these findings apply to younger postmenopausal women. (See BOXED WARNINGS and WARNINGS, Dementia.)

##### ADVERSE REACTIONS

See BOXED WARNINGS, WARNINGS and PRECAUTIONS.

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice. The adverse reaction information from clinical trials does, however, provide a basis for identifying the adverse events that appear to be related to drug use and for approximating rates.

Adverse events reported with estradiol and norethindrone acetate 1 mg/0.5 mg by investigators in the Phase 3 studies regardless of causality assessment are shown in Table 6.

**TABLE 6**  
**ALL TREATMENT-EMERGENT ADVERSE EVENTS REGARDLESS OF**  
**RELATIONSHIP REPORTED AT A FREQUENCY OF ≥ 5% WITH**  
**ESTRADIOL AND NORETHDRONE ACETATE 1 MG/0.5 MG**

	Endometrial Hyperplasia Study (12-Months)		Vasomotor Symptoms Study (3-Months)		Osteoporosis Study (2-Years)	
	Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n = 295)	1 mg E <sub>2</sub> (n=296)	Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n = 29)	Placebo (n=34)	Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n = 47)	Placebo (n=48)
<b>Body as a Whole</b>						
Back Pain	6 %	5%	3%	3%	6%	4%
Headache	16%	16%	17%	18%	11%	6%
<b>Digestive System</b>						
Nausea	3%	5%	10%	0%	11%	0%
Gastroenteritis	2%	2%	0%	0%	6%	4%
<b>Nervous System</b>						
Insomnia	6%	4%	3%	3%	0%	8%
Emotional Liability	1%	1%	0%	0%	6%	0%
<b>Respiratory System</b>						
Upper Respiratory Tract Infection	18%	15%	10%	6%	15%	19%
Sinusitis	7%	11%	7%	0%	15%	10%
<b>Metabolic and Nutritional</b>						
Weight Increase	0%	0%	0%	0%	9%	6%
<b>Urogenital System</b>						
Breast Pain	24%	10%	21%	0%	17%	8%
Post-Menopausal Bleeding	5%	15%	10%	3%	11%	0%
Uterine Fibroid	5%	4%	0%	0%	4%	8%
Ovarian Cyst	3%	2%	7%	0%	0%	8%
<b>Resistance Mechanism</b>						
Infection Viral	4%	6%	0%	3%	6%	6%
Moniliasis Genital	4%	7%	0%	0%	6%	0%
<b>Secondary Terms</b>						
Injury Accidental	4%	3%	3%	0%	17%*	4%*

(cont'd)

**TABLE 6**  
**ALL TREATMENT-EMERGENT ADVERSE EVENTS REGARDLESS OF**  
**RELATIONSHIP REPORTED AT A FREQUENCY OF ≥ 5% WITH**  
**ESTRADIOL AND NORETHDRONE ACETATE 1 MG/0.5 MG**

	Endometrial Hyperplasia Study (12-Months)		Vasomotor Symptoms Study (3-Months)		Osteoporosis Study (2-Years)	
	Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n = 295)	1 mg E <sub>2</sub> (n=296)	Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n = 29)	Placebo (n=34)	Estradiol and Norethindrone Acetate 1 mg/0.5 mg (n = 47)	Placebo (n=48)
<b>Secondary Terms (continued)</b>						
Other Events	2%	3%	3%	0%	6%	4%

\* including one upper extremity fracture in each group  
 Adverse events reported with estradiol and norethindrone acetate 0.5 mg/0.1 mg by investigators during the Phase 3 study regardless of causality assessment are shown in Table 7.

**TABLE 7**  
**ALL TREATMENT-EMERGENT ADVERSE EVENTS REGARDLESS OF**  
**RELATIONSHIP REPORTED AT A FREQUENCY OF ≥ 5% WITH**  
**ESTRADIOL AND NORETHDRONE ACETATE 0.5 MG/0.1 MG**

	Estradiol and Norethindrone Acetate 0.5 mg/0.1 mg (n=194)	Placebo (n=200)
<b>Body as a Whole</b>		
Back Pain	10%	4%
Headache	22%	19%
Pain in extremity	5%	4%
<b>Digestive System</b>		
Nausea	5%	4%
Diarrhea	6%	6%
<b>Respiratory System</b>		
Nasopharyngitis	21%	18%
<b>Urogenital System</b>		
Endometrial thickening	10%	4%
Vaginal hemorrhage	26%	12%

The following adverse reactions have been reported with estrogen and/or progestin therapy:

**1. Genitourinary System**

Changes in vaginal bleeding pattern and abnormal withdrawal bleeding or flow; breakthrough bleeding; spotting; dysmenorrhea, increase in size of uterine leiomyomata; vaginitis, including vaginal candidiasis; change in amount of cervical secretion; changes in cervical ectropion; premenstrual-like syndrome; cystitis-like syndrome; ovarian cancer; endometrial hyperplasia; endometrial cancer.

**2. Breasts**

Tenderness, enlargement, pain, nipple discharge, galactorrhea; fibrocystic breast changes; breast cancer.

**3. Cardiovascular**

Deep and superficial venous thrombosis; pulmonary embolism; thrombophlebitis; myocardial infarction, stroke; increase in blood pressure.

**4. Gastrointestinal**

Nausea, vomiting; changes in appetite; cholestatic jaundice; abdominal pain/cramps, flatulence, bloating; increased incidence of gallbladder disease; pancreatitis; enlargement of hepatic hemangiomas.

**5. Skin**

Chloasma or melasma that may persist when drug is discontinued; erythema multiforme; erythema nodosum; hemorrhagic eruption; loss of scalp hair; seborrhea; hirsutism; itching; skin rash; pruritus.

**6. Eyes**

Retinal vascular thrombosis, intolerance to contact lenses.

**7. Central Nervous System**

Headache; migraine; dizziness; mental depression; chorea; insomnia; nervousness; mood disturbances; irritability; exacerbation of epilepsy; probable dementia.

**8. Miscellaneous**

Increase or decrease in weight; aggravation of porphyria; edema; leg cramps; changes in libido; fatigue; reduced carbohydrate tolerance; anaphylactoid/anaphylactic reactions; hypocalcemia; exacerbation of asthma; increased triglycerides; back pain; arthralgia; myalgia.

**OVERDOSAGE**

Serious ill effects have not been reported following acute ingestion of large doses of estrogen-containing drug products by young children. Overdosage of estrogen may cause nausea and vomiting, and withdrawal bleeding may occur in females.

**DOSSAGE AND ADMINISTRATION**

Use of estrogen, alone or in combination with a progestin, should be with the lowest effective dose and for the shortest duration consistent with treatment goals and risks for the individual woman. Patients should be re-evaluated periodically as clinically appropriate (e.g., 3 to 6 month intervals) to determine if treatment is still necessary (See BOXED WARNINGS and WARNINGS). For women who have a uterus, adequate diagnostic measures, such as endometrial sampling, when indicated, should be undertaken to rule out malignancy in cases of undiagnosed persistent or recurring abnormal vaginal bleeding. Mimvey (estradiol and norethindrone acetate tablets, USP) therapy consists of a single tablet to be taken once daily.

1. For the treatment of moderate to severe vasomotor symptoms associated with menopause, and the prevention of postmenopausal osteoporosis.

When prescribing solely for the prevention of postmenopausal osteoporosis, therapy should only be considered for women at significant risk of osteoporosis and non-estrogen medications should be carefully considered.

2. For the treatment of moderate to severe symptoms of vulvar and vaginal atrophy. When used solely for the treatment of symptoms of vulvar and vaginal atrophy, topical vaginal products should be considered.

Patients should be started at the lowest dose.

**HOW SUPPLIED**

Mimvey (estradiol and norethindrone acetate tablets, USP) are available as: 1 mg/0.5 mg: White, round, film-coated, unscored tablet, debossed with stylized b on one side and 34 on the other side.

Available in blister cards of 28 tablets  
 1 blister card per carton NDC 0093-5455-28  
 5 blister cards per carton NDC 0093-5455-42

Store in a dry place protected from light.  
 Store at 20° to 25°C (68° to 77°F) [See USP Controlled Room Temperature].

Manufactured For:  
**TEVA PHARMACEUTICALS USA**  
 Sellersville, PA 18960



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