

PRODUCT MONOGRAPH

Pr **PREMARIN**[®]
(conjugated estrogens sustained release tablets)
0.3 mg, 0.625 mg, and 1.25 mg

ESTROGENIC HORMONES

® Wyeth Canada
Pfizer Canada Inc., Licensee
17,300 Trans-Canada Highway
Kirkland, Quebec H9J 2M5

Date of Revision:
December 1, 2014

Submission Control No: 177429

Table of Contents

PART I: HEALTH PROFESSIONAL INFORMATION	3
SUMMARY PRODUCT INFORMATION.....	3
INDICATIONS AND CLINICAL USE	3
CONTRAINDICATIONS.....	4
WARNINGS AND PRECAUTIONS	4
ADVERSE REACTIONS	14
DRUG INTERACTIONS	20
DOSAGE AND ADMINISTRATION	23
OVERDOSAGE.....	25
ACTION AND CLINICAL PHARMACOLOGY	25
STORAGE AND STABILITY	28
DOSAGE FORMS, COMPOSITION AND PACKAGING.....	29
PART II: SCIENTIFIC INFORMATION	30
PHARMACEUTICAL INFORMATION.....	30
CLINICAL TRIALS	30
DETAILED PHARMACOLOGY	35
TOXICOLOGY.....	35
REFERENCES.....	36
PART III: CONSUMER INFORMATION	40

Pr **Premarin**[®]
(conjugated estrogens sustained release tablets)
0.3 mg, 0.625 mg, and 1.25 mg

PART I: HEALTH PROFESSIONAL INFORMATION

SUMMARY PRODUCT INFORMATION

Route of Administration	Dosage Form / Strength	Clinically Relevant Nonmedicinal Ingredients
oral	conjugated estrogens sustained release tablets	Lactose <i>For a complete listing see Dosage Forms, Composition and Packaging section.</i>

INDICATIONS AND CLINICAL USE

PREMARIN[®] (conjugated estrogens sustained release tablets) is indicated for the following:

1. the relief of menopausal and postmenopausal symptoms occurring in naturally or surgically induced estrogen deficiency states including vulvar and vaginal atrophy.
2. the prevention of osteoporosis in naturally occurring or surgically induced estrogen-deficiency states. When prescribing solely for the prevention of postmenopausal osteoporosis, therapy with PREMARIN should be considered in light of other available therapies (see **Boxed Warning**) and should only be considered for women at significant risk of osteoporosis. Non-estrogen medications should be carefully considered. For older women who are not experiencing any more acute symptoms of menopause, use in combination with a progestin should only be considered for women who failed on, or were intolerant of, non-estrogen medication. Adequate diet, calcium and vitamin D intake, cessation of smoking, as well as regular physical weight-bearing exercise are required in addition to the administration of PREMARIN. Postmenopausal women require an average of 1000 mg to 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 400-800 IU/day may also be required to ensure adequate daily intake in postmenopausal women.
3. hypoestrogenism due to hypogonadism, castration, or primary ovarian failure.
4. atrophic vaginitis
5. vulvar atrophy (with or without pruritis). When prescribing solely for the treatment of symptoms of vulvar and vaginal atrophy, topical vaginal products should be considered.

In patients with an intact uterus, PREMARIN should be prescribed with an appropriate dosage of a progestin for women with intact uteri, in order to prevent endometrial hyperplasia/carcinoma.

Geriatrics (> 65 years of age): See above indications.

Pediatrics (< 16 years of age): Clinical studies have not been conducted in the pediatric population. PREMARIN is not indicated for use in children.

CONTRAINDICATIONS

PREMARIN (conjugated estrogens sustained release tablets) is contraindicated in the following conditions:

- Patients who are hypersensitive to this drug or to any ingredient in the formulation or component of the container. For a complete listing, see the **Dosage Forms, Composition and Packaging** section of the product monograph.
- Liver dysfunction or disease as long as liver function tests have failed to return to normal.
- Known or suspected estrogen-dependent malignant neoplasia (e.g. endometrial cancer).
- Endometrial hyperplasia.
- Known, suspected, or past history of breast cancer.
- Undiagnosed abnormal genital bleeding.
- Known or suspected pregnancy (see **WARNINGS AND PRECAUTIONS, Special Populations, Pregnant Women**)
- Active or past history of confirmed venous thromboembolism (such as deep venous thrombosis or pulmonary embolism) or active thrombophlebitis.
- Active or past history of arterial thromboembolic disease (e.g. stroke, myocardial infarction, coronary heart disease).
- Partial or complete loss of vision due to ophthalmic vascular disease.
- Known thrombophilic disorders (e.g. protein C, protein S, or antithrombin deficiency).
- Migraine with or without aura

WARNINGS AND PRECAUTIONS

Serious Warnings and Precautions

The Women's Health Initiative (WHI) trial examined the health benefits and risks of oral combined *estrogen plus progestin* therapy (n=16,608) and oral *estrogen-alone* therapy (n=10,739) in postmenopausal women aged 50 to 79 years.

The *estrogen plus progestin* arm of the WHI trial (mean age 63.3 years) indicated an increased risk of *myocardial infarction* (MI), *stroke*, *invasive breast cancer*, *pulmonary emboli* and *deep vein thrombosis* in postmenopausal women receiving treatment with combined conjugated equine estrogens (CEE, 0.625 mg/day) and medroxyprogesterone acetate (MPA, 2.5 mg/day) for 5.2 years compared to those receiving placebo.

The *estrogen-alone* arm of the WHI trial (mean age 63.6 years) indicated an increased risk of *stroke* and *deep vein thrombosis* in hysterectomized women treated with CEE-alone (0.625 mg/day) for 6.8 years compared to those receiving placebo.

Therefore, the following should be given serious consideration at the time of prescribing:

- Estrogens with or without progestins should not be prescribed for primary or secondary prevention of cardiovascular diseases.
- Estrogens with or without progestins should be prescribed at **the lowest effective dose** for the approved indication.
- Estrogens with or without progestins should be prescribed for the **shortest period possible** for the approved indication.
- The use of PREMARIN for the prevention of osteoporosis should be considered in light of other available therapies.

General

For the treatment of postmenopausal symptoms, HRT should only be initiated for symptoms/conditions that are consistent with the indications (see **INDICATIONS AND CLINICAL USE**). In all cases, a careful appraisal of the risks and benefits should be undertaken at least annually and HRT should only be continued as long as the benefit outweighs the risks.”

Combined Estrogen and Progestin Therapy:

There are additional and/or increased risks that may be associated with the use of combination estrogen-plus-progestin therapy compared with using estrogen-alone regimens. These include an increased risk of myocardial infarction, pulmonary embolism, invasive breast cancer and ovarian cancer.

Carcinogenesis and Mutagenesis

Breast cancer

Available epidemiological data indicate that the use of combined *estrogen plus progestin* by postmenopausal women is associated with an increased risk of invasive breast cancer.

In the *estrogen plus progestin* arm of the WHI trial, among 10,000 women over a one-year period, there were:

- 8 more cases of invasive breast cancer (38 on combined HRT versus 30 on placebo).

The WHI study also reported that the invasive breast cancers diagnosed in the *estrogen plus progestin* group were similar in histology but were larger (mean [SD], 1.7 cm [1.1] vs 1.5 cm [0.9], respectively; P=0.04) and were at a more advanced stage compared with those diagnosed in the placebo group. The percentage of women with abnormal mammograms (recommendations for short-interval follow-up, a suspicious abnormality, or highly suggestive of

malignancy) was significantly higher in the *estrogen plus progestin* group versus the placebo group. This difference appeared at year one and persisted in each year thereafter.

In the *estrogen-alone* arm of the WHI trial, there was no statistically significant difference in the rate of invasive breast cancer in hysterectomized women treated with conjugated equine estrogens versus women treated with placebo.

It is recommended that estrogens not be given to women with existing breast cancer or those with a previous history of the disease (see **CONTRAINDICATIONS**).

There is a need for caution in prescribing estrogens for women with known risk factors associated with the development of breast cancer, such as strong family history of breast cancer (first degree relative) or who present a breast condition with an increased risk (abnormal mammograms and/or atypical hyperplasia at breast biopsy).

Other known risk factors for the development of breast cancer such as nulliparity, obesity, early menarche, late age at first full term pregnancy and at menopause should also be evaluated.

It is recommended that women undergo mammography prior to the start of HRT treatment and at regular intervals during treatment, as deemed appropriate by the treating physician and according to the perceived risks for each patient.

The overall benefits and possible risks of hormone replacement therapy should be fully considered and discussed with patients. It is important that the modest increased risk of being diagnosed with breast cancer after 4 years of treatment with combined estrogen plus progestin HRT (as reported in the results of the WHI trial) be discussed with the patient and weighed against its known benefits.

Instructions for regular self-examination of the breasts should be included in this counselling.

Endometrial hyperplasia & endometrial carcinoma

Estrogen-only HRT increases the risk of endometrial hyperplasia/carcinoma if taken by women with intact uteri. Estrogen should be prescribed with an appropriate dosage of a progestin for women with intact uteri in order to prevent endometrial hyperplasia/carcinoma.

The reported endometrial cancer risk among unopposed estrogen users is about 2- to 12-fold or greater than in non-users and appears to be dependent on duration of treatment and on estrogen dose. The greatest risk appears associated with prolonged use, with increased risks of 15- to 24-fold for five years or more, and this risk has been shown to persist for at least 8 to 15 years after ERT is discontinued.

Clinical surveillance of all women taking combined estrogen plus progestin HRT 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 postmenopausal estrogen therapy has been shown to reduce the risk of endometrial hyperplasia, which may be a precursor to endometrial cancer.

Ovarian cancer

In some epidemiologic studies, the use of estrogen therapy has been associated with an increased risk of ovarian cancer over multiple years of use. Other epidemiologic studies have not found these associations.

Cardiovascular

Cardiovascular risk

ERT has been reported to increase the risk of stroke and deep venous thrombosis (DVT).

Risk factors for cardiovascular disease (e.g., hypertension, diabetes mellitus, tobacco use, hypercholesterolemia, and obesity) should be managed appropriately.

The results of the Heart and Estrogen/progestin Replacement Studies (HERS and HERS II) and the Women's Health Initiative (WHI) trial indicate that the use of *estrogen plus progestin* is associated with an increased risk of coronary heart disease (CHD) in postmenopausal women. The results of the WHI trial indicate that the use of *estrogen-alone* and *estrogen plus progestin* is associated with an increased risk of stroke in postmenopausal women.

Patients who are at risk of developing migraines with aura may be at risk of ischemic stroke and should be kept under careful observation.

Should a stroke occur or be suspected, PREMARIN should be discontinued immediately.

WHI trial findings

In the combined *estrogen plus progestin* arm of the WHI trial, among 10,000 women over a one-year period, there were:

- 8 more cases of stroke (29 on combined HRT versus 21 on placebo)
- 7 more cases of CHD (37 on combined HRT versus 30 on placebo).

In the *estrogen-alone* arm of the WHI trial of women with prior hysterectomy, among 10,000 women over a one-year period, there were/was:

- 12 more cases of stroke (44 on *estrogen-alone* therapy versus 32 on placebo)
- no statistically significant difference in the rate of CHD.

HERS and HERS II findings

In the Heart and Estrogen/progestin Replacement Study (HERS) of postmenopausal women with documented heart disease (n=2763, average age 66.7 years), a randomized placebo-controlled clinical trial of secondary prevention of coronary heart disease (CHD), treatment with 0.625 mg/day oral conjugated equine estrogen (CEE) plus 2.5 mg oral medroxyprogesterone acetate

(MPA) demonstrated no cardiovascular benefit. Specifically, during an average follow-up of 4.1 years, treatment with CEE plus 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 hormone-treated group than in the placebo group in year 1, but not during the subsequent years.

From the original HERS trial, 2321 women consented to participate in an open label extension of HERS known as HERS II. Average follow-up in HERS II was an additional 2.7 years, for a total of 6.8 years overall. After 6.8 years, hormone therapy did not reduce the risk of cardiovascular events in women with CHD.

Blood pressure

Women using hormone replacement therapy sometimes experience increased blood pressure. Blood pressure should be monitored with HRT use. Elevation of blood pressure in previously normotensive or hypertensive patients should be investigated and HRT may have to be discontinued.

Endocrine and Metabolism

Glucose and lipid metabolism

Women with familial hyperlipidemias need special surveillance. Lipid-lowering measures are recommended additionally, before treatment is started.

A worsening of glucose tolerance and lipid metabolism has been observed in a significant percentage of peri- and post-menopausal patients. Therefore, diabetic patients, or those with a predisposition to diabetes, should be observed closely to detect any alterations in carbohydrate or lipid metabolism, especially in triglyceride blood levels.

Caution should be exercised in patients with pre-existing hypertriglyceridemia since rare cases of large increases of plasma triglycerides leading to pancreatitis have been reported with estrogen therapy in this population.

Heme metabolism

Women with porphyria need special surveillance.

Estrogens should be used with caution in individuals with pre-existing severe hypocalcemia.

Calcium and phosphorus metabolism

Because the prolonged use of estrogens influences the metabolism of calcium and phosphorus, estrogens should be used with caution in patients with metabolic and malignant bone diseases associated with hypercalcemia and in patients with renal insufficiency.

Estrogen therapy should be used with caution in individuals with hypoparathyroidism as estrogen-induced hypocalcemia may occur.

If hypercalcemia occurs, use of the drug should be stopped and appropriate measures should be taken to reduce the serum calcium level.

Hypothyroidism

Estrogen administration leads to increased thyroid-binding globulin (TBG) levels. Patients who require thyroid hormone replacement therapy and who are also taking estrogen may require increased doses of their thyroid replacement therapy. These women should have their thyroid function monitored in order to maintain their free thyroid hormone levels remain in an acceptable range (see ***Drug-Laboratory Test Interactions***).

Other conditions

PREMARIN contains lactose. In patients with rare hereditary galactose intolerance, lactase deficiency or glucose-galactose malabsorption, the severity of the condition should be taken into careful consideration before prescribing PREMARIN. The patient should be closely monitored.

Genitourinary

Endometriosis

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

Uterine Leiomyomata

Pre-existing uterine leiomyomata may increase in size during estrogen use. Growth, pain or tenderness of uterine leiomyomata requires discontinuation of medication and appropriate investigation.

Vaginal bleeding

Abnormal vaginal bleeding, due to its prolongation, irregularity or heaviness, occurring during therapy should prompt appropriate diagnostic measures to rule out the possibility of uterine malignancy and the treatment should be re-evaluated.

Hematologic

Venous thromboembolism

Available epidemiological data indicate that use of estrogen with or without progestin by postmenopausal women is associated with an increased risk of developing venous thromboembolism (VTE).

In the *estrogen plus progestin* arm of the WHI trial, among 10,000 women on combined HRT over a one-year period, there were 18 more cases of venous thromboembolism, including 8 more cases of pulmonary embolism.

In the *estrogen-alone* arm of the WHI trial, among 10,000 women on estrogen therapy over a one-year period, there were 7 more cases of venous thromboembolism, although there was no statistically significant difference in the rate of pulmonary embolism.

Generally recognized risk factors for VTE include a personal history, a family history (the occurrence of VTE in a direct relative at a relatively early age may indicate genetic

predisposition), severe obesity (body mass index > 30 kg/m²) and systemic lupus erythematosus. The risk of VTE also increases with age and smoking.

The risk of VTE may be temporarily increased with prolonged immobilization, major surgery or trauma. In women on HRT, attention should be given to prophylactic measures to prevent VTE following surgery. Also, patients with varicose veins should be closely supervised. The physician should be alert to the earliest manifestations of thrombotic disorders (thrombophlebitis, retinal thrombosis, cerebral embolism and pulmonary embolism). If these occur or are suspected, PREMARIN should be discontinued immediately, given the risks of long-term disability or fatality.

If feasible, PREMARIN should be discontinued at least 4 weeks before major surgery which may be associated with an increased risk of thromboembolism, or during periods of prolonged immobilization.

Hepatic/Biliary/Pancreatic

Liver disorders

Patients who have previously had liver disorders such as liver adenoma should be closely supervised as this condition may recur or be aggravated during treatment with PREMARIN.

Gallbladder diseases

A 2 to 4-fold increase in the risk of gallbladder disease requiring surgery in women receiving postmenopausal estrogens has been reported.

Hepatic hemangiomas

Particular caution is indicated in women with hepatic hemangiomas, as HRT may cause an exacerbation of this condition.

Jaundice

Caution is advised in patients with a history of liver and/or biliary disorders. If cholestatic jaundice develops during treatment, the treatment should be discontinued and appropriate investigations carried out. Estrogens may be poorly metabolized in patients with impaired liver function.

Liver function tests

Liver function tests should be done periodically in subjects who are suspected of having hepatic disease. For information on endocrine and liver function tests, see **Monitoring and Laboratory Tests**.

Immune

Systemic lupus erythematosus

Particular caution is indicated in women with systemic lupus erythematosus, as HRT may cause an exacerbation of this condition.

Angioedema

Exogenous estrogens may induce or exacerbate symptoms of angioedema, particularly in women with hereditary angioedema.

Anaphylactic Reaction and Angioedema

Cases of anaphylaxis, which developed within minutes to hours after taking PREMARIN and require emergency medical management, have been reported in the postmarketing setting. Skin (hives, pruritis, swollen lips-tongue-face) and either respiratory tract (respiratory compromise) or gastrointestinal tract (abdominal pain, vomiting) involvement has been noted.

Angioedema involving the tongue, larynx, face, hands, and feet requiring medical intervention has occurred postmarketing in patients taking PREMARIN. If angioedema involves the tongue, glottis, or larynx, airway obstruction may occur. Patients who develop an anaphylactic reaction with or without angioedema after treatment with PREMARIN should not receive PREMARIN again.

Exogenous estrogens may exacerbate symptoms of angioedema in women with hereditary angioedema.

Neurologic

Cerebrovascular insufficiency

Patients who develop visual disturbances, classical migraine, transient aphasia, paralysis or loss of consciousness should discontinue medication.

Patients with a previous history of classical migraine and who develop a recurrence or worsening of migraine symptoms should be reevaluated.

Ophthalmologic

If visual abnormalities develop: Discontinue PREMARIN pending examination if there is sudden partial or complete loss of vision, or a sudden onset of proptosis, diplopia, or migraine. If examination reveals papilledema or retinal vascular lesions, PREMARIN should be withdrawn. Retinal vascular thrombosis has been reported in patients receiving estrogens with or without progestins.

Dementia

Available epidemiological data indicate that the use of combined *estrogen plus progestin* in women age 65 and over may increase the risk of developing probable dementia.

The Women's Health Initiative Memory Study (WHIMS), a clinical substudy of the WHI, was designed to assess whether postmenopausal hormone replacement therapy (oral *estrogen plus progestin* or oral *estrogen-alone*) reduces the risk of dementia in women aged 65 and over (age range 65-79 years) and free of dementia at baseline.

It is unknown whether these findings apply to younger postmenopausal women (see **Special Populations, Geriatrics**).

In the *estrogen plus progestin* arm of the WHIMS (n=4532), women with intact uteri were treated with daily 0.625 mg conjugated equine estrogens (CEE) plus 2.5 mg medroxyprogesterone acetate (MPA) or placebo for an average of 4.05 years. The results, when extrapolated to 10,000 women treated over a one-year period showed:

- 23 more cases of probable dementia (45 on combined HRT versus 22 on placebo).

In the *estrogen-alone* arm of the WHIMS (n=2947), women with prior hysterectomy were treated with daily 0.625 mg CEE or placebo for an average of 5.21 years. The results, when extrapolated to 10,000 women treated over a one-year period showed:

- 12 more cases of probable dementia (37 on *estrogen-alone* versus 25 on placebo), although this difference did not reach statistical significance.

When data from the *estrogen plus progestin* arm of the WHIMS and the *estrogen-alone* arm of the WHIMS were combined, as per the original WHIMS protocol, in 10,000 women over a one-year period, there were:

- 18 more cases of probable dementia (41 on *estrogen plus progestin* or *estrogen-alone* versus 23 on placebo).

Epilepsy

Particular caution is indicated in women with epilepsy, as HRT may cause an exacerbation of this condition.

Ear/Nose/Throat

Otosclerosis

Estrogens should be used with cautions in patients with otosclerosis.

Psychiatric

Depression

Patients who are taking progestogens and have a history of depression should be observed. If the depression occurs to a serious degree, the drug should be discontinued.

Renal

Fluid retention

Estrogens may cause fluid retention.

Therefore, particular caution is indicated in cardiac, renal dysfunction, or asthma. If, in any of the above-mentioned conditions, a worsening of the underlying disease is diagnosed or suspected during treatment, the benefits and risks of treatment should be reassessed based on the individual case.

Special Populations

Pregnant Women: PREMARIN is contraindicated during pregnancy (see **CONTRAINDICATIONS**). If pregnancy occurs during medication with PREMARIN treatment should be withdrawn immediately.

Nursing Women: 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 the drug. Where an assessment of the risk to benefit ratio suggests the use of this product in nursing women is unfavourable, formula feeding should be substituted for breast feeding.

Pediatrics (< 16 years of age): PREMARIN is not indicated for use in children. Safety and effectiveness in pediatric patients have not been established.

Large and repeated doses of estrogens over an extended time period have been shown to accelerate epiphyseal closure, which could result in short stature if treatment is initiated before the completion of physiologic puberty in normally developing children. If estrogens are administered to patients whose bone growth is not complete, periodic monitoring of bone maturation and effects on epiphyseal centers is recommended during administration of estrogens.

Estrogen treatment of prepubertal girls also induces premature breast development and vaginal cornification, and may induce vaginal bleeding. (See **INDICATIONS AND CLINICAL USE** and **DOSAGE AND ADMINISTRATION**).

Geriatrics (> 65 years of age): There have not been sufficient numbers of geriatric women involved in clinical studies utilizing PREMARIN to determine whether those over 65 years of age differ from younger subjects in their response to PREMARIN.

The Women's Health Initiative Study

In the Women's Health Initiative (WHI) estrogen-alone substudy (daily [0.625 mg] versus placebo), there was a higher relative risk of stroke in women greater than 65 years of age.

In the WHI estrogen plus progestin substudy (daily CE [0.625 mg] plus MPA [2.5 mg] versus placebo), there was a higher relative risk of nonfatal stroke and invasive breast cancer in women older than 65 years of age.

The Women's Health Initiative Memory Study

In the WHIMS ancillary studies of postmenopausal women 65 to 79 years of age, there was an increased risk of developing probable dementia in women receiving estrogen-alone or estrogen plus progestin when compared to placebo.

Since both ancillary studies were conducted in women 65 to 79 years of age, it is unknown whether these findings apply to younger postmenopausal women.

Information for Patients

No studies on the effect of ability to drive or use machines have been performed.

Monitoring and Laboratory Tests

Before PREMARIN is administered, the patient should have a complete physical examination including blood pressure determination. Breasts and pelvic organs should be appropriately examined and a Papanicolaou smear should be performed. Endometrial biopsy should be done only when indicated. Baseline tests should include mammography, measurements of blood glucose, calcium, triglycerides and cholesterol, and liver function tests. Before starting treatment pregnancy should be excluded. Periodic check-ups and careful benefit/risk evaluations should be undertaken in women treated with ERT/HRT therapy. The first follow-up examination should be done within three to six months of initiation of treatment to assess response to treatment. Thereafter, examinations should be made at intervals of at least once a year. Appropriate investigations should be arranged at regular intervals as determined by the physician.

Mammography examinations should be scheduled based on patient age, risk factors and prior mammogram results.

The importance of regular self-examination of the breasts should be discussed with the patient.

ADVERSE REACTIONS

Adverse Drug Reaction Overview

See **Warnings/Precautions** regarding potential induction of malignant neoplasia and other adverse effects similar to those observed with oral contraceptives.

The following additional adverse reactions have been reported with estrogen replacement therapy or are undesirable effects associated with hormone replacement therapy:

Blood and lymphatic system disorders

Altered coagulation tests (see **WARNINGS AND PRECAUTIONS**, **Drug-Laboratory Tests Interactions**).

Cardiac disorders

Palpitations; increase in blood pressure (see **WARNINGS AND PRECAUTIONS**); coronary thrombosis, myocardial infarction.

Endocrine disorders

Increased blood sugar levels; decreased glucose tolerance, carbohydrate tolerance

Eye disorders

Neuro-ocular lesions (e.g. retinal vascular thrombosis, optic neuritis); visual disturbances; steepening of the corneal curvature; intolerance to contact lenses.

Gastrointestinal disorders

Nausea; vomiting; abdominal discomfort (cramps, pressure, pain), bloating, pancreatitis, gallbladder disorder; ischemic colitis.

General disorders and administration site conditions

Fatigue; changes in appetite; changes in body weight; changes in libido, exacerbation of porphyria, hypocalcemia (in patients with disease that can predispose to severe hypocalcemia), exacerbation of asthma, angioedema, hypersensitivity; anaphylactic/anaphylactoid reactions, increased triglycerides.

Hepatobiliary disorders

Gallbladder disorder; cholestatic jaundice.

Musculoskeletal and connective tissue disorders

Musculoskeletal pain including leg pain not related to thromboembolic disease (usually transient, lasting 3-6 weeks) may occur, arthralgia, leg cramps.

Neoplasms, benign

Fibrocystic breast changes; enlargement of hepatic hemangiomas.

Nervous system disorders

Aggravation of migraine episodes; headaches; dizziness; cerebrovascular accident/stroke, exacerbation of epilepsy, stroke, exacerbation of chorea, somnolence, insomnia.

Psychiatric disorders

Mental depression; nervousness; irritability, anxiety, mood disturbances, dementia, fatigue.

Renal and urinary disorders

Cystitis; dysuria; sodium retention; edema.

Reproductive system and breast disorders

Breakthrough bleeding; spotting; change in menstrual flow and abnormal withdrawal bleeding or flow, dysmenorrhea/pelvic pain; vaginal itching/discharge; dyspareunia; endometrial hyperplasia; pre-menstrual-like syndrome; reactivation of endometriosis; changes in cervical erosion and amount of cervical secretion; vaginal candidiasis, amenorrhea, vaginitis, increase in size of uterine leiomyomata, breast swelling and tenderness, breast pain, enlargement, galactorrhea, breast discharge; growth potentiation of benign meningioma; leukorrhea.

Skin and subcutaneous tissue disorders

Chloasma or melasma, which may persist when drug is discontinued; erythema multiforme; erythema nodosum; haemorrhagic eruption; loss of scalp hair; hirsutism and acne, urticaria, pruritus, generalized rash, rash (allergic) with without pruritus, alopecia.

Vascular disorders

Isolated cases of: thrombophlebitis; thromboembolic disorders, venous thrombosis.

Clinical Trial Adverse Drug Reactions

Because clinical trials are conducted under very specific conditions the adverse drug reaction rates observed in the clinical trials may not reflect the rates observed in practice and should not be compared to the rates in the clinical trials of another drug. Adverse drug reaction information from clinical trials is useful for identifying drug-related adverse events and for approximating rates.

A phase III double-blind, randomized study was conducted to compare the efficacy and safety of various regimens of PREMARIN (conjugated estrogens) and medroxyprogesterone acetate (MPA). Efficacy was determined by the incidence of endometrial hyperplasia at the twelve month evaluation. A total of 1,724 generally healthy postmenopausal women (mean age, 54.0 years \pm SD 4.6) participated in the study. The patients were considered as having completed the study if they participated in all 13 cycles (28 days/cycle). The five arms in the study were: 2 for Premplus®, 2 for Premplus Cycle®, and 1 for PREMARIN alone.

Prior to treatment, the following were performed: physical examinations, vital signs, papanicolaou smear, laboratory safety screen, mammography, follicle stimulating hormone (FSH), and endometrial biopsy. During the patient visit for Cycle 6, all but the mammography and FSH were performed. At the end of the study, Cycle 13, all but the FSH were performed.

No dose-dependent incidence of adverse experiences was seen in the multicenter efficacy and safety study. Significantly ($p < 0.05$) fewer (12%) PREMARIN treated patients reported breast pain than in the PREMARIN /MPA groups. Headache was the most common drug-related study event in the PREMARIN alone group, reported by 69 (20%) patients. Table 1 summarizes the treatment-emergent drug-related study events reported by 2% or more of the patients.

Table 1: Treatment-Emergent Drug-Related Study Events With an Incidence of $\geq 2\%$

Study Event	PREMARIN 0.625 mg CE (n=347) No. (%) of Patients ⁺
General disorders and administration site conditions	
Asthenia	18 (5)
Chest pain	2 (<1)
Generalized edema	9 (3)
Edema	5 (1)
Peripheral edema	11 (3)
Pain	11 (3)
Vascular disorders	
Hypertension	7 (2)
Vasodilatation	9 (3)
Gastrointestinal disorders	
Diarrhea	6 (2)
Dyspepsia	4 (1)
Flatulence	14 (4) ^b
Nausea	19 (5)
Abdominal pain	46 (13)
Musculoskeletal connective tissue, and bone disorders	
Leg cramps	8 (2)
Back pain	13 (4)
Nervous system disorders	
Headache	69 (20)
Depression	22 (6)
Migraine	7 (2)
Dizziness	10 (3)
Emotional lability	4 (1)
Insomnia	2 (<1)
Nervousness	1 (<1) ^{b, d}

Table 1: Treatment-Emergent Drug-Related Study Events With an Incidence of $\geq 2\%$

Study Event	PREMARIN 0.625 mg CE (n=347) No. (%) of Patients ⁺
Skin and subcutaneous tissue disorders	
Acne	6 (2)
Pruritus	6 (2) ^{a, b}
Rash	5 (1)
Reproductive system and breast disorders	
Breast enlargement	4 (1) ^{a, b}
Breast pain *	40 (12) ^{a, b, d}
Cervix disorder**	12 (3)
Dysmenorrhea	17 (5) ^d
Endometrial hyperplasia	57 (20)
Leukorrhea	24 (7)
Menstrual disorder	3 (<1)
Pelvic pain	16 (5)
Uterine spasm	0 (0) ^{a, d}
Vaginal bleeding ***	28 (8) ^b
Vaginitis	4 (1) ^{a, b}
Investigations	
Pap smear abnormal [†]	0 (0) ^a
Weight increased	10 (3)
Psychiatric disorders	
Depression	22 (6)
Emotional lability	4 (1)
Nervousness	1 (<1) ^{b, d}

Table 1: Treatment-Emergent Drug-Related Study Events With an Incidence of $\geq 2\%$

Study Event	PREMARIN 0.625 mg CE (n=347) No. (%) of Patients ⁺
-------------	--

- + Patients were counted only once for a particular study event.
- * Breast pain also includes breast discomfort, breast soreness, breast tenderness, mastodynia, nipple soreness and nipple tenderness.
- ** Cervix disorder includes cervical dysplasia, cervical erosion, cervical hypersecretion.
- † Pap smear abnormal refers to positive Pap smear class III through V.
- *** Vaginal bleeding includes menorrhagia, metrorrhagia, uterine hemorrhage, and vaginal hemorrhage.
- a, b, d, = Significant difference ($p < 0.05$) from treatment group Premplus® (0.625/2.5 mg), Premplus® (0.625/5.0 mg), Premplus Cycle® (0.625/10.0 mg) and PREMARIN (0.625 mg) respectively.

The above Table 1 summarizes the treatment-emergent drug-related study events reported by greater than 2% of the patients. The number of patients with any study event is not necessarily the sum of the individual events since a patient might have reported two or more different study events. The addition of progestin to estrogen replacement therapy may contribute to breast pain. This is reflected by the greater percentage of patients with breast pain on combination therapy than on PREMARIN alone.

If adverse symptoms persist, the prescription of HRT should be re-considered.

Post Marketing Adverse Drug Reactions

The following adverse reactions have been reported with PREMARIN tablets. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate the frequency or establish a causal relationship to drug exposure.

Genitourinary System

Abnormal uterine bleeding, dysmenorrhea/pelvic pain, increase in size of uterine leiomyomata, vaginitis, including vaginal candidiasis, change in cervical secretion, ovarian cancer, endometrial hyperplasia, endometrial cancer, leucorrhea.

Breasts

Tenderness, enlargement, pain, discharge, galactorrhea, fibrocystic breast changes, breast cancer, gynecomastia in males.

Cardiovascular

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

Gastrointestinal

Nausea, vomiting, abdominal pain, bloating, cholestatic jaundice, increased incidence of gallbladder disease, pancreatitis, enlargement of hepatic hemangiomas, ischemic colitis.

Skin

Chloasma or melasma that may persist when drug is discontinued, erythema multiforme, erythema nodosum, loss of scalp hair, hirsutism, pruritus, rash.

Eyes

Retinal vascular thrombosis, intolerance to contact lenses.

Central Nervous System

Headache, migraine, dizziness, mental depression, nervousness, mood disturbances, irritability, exacerbation of epilepsy, dementia, possible growth potentiation of benign meningioma.

Miscellaneous

Increase or decrease in weight, glucose intolerance, aggravation of porphyria, edema, arthralgia, leg cramps, changes in libido, urticaria, angioedema, anaphylactoid/anaphylactic reactions, exacerbation of asthma, increased triglycerides, hypersensitivity.

Additional postmarketing adverse reactions have been reported in patients receiving other forms of hormone therapy.

DRUG INTERACTIONS

Overview

Data from a drug-drug interaction study involving conjugated estrogens and medroxyprogesterone acetate indicate that the pharmacokinetic disposition of both drugs are not altered when the drugs are co-administered. Other clinical drug-drug interaction studies have not been conducted with conjugated estrogens.

Estrogens may diminish the effectiveness of anticoagulant, antidiabetic and antihypertensive agents.

Drug-Drug Interactions

The following section contains information on drug interactions with ethinyl estradiol-containing products (specifically, oral contraceptives) that have been reported in the public literature. The clinical significance of these drugs is unknown; additionally, it is unknown whether such interactions occur with drug products containing other types of estrogens. Monitoring of patient response to therapy is recommended.

Hepatic metabolism

Interactions can occur with drugs that induce microsomal enzymes which can decrease ethinyl estradiol concentrations (eg., rifampin, barbiturates, phenytoin, carbamazepine, troglitazone).

Gastrointestinal wall

Sulfation of ethinyl estradiol has been shown to occur in the gastrointestinal (GI) wall. Therefore, drugs which act as competitive inhibitors for sulfation in the GI wall may increase ethinyl estradiol bioavailability (eg., ascorbic acid, acetaminophen).

Interference in the metabolism of other drugs

Ethinyl estradiol may interfere with the metabolism of other drugs by inhibiting hepatic microsomal enzymes or by inducing hepatic drug conjugation, particularly glucuronidation. Increased plasma concentrations of cyclosporin, prednisolone, and theophylline have been reported with concomitant administration of certain drugs containing ethinyl estradiol (eg., oral contraceptives containing ethinyl estradiol). In addition, products containing ethinyl estradiol may induce the conjugation of other compounds.

Decreased plasma concentrations of acetaminophen and increased clearance of temazepam, salicylic acid, morphine, and clofibric acid have been noted when these drugs were administered with certain ethinyl estradiol-containing drug products (eg., oral contraceptives containing ethinyl estradiol).

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 (*Hypericum perforatum*) preparations, phenobarbital, phenytoin, carbamazepine, rifampicin, and dexamethasone 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 cimetidine, erythromycin, clarithromycin, ketoconazole, itraconazole, ritonavir and grapefruit juice, may increase plasma concentrations of estrogens and may result in side effects.

Other interactions with ethinyl estradiol

Coadministration of atorvastatin and certain ethinyl estradiol-containing drug products (eg., oral contraceptives) increase AUC values for ethinyl estradiol by 20 percent.

Clinical pharmacokinetic studies have not demonstrated any consistent effect of antibiotics (other than rifampin) on plasma concentrations of synthetic steroids.

Drug-Food Interactions

CYP3A4 inhibitors such as grapefruit juice may increase plasma concentrations of 17 β -estradiol and may result in side effects.

A single dose study in healthy, postmenopausal women was conducted to investigate any potential drug interaction when 2 x 0.625 mg PREMARIN (conjugated estrogens) and 2.5 mg medroxyprogesterone acetate (MPA) tablets were administered immediately following a high-fat breakfast. Administration with food slowed the absorption of the conjugated estrogens, thereby reducing the C_{max} of the various estrogens by 25% to 30%, and increasing MPA C_{max} by 89% and $AUC_{0-\infty}$ by 28%. Thus, food slightly lowered the C_{max} , but did not affect the AUC, of the estrogens from a 0.625 mg PREMARIN tablet; food significantly increased the C_{max} and AUC of MPA from a 2.5-mg tablet.

Drug-Herb Interactions

It was found that some herbal products (e.g., St. John's wort), which are available as over-the-counter (OTC) products, might interfere with steroid metabolism, and therefore alter the efficacy and safety of estrogen/progestin products. Hot flashes and vaginal bleeding have been reported in patients taking estrogen replacement therapy (ERT) and combined estrogen plus progestin therapy (HRT) and St. John's Wort (*Hypericum perforatum*) preparations. St. John's Wort may induce hepatic microsomal enzymes, which theoretically may result in reduced efficacy of ERT and HRT.

Physicians and other health care providers should be made aware of other non-prescription products concomitantly used by the patient, including herbal and natural products, obtained from the widely spread Health Stores.

Drug-Laboratory Test Interactions

The results of certain endocrine and liver function tests may be affected by estrogen-containing products:

- increased prothrombin time and partial thromboplastin time; increased levels of fibrinogen and fibrinogen activity, increased coagulation factors VII, VIII, IX, X; increased norepinephrine-induced platelet aggregability; decreased antithrombin III;
- increased thyroid-binding globulin (TBG) levels leading to increased circulating total thyroid hormone (T4) as measured by column or radioimmunoassay; T3 resin uptake is decreased, reflecting the elevated TBG; free T4 concentration is unaltered;
- impaired glucose tolerance;
- increased plasma HDL and HDL₂ cholesterol subfraction concentrations, reduced LDL cholesterol concentrations, increased serum triglycerides and phospholipids concentration;
- other binding proteins may be elevated in serum i.e., corticosteroid binding globulin (CBG), sex-hormone binding globulin (SHBG), leading to increased circulating corticosteroids and sex steroids respectively; free or biologically active hormone concentrations are unchanged;
- The response to metyrapone may be reduced.

The results of the above laboratory tests should not be considered reliable unless therapy has been discontinued for two to four weeks.

The pathologist should be informed that the patient is receiving hormone replacement therapy (HRT) when relevant specimens are submitted.

Drug-lifestyle interactions

Acute alcohol ingestion during HRT may lead to elevations in circulating estradiol levels.

Drug-Food Interactions

The absorption of estrogens from the PREMARIN tablets 1.25 mg is not affected by food. PREMARIN tablets may be taken without regard to meals (see **DOSAGE AND ADMINISTRATION**).

DOSAGE AND ADMINISTRATION

Dosing Considerations

The benefits and risks of HRT must always be carefully weighed, including consideration of the emergence of risks as therapy continues. Use of estrogens alone or in combination with progestins therapy should be prescribed at the lowest effective doses and for the shortest duration consistent with treatment goals and risks for the individual woman. Patients should be re-evaluated periodically as clinically appropriate to determine if treatment is still necessary (see **boxed Serious Warnings and Precautions**). For women who have intact uteri, 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. In the absence of comparable data, the risks of HRT should be assumed to be similar for all estrogens and estrogen/progestin combinations.

Hormone replacement therapy (HRT) involving either estrogen alone or estrogen plus progestin combined therapy should only be continued as the benefits outweigh the risks for the individual.

Recommended Dose and Dosage Adjustment

PREMARIN therapy may be given continuously with no interruption in therapy, or in cyclical regimens (regimens such as 25 days on drug followed by five days off drug) as is medically appropriate on an individualized basis.

Continuous, non-cyclic therapy may be indicated in hysterectomized women or in cases where the signs and symptoms of estrogen deficiency become problematic during the treatment-free interval. In women with an intact uterus, a progestin should be coadministered for a **minimum** of 10, but preferably at least 12 to 14 days per cycle to avoid overstimulation of the endometrium. In addition, progestin should be administered to minimize the occurrence of endometrial hyperplasia. Unexpected or abnormal vaginal bleeding in such patients requires institution of prompt diagnostic measures, such as endometrial biopsy or curettage to rule out the possibility of uterine malignancy. Since progestins are administered to reduce the risk of hyperplastic changes of the endometrium, patients without a uterus do not require a progestin for this purpose.

In some cases, hysterectomized women with a history of endometriosis may need a progestin, see **WARNINGS AND PRECAUTIONS, Endometriosis**.

For maintenance therapy one should always use the lowest dose that still proves effective. The requirement for hormone replacement therapy for menopausal symptoms should be reassessed periodically.

PREMARIN may be taken without regard to meals. Tablets should be taken whole; do not divide, crush, chew, or dissolve tablets in mouth.

Usual Dosage Range

Menopausal symptoms

Patients should be treated with the lowest effective dose. Generally, women should be started at 0.3 mg PREMARIN daily, cyclically or continuously as is medically required. Adjust dosage according to severity of symptoms and response of the patient. For maintenance, adjust dosage to lowest level providing effective control.

Osteoporosis (loss of bone mass)

Patients should be treated with the lowest effective dose. Generally, women should be started at 0.3 mg PREMARIN daily. Subsequent dosage adjustments may be made based upon the individual clinical and bone mineral density responses. This dose should be periodically reassessed by the healthcare provider.

Hypoestrogenism due to

1. Female hypogonadism: 0.3 mg to 0.625 mg daily, administered cyclically (e.g., 3 weeks on and 1 week off) or continuously as required. Doses are adjusted depending on the severity of symptoms and responsiveness of the endometrium.
2. Female castration or primary ovarian failure: 1.25 mg daily, cyclically or continuously as required. Adjust dosage according to severity of symptoms and response of the patient. For maintenance, adjust dosage to lowest level that will provide effective control.

Atrophic Vaginitis

Patients should be treated with the lowest effective dose. Generally, women should be started at 0.3 mg PREMARIN daily depending upon the tissue response of the individual patient. Administer cyclically or continuously as required.

Vulvar Atrophy

Patients should be treated with the lowest effective dose. Generally, women should be started at 0.3 mg PREMARIN daily depending upon the tissue response of the individual patient. Administer cyclically or continuously as required.

Administration

Oral

PREMARIN should be prescribed with an appropriate dosage of a progestin for women with intact uteri in order to prevent endometrial hyperplasia/carcinoma. Progestin therapy is not required as part of hormone replacement therapy in women who have had a previous hysterectomy.

Missed Dose

If a patient misses a dose, advise them to take the dose as soon as possible. If it is almost time for the patient's next dose, advise the patient to skip the missed dose and go back to their normal schedule. Patients should not take 2 doses at the same time.

OVERDOSAGE

Symptoms of overdose

Numerous reports of ingestion of large doses of estrogen products and estrogen-containing oral contraceptives by young children have not revealed acute serious ill effects.

Overdosage with estrogen may cause nausea, breast discomfort, fluid retention, bloating or vaginal bleeding in women.

Treatment of overdose

There is no specific antidote and further treatment if necessary should be symptomatic.

For management of a suspected drug overdose, contact your regional Poison Control Centre.

ACTION AND CLINICAL PHARMACOLOGY

Mechanism of Action

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 estriol, at the receptor level.

The primary source of estrogen in normally cycling adult women is the ovarian follicle, which secretes 70 to 500 µg of estradiol daily, depending on the phase of the menstrual cycle. After menopause, most endogenous estrogen is produced by conversion of androstenedione, which is secreted by the adrenal cortex, to estrone in the 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 gonadotropins seen in postmenopausal women.

Pharmacodynamics

Conjugated estrogens used in therapy are soluble in water and are well absorbed through the skin, mucous membranes, and gastrointestinal tract after release from the drug formulation.

Effects on vasomotor symptoms associated with estrogen deficiency

Hot flushes, feelings of intense heat over the upper trunk and face, with flushing of the skin and sweating occur in approximately 80% of women as a result of the decrease in ovarian hormones. These vasomotor symptoms are seen in women whether menopause is surgically induced or spontaneous. However, hot flushes may be more severe in women who undergo surgical menopause. Hot flushes can begin before the cessation of menses.

Effects on Osteoporosis associated with estrogen deficiency

For several years following natural or induced menopause, the rate of bone mass decline is accelerated. Conjugated estrogens reduce bone resorption and retard postmenopausal bone loss. Case-control studies have shown a reduction of up to 60% in hip and wrist fractures in women whose estrogen replacement was begun within a few years of menopause. Studies also suggest that estrogen reduces the rate of vertebral fractures. One clinical study demonstrated that even when estrogen was started as late as fifteen years after menopause, further loss of bone mass was prevented, but was not restored to premenopausal levels. The effect on bone mass conservation is sustained only as long as conjugated estrogens therapy is continued.

Effects on female hypogonadism

In clinical studies of delayed puberty due to female hypogonadism, breast development was induced by doses as low as 0.15 mg. The dosage may be gradually titrated upward at 6 to 12-month intervals as needed to achieve appropriate bone age advancement and eventual epiphyseal closure. Available data suggest that chronic dosing with 0.625 mg is sufficient to induce artificial cyclic menses with sequential progestin treatment and to maintain bone mineral density after skeletal maturity is achieved.

Effects on the Endometrium

The use of unopposed estrogen therapy has been associated with an increased risk of endometrial hyperplasia, a possible precursor of endometrial adenocarcinoma. The results of clinical studies indicate that the addition of a progestin to an estrogen replacement regimen for more than 10 days per cycle reduces the incidence of endometrial hyperplasia and the attendant risk of adenocarcinoma in women with intact uteri. The addition of a progestin into an estrogen replacement regimen has not been shown to interfere with the efficacy of estrogen replacement therapy for its approved indications.

Effect on bleeding patterns

With a continuous therapy, several bleeding patterns may occur. These may range from absence of bleeding to irregular bleeding. If bleeding occurs, it is frequently light spotting or moderate bleeding.

Pharmacokinetics

Absorption

Conjugated estrogens are soluble in water and are well absorbed from the gastrointestinal tract after release from the drug formulation. The PREMARIN tablet releases conjugated estrogens slowly over several hours. **Table 2-1** and **2-2** summarize the mean pharmacokinetic parameters for unconjugated and conjugated estrogens following administration of 1 x 0.625 mg and 1 x 1.25 mg tablets to healthy postmenopausal women.

The pharmacokinetics of PREMARIN 1.25 mg tablets was assessed following a single dose with a high-fat breakfast and with fasting administration. These data demonstrate that the absorption of estrogens from the 1.25 mg tablets is not affected by food and that it may be taken without regard to meals.

Table 2-1: Pharmacokinetic Profile of Unconjugated and Total Estrogens Following a Dose of 1 x 0.625 mg

PK Parameter Arithmetic Mean (%CV)	C_{max} (pg/mL)	t_{max} (h)	t_{1/2} (h)	AUC (pg•h/mL)
Estrone	87 (33)	9.6 (33)	50.7 (35)	5557 (59)
Baseline-adjusted estrone	64 (42)	9.6 (33)	20.2 (40)	1723 (52)
Equilin	31 (38)	7.9 (32)	12.9 (112)	602 (54)
Total estrone	2.7 (43)	6.9 (25)	26.7 (33)	75 (52)
Baseline-adjusted total estrone	2.5 (45)	6.9 (25)	14.8 (35)	46 (48)
Total equilin	1.8 (56)	5.6 (45)	11.4 (31)	27 (56)

Table 2-2: Pharmacokinetic Profile of Unconjugated and Total Estrogens Following a Dose of 1 x 1.25 mg

PK Parameter Arithmetic Mean (%CV)	C_{max} (pg/mL)	t_{max} (h)	t_{1/2} (h)	AUC (pg•h/mL)
Estrone	124 (30)	10.0 (32)	38.1 (37)	6332 (44)
Baseline-adjusted estrone	102 (35)	10.0 (32)	19.7 (48)	3159 (53)
Equilin	59 (43)	8.8 (36)	10.9 (47)	1182 (42)
Total estrone	4.5 (39)	8.2 (58)	26.5 (40)	109 (46)
Baseline-adjusted total estrone	4.3 (41)	8.2 (58)	17.5 (41)	87 (44)
Total equilin	2.9 (42)	6.8 (49)	12.5 (34)	48 (51)

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 concentration in the sex hormone target organs. Estrogens circulate in the blood largely bound to sex hormone binding globulin (SHBG) and albumin.

Metabolism

Metabolic conversion of estrogens occurs primarily in the liver (first pass effect), but also at local target tissue sites. Complex metabolic processes result in a dynamic equilibrium of circulating conjugated and unconjugated estrogenic forms which are continually interconverted, especially between estrone and estradiol and between esterified and non-esterified forms.

When given orally, naturally-occurring estrogens and their esters are extensively metabolized (first pass effect) and circulate primarily as estrone sulfate, with smaller amounts of other conjugated and unconjugated estrogenic species. This results in limited oral potency. By contrast, synthetic estrogens, such as ethinyl estradiol and the nonsteroidal estrogens, are degraded very slowly in the liver and other tissues, which results in their high intrinsic potency.

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 estriol, which is a 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.

Excretion

During this enterohepatic recirculation, estrogens are desulfated and resulfated and undergo degradation through conversion to less active estrogens (estriol and other estrogens), oxidation to nonestrogenic substances (catecholestrogens, which interact with catecholamine metabolism, especially in the central nervous system), and conjugation with glucuronic acids (which are then rapidly excreted in the urine).

Estradiol, estrone, and estriol are excreted in the urine, along with glucuronide and sulfate conjugates.

Special Populations and Conditions

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

STORAGE AND STABILITY

Store at 15°C - 30°C.

Keep out of reach of children.

Special Handling Instructions

None required.

DOSAGE FORMS, COMPOSITION AND PACKAGING

PREMARIN (conjugated estrogens sustained release tablets) for oral administration contains a mixture of conjugated estrogens obtained exclusively from natural sources, occurring as the sodium salts of water-soluble estrogen sulfates blended to represent the average composition of material derived from pregnant mares' urine. It is a mixture of sodium estrone sulphate and sodium equilin sulphate. It contains concomitant components, as sodium sulphate conjugates, 17 β -dihydroequilin, 17 β -estradiol, and 17 α -dihydroequilin. Tablets for oral administration are available in 0.3 mg, 0.625 mg, and 1.25 mg strengths of conjugated estrogens.

PREMARIN 0.3 mg, 0.625 mg, and 1.25 mg tablets also contain the following non-medicinal ingredients: calcium phosphate tribasic, carnauba wax, hydroxypropyl cellulose, hypromellose, lactose monohydrate, magnesium stearate, microcrystalline cellulose, polyethylene glycol, sucrose, purified Water.

PREMARIN Tablets are available as :

0.3 mg (green) tablets in blister strips of 28;

0.625 mg (maroon) tablets in blister strips of 28;

1.25 mg (yellow) tablets in blister strips of 14.

The tablets come in different strengths and each strength tablet is a different color. The color ingredients are:

- **0.3 mg** (green color tablet with "0.3" printed in white ink): hypromellose, quinoline yellow lake, macrogol, FD&C Blue No. 2, Indigo carmine aluminum lake, titanium dioxide, polysorbate 80. The white branding ink contains the following: titanium dioxide, purified water, isopropyl alcohol, propylene glycol, hypomellose.

- **0.625 mg** (maroon color tablet with "0.625" printed in white ink): hypromellose, titanium dioxide, FD&C Red #40 aluminum lake, macrogol, FD&C Blue #2 aluminum lake. The white branding ink contains the following: titanium dioxide, purified water, isopropyl alcohol, propylene glycol, hypomellose

- **1.25 mg** (yellow color tablet with "1.25" printed in black ink): hypromellose, titanium dioxide, quinoline yellow aluminum lake, macrogol, polysorbate, FD&C yellow #6 sunset yellow FCF aluminum lake. The black branding ink contains the following: purified water, iron oxide black, isopropyl alcohol, propylene glycol, hypomellose.

PART II: SCIENTIFIC INFORMATION

PHARMACEUTICAL INFORMATION

Drug Substance

Proper name: Conjugated estrogens, C.S.D.

Chemical name: Not applicable

Molecular formula and molecular mass: Not applicable

Structural formula: Not applicable

Description: Conjugated estrogens C.S.D. contains a mixture of estrogens obtained exclusively from natural sources, occurring as the sodium salts of water-soluble estrogen sulfates blended to represent the average composition of material derived from pregnant mares' urine. It is a mixture of at least the following estrogens: estrone, equilin, 17 α -dihydroequilin, 17 α -estradiol, 17 β -dihydroequilin, $\Delta^{8,9}$ -dehydroestrone, 17 β -estradiol, equilenin, 17 α -dihydroequilenin, 17 β -dihydroequilenin and as salts of their sulfate esters.

CLINICAL TRIALS

Published Studies

Vasomotor Symptoms

The Postmenopausal Estrogen Progestin Interventions (PEPI) Trial was a randomized clinical trial (RCT) in 875 postmenopausal women ages 45 to 64 years of age. Vasomotor symptoms were evaluated using a self-reported checklist at baseline, at 1 year, and at 3 years. The five treatment groups received either conjugated equine estrogens (CEE) 0.625 mg/day, CEE 0.625 mg/day plus cyclical (12 days per cycle) medroxyprogesterone acetate (MPA) 10 mg, CEE 0.625 mg/day plus MPA 2.5 mg/day, CEE 0.625 mg/day plus cyclical (12 days per cycle) micronized progesterone (MP) 200 mg, or placebo.

Key observations demonstrated that therapy with CEE alone and CEE with MPA and CEE with MP decreased levels of vasomotor symptoms in subjects over 36 months. On average there were no significant differences in symptom levels between each group.

At year 1, the adjusted odds of having higher vasomotor symptoms for continuous CEE with MPA vs. placebo were 0.17 (0.09, 0.32). At year 3, the adjusted odds for continuous CEE with MPA vs. placebo were 0.39 (0.22, 0.69). These reported results are the odds ratios with 95% confidence intervals from generalized Wald tests in parentheses.

Vasomotor Symptoms and Vaginal Atrophy

The Women's Health, Osteoporosis, Progestin, Estrogen (HOPE) Study was an RCT to evaluate the safety and efficacy of lower doses of CEE and MPA in postmenopausal women. The design included a one year basic study to evaluate the efficacy of lower doses of CEE with and without MPA in relieving vasomotor symptoms (VMS) and vulvar and vaginal atrophy (VVA). A total of 2,673 healthy, postmenopausal women 40 to 65 years of age with an intact uterus (mean age of 53.3 years), including a vasomotor symptom efficacy-evaluable population (n=241 at baseline) participated.

Efficacy measures were frequency and severity of daily hot flushes and Papanicolaou smear with vaginal maturation index (VMI) to assess vaginal atrophy.

There were a total of eight treatment arms consisting of the following:

CEE 0.625 mg/day; CEE 0.625 mg/MPA 2.5 mg/day; CEE 0.45 mg/day; CEE 0.45 mg/MPA 2.5 mg/day; CEE 0.45 mg/MPA 1.5 mg/day; CEE 0.3 mg/day; CEE 0.3 mg/MPA 1.5 mg/day; or placebo.

Key observations for VMS: All active treatment groups significantly reduced mean number of hot flushes from baseline by week 1 or 2 ($P<0.01$) and all active treatment groups significantly reduced mean number of hot flushes compared with placebo by week 2 or 3 ($P<0.001$).

Numbers of hot flushes

- For the placebo group, the mean daily number of hot flushes dropped from approximately 10 at week 1, to approximately 5 at week 12, and continuing at approximately 5 to cycle 13.
- For the 0.625 mg CEE/2.5 mg MPA treatment group, the mean daily number of hot flushes decreased from approximately 10 at week 1, to approximately 1 at week 12, dropping to approximately 0.5 at cycle 13. The difference from placebo was significant ($P<0.05$) beginning from week 2 to the end of cycle 13.

Severity of hot flushes

A mild hot flush was rated a 1, a moderate hot flush a 2, and a severe hot flush a 3.

- For the placebo group, the mean daily severity of hot flushes decreased from approximately 2.1 at week 1, to approximately 1.7 at week 12, and continuing at approximately 1.7 to cycle 13.
- The mean daily severity of hot flushes was significantly lower at all cycles in the CEE 0.625 group, compared with the CEE 0.45 group ($P<0.05$). By cycle 2, mean severity in the CEE 0.625 group was significantly lower than in the CEE 0.3 group, and this difference continued through cycle 13 ($P<0.05$).

Key observations for VVA: All active treatment groups significantly increased the percentage of superficial cells from baseline at cycles 6 and 13 ($P<0.001$) and all active treatment groups significantly increased the percentage of superficial cells compared with placebo at cycles 6 and 13 ($P<0.001$).

Osteoporosis – Bone Mineral Density

The PEPI Trial was a RCT in 875 postmenopausal women ages 45 to 64 years of age. This study was designed to assess the effects of CEE alone in comparison with CEE and MPA or MP on bone mineral density (BMD) at the spine and the hip as measured by dual-energy x-ray absorptometry (DXA) technology. Its primary measures were BMD scores at baseline, 12 months and 36 months. Five treatment groups received either CEE 0.625 mg/day, CEE 0.625 mg/day plus cyclical (12 days per cycle) MPA 10 mg, CEE 0.625 mg/day plus MPA 2.5 mg/day, CEE 0.625 mg/day plus cyclical (12 days per cycle) MP 200 mg, or placebo.

Key observations: Women in the placebo group lost significant amounts of BMD at both the spine and the hip compared with active treatments by month 12. All active treatment groups produced significant BMD gains at the spine and hip from baseline by month 12 continuing until month 36 compared with losses in the placebo group. At 36 months, the placebo group had lost an average of 1.8% of spine BMD, and 1.7% of hip BMD, while the active treatment groups gained from 3.5% to 5.0% mean total increases in spinal BMD and a mean total increase of 1.7% hip BMD.

The Women's HOPE Study evaluated 822 healthy, postmenopausal women (mean age of 51.6 years) with a modified intent-to-treat population (n=695 at baseline) in a 2 year, randomized, double-blind, placebo controlled osteoporosis substudy.

The efficacy measures were changes in BMD of the lumbar spine (L2 to L4) and total hip, BMC of the total body as measured by DXA, and the two biochemical markers of bone turnover, osteocalcin and N-telopeptides of type I collagen.

There were a total of 8 treatment arms consisting of the following: CEE 0.625 mg/day; CEE 0.625 mg/MPA 2.5 mg/day; CEE 0.45 mg/day; CEE 0.45 mg/MPA 2.5 mg/day; CEE 0.45 mg/MPA 1.5 mg/day; CEE 0.3 mg/day; CEE 0.3 mg/MPA 1.5 mg/day; or placebo.

Key observations: Women in the placebo group experienced significant losses ($P<0.001$) in BMD at the spine compared with baseline at the 24 month visit. All dose formulations of CEE and CEE/MPA were effective in preventing bone loss at the spine and hip from baseline ($P<0.001$) and all were effective in reducing bone turnover from baseline ($P<0.001$).

The secondary analysis of the Women's HOPE study defined bone response to treatment. Response was defined as loss of $>2\%$, $<2\%$ loss, or greater than or equal to 0% gain of spine or hip BMD from baseline at months 12 and 24.

The key findings were as follows:

- At 24 months, less than 15.5% of women failed to respond to active treatment (losing $>2\%$ in spine BMD) compared with 55.2% in the placebo group.
- At 24 months, less than 15% of women failed to respond to active treatment (losing $>2\%$ in hip BMD) compared with 36.5% in the placebo group
- Women who responded to treatment had a significantly greater reduction in markers of bone turnover (osteocalcin & N-telopeptides) at 12 months ($P<0.0001$ & $P=0.0018$,

respectively) and at 24 months for both markers ($P < 0.0001$) than women who did not respond to treatment.

Efficacy and Safety Studies

Study demographics and trial design

A phase III double-blind, randomized study was conducted to compare the efficacy and safety of various regimens of PREMARIN and medroxyprogesterone acetate (MPA). Efficacy was determined by the incidence of endometrial hyperplasia at the twelve month evaluation. Patients in all five treatment groups took 0.625 mg of PREMARIN every day of a 28-day cycle; in four groups, they also took MPA (see Table 3 below).

A total of 1,724 generally healthy postmenopausal women between the ages of 43 and 66 years were admitted to the study. They were eligible to participate in the study if they had their last natural menstrual cycle at least 12 months before entering the study (baseline screening). The serum screening follicle-stimulating hormone (FSH) concentrations had to be higher than the lower limit for postmenopausal women for the given laboratory. The women were relatively healthy and had intact reproductive organs.

The study was comprised of five arms: 4 PREMARIN and MPA and 1 for PREMARIN alone, as indicated below. Each patient was to participate for 13 cycles (28 days/cycle). A total of 1,361 patients completed the study.

Table 3: Pivotal Trial Treatment Groups

Treatment Group	Strengths (mg)		Days of Use/Cycle
	PREMARIN	MPA	
A	0.625	2.5	1-28
B	0.625	5.0	1-28
C*	0.625	Placebo	1-14
	0.625	5.0	15-28
D*	0.625	Placebo	1-14
	0.625	10.0	15-28
E	0.625	Placebo	1-28

* results from these two non-commercialized product presentations have not been included in the "Study results" section.

Study results

Effects on the Endometrium

Table 4 summarizes the incidence of endometrial hyperplasia after one year of treatment with the continuous (28 days/cycle of both the CE and MPA tablets) therapy.

Table 4: Incidence of Endometrial Hyperplasia after One Year of Treatment

Patient	Dose Groups.....		
	PREMARIN/MPA 0.625 mg/2.5 mg	PREMARIN/MPA 0.625 mg/5.0 mg	PREMARIN 0.625 mg
Total number of patients	279	274	283
No. (%) of patients with abnormal biopsies			
• all focal and non-focal hyperplasia	2(<1)*	0(0)*	57(20)

*Significant (p<0.001) in comparison with PREMARIN alone (0.625 mg).
PREMARIN 0.625 mg tablets contain 0.625 mg CE per tablet.

Table 5 summarizes the incidence of endometrial hyperplasia after one year of treatment with conjugated estrogen/medroxyprogesterone acetate, cyclic therapy (MPA tablets taken concomitantly with PREMARIN tablets only on days 15 to 28).

Table 5: Incidence of Endometrial Hyperplasia after One Year of Treatment

Patient	Dose Groups.....	
	PREMARIN /MPA 0.625 mg/10 mg	PREMARIN 0.625 mg
Total number of patients	272	283
No. (%) of patients with abnormal biopsies		
• all focal and non-focal hyperplasia	0(0)*	57(20)

*Significant (p<0.001) in comparison with PREMARIN alone (0.625 mg).

Women treated with PREMARIN and MPA had a significantly (p < 0.001) lower incidence of endometrial hyperplasia than women treated with PREMARIN alone.

Effect on bleeding patterns

Table 6 presents the incidence of amenorrhea for cycles 7 through 13, of the patient group who completed the study with a continuous regimen of PREMARIN 0.625 mg alone.

Table 6: Incidence of Amenorrhea for Cycles 7 through 13

Percent (Number/Total Number) of Patients	
Population	Dose Groups.....
	PREMARIN 0.625 mg
Completed 13 cycles	53.8% (98/182)

Withdrawals from the clinical study

Safety-related events were the most common primary reasons for withdrawal from the clinical study except in the group treated with PREMARIN 0.625 mg CE/10 mg MPA, in which patient request predominated. The reasons for patient withdrawal and the number of patients withdrawn for each of these reasons are shown in Table 7 below.

Table 7: Summary of reasons for withdrawals from clinical study

Study Drug	# patients	-----Number of Patients (%)-----						
		Safety-Related Reasons	Failed to Return	Other Medical Event	Other Non-medical Event	Patient Request	Prestudy Screen or Protocol Violation	Lack Of Efficacy ^a
0.625 mg for 28 days in each group:								
2.5 mg MPA/28 days	340	20 (6)	6 (2)	5 (1)	5 (1)	12 (4)	10 (3)	1 (<1)
5.0 mg MPA/28 days	338	19 (6)	8 (2)	8 (2)	4 (1)	10 (3)	10 (3)	2 (<1)
10 mg MPA/14 days	348	24 (7)	6 (2)	8 (2)	7 (2)	27(8)	6 (2)	1 (<1)
No MPA	347	42 (12)	6 (2)	14 (4)	1 (<1)	15 (4)	14 (4)	0

a: Interpreted by the investigator as lack of symptom control

DETAILED PHARMACOLOGY

See “Action and Clinical Pharmacology” section under the Health Professional Information Section.

TOXICOLOGY

Acute toxicity studies have been conducted with conjugated estrogens (PREMARIN).

Acute Toxicity

PREMARIN

In studies conducted by Wyeth, PREMARIN (125 mg/kg) was administered orally. The LD₅₀ value for PREMARIN administered orally or intraperitoneally to male and female CD-1 mice and CD rats was greater than 125 mg/kg.

REFERENCES

SELECTED BIBLIOGRAPHY

1. Canadian Menopause Consensus Conference. *J Soc Obstet Gynecol Can* 1994; 16:1-40.
2. Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and hormonal contraceptives: collaborative reanalysis of individual data on 53 297 women with breast cancer and 100 239 women without breast cancer from 54 epidemiological studies. *Lancet* 1996; 347:1713-27.
3. Lindsay R, Tohme JF. Estrogen treatment of patients with established menopausal osteoporosis. *Obstet Gynecol* 1990; 76:290-5.
4. Lobo RA. Treatment of the postmenopausal woman: basic and clinical aspects. New York: Raven Press, 1994.
5. Medical Management of the Menopause. A Report by the Special Advisory Committee on Reproductive Physiology to the Drugs Directorate. Health Protection Branch. Health Canada. 1995
6. Primary Care Guidelines for the diagnosis and management of osteoporosis. Scientific Advisory Board to the Osteoporosis Society of Canada. Submitted for publication: *Can Med Assoc J*, May 1996.
7. Mebane-Sims I, Bush TL, Wells HB, James MK, Barrett-Connor E, Marcus R, et al. Effects of hormone therapy on bone mineral density. Results from the Postmenopausal Estrogen/Progestin Interventions (PEPI) Trial. *JAMA* 1996; 276(17):1389-96.
8. Writing Group for the Women's Health Initiative Investigators. Risks and benefits of estrogen plus progestins in healthy postmenopausal women. *JAMA*. 2002; 288(3):321-33.
9. The Women's Health Initiative Steering Committee. Effects of conjugated equine estrogen in postmenopausal women with hysterectomy. The Women's Health Initiative randomized controlled trial. *JAMA*. 2004; 291(14):1701-12
10. Hulley S, Furberg C, Barrett-Conner E, Cauley J, Grady D, Haskell W, et al. Noncardiovascular disease outcomes during 6.8 years of hormone therapy (HERS II). *JAMA*. 2002; 288(1):58-66.
11. Hulley S, Grady D, Bush T, Furberg C, Herrington D, Riggs B, Vittinghoff E, for the Heart and Estrogen/progestin Replacement Study (HERS) Research Group. Randomized trial of estrogen plus progestin for secondary prevention of coronary heart disease in postmenopausal women. *JAMA*. 1998; 280(7):605-13.

12. Shumaker SA, Legault C, Rapp SR, Thal L, Wallace RB, Ockene JK, et al. The Women's Health Initiative Memory Study: A Randomized Controlled Trial. Estrogen plus Progestin and the Incidence of Dementia and Mild Cognitive Impairment in Postmenopausal Women. *JAMA*. 2003; 289 (20):2651-62.
13. Rapp SR, Espeland MA, Shumaker SA, Henderson VW, Brunner RL, Manson JE, et al. The Women's Health Initiative Memory Study: A Randomized Controlled Trial. Effect of Estrogen plus Progestin on Global Cognitive Function in Postmenopausal Women. *JAMA*. 2003; 289(20):2663-72.
14. Wassertheil-Smoller S, Hendrix SL, Limacher M, Heiss G, Kooperberg C, Baird A, et al. The Women's Health Initiative Memory Study: A Randomized Controlled Trial. Effect of Estrogen plus Progestin on Stroke in Postmenopausal Women. *JAMA*. 2003; 289(20):2673-84.
15. Chlebowski RT, Hendrix SL, Langer RD, Stefanick ML, Gass M, Lane D, et al. The Women's Health Initiative Randomized Trial. Influence of Estrogen plus Progestin on Breast Cancer and Mammography in Healthy Postmenopausal Women. *JAMA*. 2003; 289(24):3243-53.
16. Li C, Malone K, Porter P, Weiss N, Tang M, Cushing-Hauzen K, Daling J. Relationship Between Long Durations and Different Regimens of Hormone Therapy and Risk of Breast Cancer. *JAMA*. 2003; 289(24):3254-63.
17. Report from the Scientific Advisory Board of the National Osteoporosis Foundation. Clinical indications for bone mass measurements. *J. Bone Miner Res*. 1989; 4 (suppl 2):1-6.
18. Lacey JV, Mik PJ, Lubin JH, Sherman ME, Troisi R, Hartge P, Schatzkin A, Schainer C. Menopausal hormone replacement therapy and risk of ovarian cancer. *JAMA*. 2002; 288(3):334-41.
19. Rodriguez C, Patel AV, Calle EE, Jacob EJ, Thun MJ. Estrogen replacement therapy and ovarian cancer mortality in a large prospective study of US women. *JAMA*. 2001; 285(11):1460-65.
20. The Writing Group for the PEPI Trial. Effects of estrogen or estrogen/progestin regimens on heart disease risk factors in postmenopausal women. *JAMA*. 1995; 273(3):199-208
21. Anderson GL, Limacher M, Assaf AR, Bassford T, Beresford SA, Black H, et al. Effects of conjugated equine estrogens in postmenopausal women with hysterectomy - The Women's Health Initiative Randomized Controlled Trial. *JAMA* 2004 April 14; 291(24):1701-12.

22. Writing Group of the Women's Health Initiative Investigators. Risks and Benefits of Estrogen Plus Progestin in Healthy Postmenopausal Women - Principal Results From the Women's Health Initiative Randomized Controlled Trial. *JAMA* 2002; 288(3):321-33.
23. Manson JE, Hsio J, Johnson KC, Rossouw JE, Assaf AR, Lasser NL, et al. Estrogen plus progestin and risk of coronary heart disease: Final results from the Women's Health Initiative. *N Engl J Med.* 2003;349(6):523-34
24. Cauley JA, Robbins J, Chen Z, Cummings SR, Jackson RD, LaCroix AZ, et al for the Women's Health Initiative Investigators. Effects of estrogen plus progestin on risk of fracture and bone mineral density: The Women's Health Initiative Randomized Trial. *JAMA.* 2003; 290(13):1729-38.
25. Anderson GL, Judd HL, Kaunitz AM, Barad DH, Beresford SA, Pettinger M, et al. Effects of Estrogen plus progestin on gynecologic cancers and associated diagnostic procedures. The Women's Health Initiative Randomized Trial. *JAMA* 2003;290(13):1739-48.
26. Chlebowski R, Wactawski-Wende J, Ritenbough C, Hubbell FA, Ascensao J, Rebecca J. Rodabough, R, et al. Estrogen plus progestin and colorectal cancer in postmenopausal women. *N Engl J Med.* 2004; 350:991-1004.
27. Shumaker SA, Legault C, Kuller L, Rapp SR, Thal L, Lane DS, et al. Conjugated equine estrogens and incidence of probable dementia and mild cognitive impairment in postmenopausal women – Women's Health Initiative Memory Study. *JAMA.* 2004; 291(24):2947-58.
28. Million Women Study Collaborators. Breast cancer and hormone-replacement therapy in the Million Women Study. *Lancet.* August 9, 2003; 362:419-27.
29. Grady D, Herrington D, Bittner V, Blumenthal R, Davidson M, Hlatky M, et al for the HERS Research Group. Cardiovascular disease outcomes during 6.8 years of hormone therapy. Heart and Estrogen/progestin Replacement Study follow-up (HERS II). *JAMA.* 2002; 288(1):49-57
30. Greendale GA, Reboussin BA, Hogan P, Barnabei VM, Shumaker S, Johnson S, et al. Symptom relief and side effects of postmenopausal hormones: results from the Postmenopausal Estrogen/Progestin Interventions Trial. *Obstet Gynecol.* 1998; 92:982-8.
31. Utian WH, Shoupe D, Bachmann G, Pinkerton JV, and Pickar JH. Relief of vasomotor symptoms and vaginal atrophy with lower doses of conjugated equine estrogens and medroxyprogesterone acetate. *Fertil Steril.* 2001; 75:1065-79.

32. Lindsay R, Gallagher JC, Kleerekoper M, Pickar JH. Effect of lower doses of conjugated equine estrogens with and without medroxyprogesterone acetate on bone in early postmenopausal women. *JAMA*. 2002; 287:2668-76.
33. Lindsay R, Gallagher JC, Kleerekoper M, Pickar JH. Bone response to treatment with lower doses of conjugated estrogens with and without medroxyprogesterone acetate in early postmenopausal women. *Osteoporos Int*. 2005; 16:372-9.
34. Land H, McCloud S, Snyder C, Nadelmann J, Doyle R. A prospective double blind, randomized, parallel study of the safety and efficacy of Premarin7 (AY 11,152) and medroxyprogesterone acetate (AX 11,236) for postmenopausal hormone replacement therapy: final report. General Medical Report 21602 (protocols 713B 300, 301 US). Wyeth Ayerst 1992. On file.
35. Pickar JH, Yeh I-T, Wheeler JE, Cunnane MF, Speroff L. Endometrial effects of lower doses of conjugated equine estrogens and medroxyprogesterone acetate. *Fertil Steril*. 2001; 76:25-31.
36. Woodruff JD, Pickar JH. The Menopauae Study Group: Incidence of endometrial hyperplasia in postmenopausal women taking CE (Premarin) with MPA or CE alone. *Am J Obstet Gynecol*. 1994; 170:1213-23.
37. Johnston Jr CC, Melton III LJ, Lindsay R, Eddy DM. Clinical indications for bone mass measurements. *J Bone Miner Res*. 1989; 4(suppl 2):1-28.
38. Lafferty FW, Helmuth DO. Post-menopausal estrogen replacement: The prevention of osteoporosis and system effects. *Maturitas*. 1985; 7:147-59.
39. Morrow CP, Townsend DE. Cancer of the uterine corpus. In: *Synopsis of gynecologic oncology*. New York: John Wiley and Sons, 2nd ed.; 1981. p. 133-185.
40. Kurman RJ, Kaminsk PF, Norris HJ. The behavior of endometrial hyperplasia: A long-term study of "untreated" hyperplasia in 170 patients. *Cancer*. 1985; 56:403-12.
41. Tsuchiya Y., Makajima M., Tsuyoshi Y. Cytochrome P450-mediated metabolism of estrogen and its regulation in human. *Cancer Letters* 227 (2005) 115-124.
42. Hendrix SL, Wassertheil-Smoller S, Johnson KC, et al. Effects of conjugated equine estrogens on stroke in the Women's Health Initiative. *Circulation*. 2006; 113:2425-2434.
43. Komm, BS, Bodine PVN. Regulation of bone cell function by estrogens. In: R. Marcus, D. Feldman, and J. Kelsey, eds. *Osteoporosis*, 2nd Edition. Academic Press: 2001. p.305-337.
44. Harris, H.A. Estrogen receptor beta: recent lessons from in vivo studies. *Molecular Endocrinology*. 2007;21:1-13.

PART III: CONSUMER INFORMATION

Pr **PREMARIN**[®] (conjugated estrogens sustained release tablets)

This leaflet is part III of a three-part "Product Monograph" published when PREMARIN was approved for sale in Canada and is designed specifically for Consumers. This leaflet is a summary and will not tell you everything about PREMARIN. Contact your doctor or pharmacist if you have any questions about the drug.

ABOUT THIS MEDICATION

What the medication is used for:

- To relieve menopausal and post-menopausal symptoms (vasomotor symptoms like hot flashes and night sweats).
- To prevent osteoporosis caused by low estrogen levels associated with menopause. Osteoporosis is a thinning of the bones that makes them weaker and easier to break.
- To treat certain types of abnormal uterine bleeding due to hormonal imbalance when your doctor has found no serious cause of the bleeding.
- To treat vulva and vaginal atrophy associated with menopause (itching, burning, dryness in or around the vagina, difficulty or burning on urination)

PREMARIN tablets for the prevention of osteoporosis is recommended only for women who are at risk of developing this condition. Talk to your doctor about whether a different treatment or medicine without estrogens might be better for you.

Adequate diet, calcium and vitamin D intake, cessation of smoking as well as regular weight-bearing exercise should be discussed with your doctor or pharmacist in addition to taking PREMARIN.

If you use PREMARIN tablets only to treat symptoms of vulvar and vaginal atrophy associated with menopause, talk with your healthcare provider about whether a vaginal (topical) treatment might be better for you.

PREMARIN Tablets should not be used by women with intact uteri unless it is prescribed in association with a progestin.

PREMARIN should be used only under the supervision of a doctor, with regular follow-up at least once a year to identify side effects associated with its use.

Your first follow-up visit should be within 3 to 6 months of starting treatment. Your visit may include a blood pressure check, a breast exam, a Pap smear and pelvic exam. You should have a mammogram before starting treatment and at regular intervals as recommended by your doctor. Your doctor may recommend some blood tests.

You should carefully discuss the risks and benefits of hormone

replacement therapy (HRT) with your doctor. You should regularly talk with your doctor about whether you still need treatment with HRT.

What it does:

When taking PREMARIN women are using a hormone, estrogen (i.e. conjugated equine estrogen tablets). PREMARIN replaces estrogen in your body, which naturally decreases at menopause.

Estrogens are female hormones that are produced by a woman's ovaries and are necessary for normal sexual development and the regulation of menstrual periods during the childbearing years.

When a woman is between the ages of 45 and 55, the ovaries normally stop making estrogens. This leads to a drop in body estrogen levels and marks the beginning of menopause (the end of monthly menstrual periods). A sudden drop in estrogen levels also occurs if both ovaries are removed during an operation before natural menopause takes place. This is referred to as surgical menopause.

When the estrogen levels begin dropping, some women develop very uncomfortable symptoms, such as feelings of warmth in the face, neck, and chest, or sudden intense episodes of heat and sweating ("hot flashes"). In some women the symptoms are mild; in others they can be severe. These symptoms may last only a few months or longer. Taking PREMARIN can alleviate these symptoms. If you are not taking estrogen for other reasons, such as the prevention of osteoporosis, you should take PREMARIN only as long as you need it for relief from your menopausal symptoms.

After menopause, some women develop osteoporosis. This is a thinning of the bones that makes them weaker and allows them to break more easily, often leading to fractures of the vertebrae, hip and wrist bones.

Using PREMARIN Tablets, in addition to taking adequate calcium (1000 milligrams to 1500 milligrams per day) and vitamin D, and regular weight-bearing exercise, slows down bone thinning and may prevent bones from breaking.

When it should not be used:

Do not take PREMARIN if you:

- Have a known, suspected, or past history of breast cancer.
- Have a known or suspected hormone-dependent cancer (e.g. endometrial cancer).
- Estrogens may increase the chances of getting certain types of cancers, including cancer of the breast or uterus. If you have or had cancer, talk with your healthcare provider about whether you should take PREMARIN.
- Have unexpected or unusual vaginal bleeding
- Have (or have had) blood clot disorders, including blood clots in the legs or lungs or thrombophlebitis (inflammation of the veins).
- Have serious liver disease
- Have active or past history of heart disease, heart attacks or stroke.

- are allergic to conjugated equine estrogens or any non-medicinal ingredient in the formulation
- are pregnant or suspect you may be pregnant. If pregnancy occurs while using PREMARIN contact your doctor immediately.
- Since pregnancy may be possible early in the pre-menopause while you are still having spontaneous periods, the use of non-hormonal birth control should be discussed with your physician at this time. If you accidentally take estrogen during pregnancy, there is a small risk of your unborn child having birth defects.
- have partially or completely lost vision due to blood vessel disease of the eye.
- have overgrowth of the lining of the uterus.
- Have some types of congenital coagulation abnormalities (e.g. protein C, protein S, or antithrombin deficiency).
- experience migraines with or without aura.

What the medicinal ingredients are:

PREMARIN Tablet contains a mixture of conjugated equine estrogens, which are a mixture of sodium estrone sulphate and sodium equilin sulphate and other components include sodium sulphate conjugates, 17β-dihydroequilin, 17β-estradiol, and 17α-dihydroequilin.

What the nonmedicinal ingredients are:

Each PREMARIN Tablet contains the following nonmedicinal ingredients:
 Calcium Phosphate, Tribasic, Carnauba Wax, Hydroxypropyl Cellulose, Hypromellose, Lactose Monohydrate, Magnesium Stearate, Microcrystalline Cellulose, Polyethylene Glycol, Purified Water, Sucrose.

In addition, the following ingredients are contained in specific strengths as indicated:

- 0.3 mg (green color): hypromellose, quinoline yellow lake, macrogol, FD&C Blue No. 2, Indigo carmine aluminum lake, titanium dioxide, polysorbate 80. The white branding ink contains the following: titanium dioxide, purified water, isopropyl alcohol, propylene glycol, hypomellose.
- 0.625 mg (maroon color): hypromellose, titanium dioxide, FD&C Red #40 aluminum lake, macrogol, FD&C Blue #2 aluminum lake. The white branding ink contains the following: titanium dioxide, purified water, isopropyl alcohol, propylene glycol, hypomellose
- 1.25 mg (yellow color): hypromellose, titanium dioxide, quinoline yellow aluminum lake, macrogol, polysorbate, FD&C yellow #6 sunset yellow FCF aluminum lake. The black branding ink contains the following: purified water, iron oxide black, isopropyl alcohol, propylene glycol, hypromellose.

What dosage forms it comes in:

PREMARIN is available as tablets, as follows:
 0.3 mg (green) tablets in blister strips of 28;
 0.625 mg (maroon) tablets in blister strips of 28;
 1.25 mg (yellow) tablets in blister strips of 14.

WARNINGS AND PRECAUTIONS

Serious Warnings and Precautions

The Women’s Health Initiative (WHI) is a large clinical study that assessed the benefits and risks of oral combined *estrogen plus progestin* therapy and oral *estrogen-alone* therapy compared with placebo (a pill with no active ingredients) in postmenopausal women.

The WHI trial indicated an increased risk of myocardial infarction (heart attack), stroke, breast cancer, pulmonary emboli (blood clots in the lungs) and deep vein thrombosis (blood clots in the large veins) in postmenopausal women taking oral combined *estrogen plus progestin*.

The WHI trial indicated an increased risk of stroke and deep vein thrombosis in postmenopausal women with prior hysterectomy (surgical removal of the uterus) taking oral *estrogen-alone*.

Therefore, you should highly consider the following:

- There is an increased risk of developing invasive breast cancer, heart attack, stroke and blood clots in both lungs and large veins with the use of estrogen plus progestin therapy.
- There is an increased risk of stroke and blood clots in the large veins with the use of estrogen-alone therapy.
- Estrogens with or without progestins should not be used for the prevention of heart disease or stroke.
- Estrogens with or without progestins should be used at the **lowest effective dose** and for the **shortest period of time** possible. Regular medical follow-up is advised.

Breast Cancer

The results of the WHI trial indicated an increased risk of breast cancer in postmenopausal women taking combined *estrogen plus progestin* compared to women taking placebo.

The results of the WHI trial indicated no difference in the risk of breast cancer in post-menopausal women with prior hysterectomy taking *estrogen-alone* compared to women taking placebo.

Estrogens should not be taken by women who have a personal history of breast cancer.

In addition, women with a family history of breast cancer or women with a history of breast lumps, breast biopsies or abnormal mammograms (breast x-rays) should consult with their doctor before starting HRT.

Women should have a mammogram before starting HRT and at regular intervals during treatment as recommended by their doctor.

Regular breast examinations by a doctor and regular breast self-examination are recommended for all women. You should review technique for breast self-examination with your doctor.

Overgrowth of the lining of the uterus and cancer of the uterus

The use of *estrogen-alone* therapy by post-menopausal women who still have a uterus increases the risk of developing endometrial hyperplasia (overgrowth of the lining of the uterus), which increases the risk of endometrial cancer (cancer of the lining of the uterus).

If you still have your uterus, you should take a progestin medication (another hormone drug) regularly for a certain number of days of each month to reduce the risk of endometrial hyperplasia.

You should discuss progestin therapy and risk factors for endometrial hyperplasia and endometrial carcinoma with your doctor. You should also report any unexpected or unusual vaginal bleeding to your doctor.

If you have had your uterus removed, you are not at risk of developing endometrial hyperplasia or endometrial carcinoma. Progestin therapy is therefore not generally required in women who have had a hysterectomy.

Ovarian Cancer

Some studies have indicated that taking *estrogen-alone* for 5 or more years may increase the risk of ovarian cancer. It is not yet known whether other kinds of hormone therapy increase the risk in the same way.

Heart Disease and Stroke

The results of the WHI trial indicated an increased risk of stroke and coronary heart disease in post-menopausal women taking combined *estrogen plus progestin* compared to women taking placebo.

The results of the WHI trial indicated an increased risk of stroke, but no difference in the risk of coronary heart disease in post-menopausal women with prior hysterectomy taking *estrogen-alone* compared to women taking placebo.

Abnormal Blood Clotting

The results of the WHI trial indicated an increased risk of blood clots in the lungs and large veins in post-menopausal women taking combined *estrogen plus progestin* compared to women taking placebo.

The results of the WHI trial indicated an increased risk of blood clots in the large veins, but no difference in the risk of blood clots in the lungs in post-menopausal women with prior hysterectomy taking *estrogen-alone* compared to women taking placebo.

The risk of blood clots also increases with age, if you or a family member has had blood clots, if you smoke or if you are severely overweight. The risk of blood clots is also temporarily increased if you are immobilized for long periods of time and following major surgery. You should discuss risk factors for blood clots with your

doctor since blood clots can be life-threatening or cause serious disability.

Gallbladder Disease

The use of estrogens by postmenopausal women has been associated with an increased risk of gallbladder disease requiring surgery.

Dementia

The Women's Health Initiative Memory Study (WHIMS) was a substudy of the WHI trial and indicated an increased risk of dementia (loss of memory and intellectual function) in post-menopausal women age 65 and over taking oral combined *estrogen plus progestin* compared to women taking placebo.

The WHIMS indicated no difference in the risk of dementia in post-menopausal women age 65 and over with prior hysterectomy taking oral *estrogen-alone* compared to women taking placebo.

BEFORE you use PREMARIN talk to your doctor or pharmacist if you:

- have a history of allergy or intolerance to any medications or other substances
- have a personal history of breast disease (including breast lumps) and/or breast biopsies, or a family history of breast cancer
- have experienced any unusual or undiagnosed vaginal bleeding
- have a history of uterine fibroids or endometriosis
- have a history of liver disease, jaundice (yellowing of the eyes and/or skin) or itching related to estrogen use or during pregnancy
- have a history of migraine headache
- have a history of high blood pressure
- have a personal or family history of blood clots, or a personal history of heart disease or stroke
- have a history of kidney disease, asthma or epilepsy (seizures)
- have a history of bone disease (this includes certain metabolic conditions or cancers that can affect blood levels of calcium and phosphorus)
- have been diagnosed with diabetes
- have been diagnosed with porphyria (a disease of blood pigment)
- have been diagnosed with otosclerosis (hearing loss due to a problem with the bones in your ear)
- have a history of high cholesterol or high triglycerides
- are pregnant or may be pregnant. If pregnancy occurs while using PREMARIN contact your doctor immediately.
- have had a hysterectomy (surgical removal of the uterus)
- smoke
- have been told that you have a condition called hereditary angioedema or if you have had episodes of rapid swelling of the hands, feet, face, lips, eyes, tongue, throat (airway blockage), or digestive tract

- have been diagnosed with lupus
- have a history of depression
- have one of the following rare hereditary diseases:
 - Galactose intolerance
 - Lapp lactase deficiency
 - Glucose-galactose malabsorption

Because lactose is a non-medicinal ingredient in PREMARIN.

Other existing conditions you should discuss with your health professional include very low calcium levels, thyroid problems, fluid retention, gallbladder disease, depression, and breastfeeding. If you have upcoming surgery or prolonged bedrest, you should also discuss these.

Clinical studies have not been conducted in the pediatric population. PREMARIN is not indicated for use in children.

INTERACTIONS WITH THIS MEDICATION

As with most medicines, interactions with other drugs are possible. Tell your doctor, nurse, or pharmacist about all the medicines you take, including drugs prescribed by other doctors, vitamins, minerals, natural supplements, or alternative medicines.

The following may interact with PREMARIN:

- Acetaminophen used to treat pain and fever
- anticoagulant medications used to thin the blood
- antidiabetic medications (eg. troglitazone)
- antihypertensives (for high blood pressure)
- antiviral medications (such as, ritinovir).
- ascorbic acid (such as vitamin C)
- atorvastatin, clofibrac acid (medication to lower cholesterol)
- carbamazepine, phenytoin, or phenobarbital (medications to prevent epilepsy or seizures)
- cimetidine (medication generally used to treat stomach problems)
- cyclosporin (medication used in suppressing the immune system)
- dexamethasone, prednisolone (corticosteroids used to treat joint pain and swelling)
- erythromycin, clarithromycin (antibiotic medications to treat infections)
- grapefruit juice
- herbal products containing St. John's Wort
- ketoconazole, itraconazole (medications to treat fungal infections)
- morphine
- oral contraceptives (birth control pills) and other medicines containing estrogen
- rifampicin (medication used in the treatment of tuberculosis)
- salicylic acid
- temazepam (medication used to treat insomnia)
- theophylline (medication used to treat breathing problems such as asthma)

PREMARIN may interfere with laboratory testing.

PROPER USE OF THIS MEDICATION

Usual adult dose:

You should follow the dosage regimen prescribed by your healthcare provider. PREMARIN may be taken without regard to meals. Tablets should be taken whole; do not divide, crush, chew, or dissolve tablets in mouth.

Estrogens should be used at the lowest dose possible for your treatment only as long as needed. You and your healthcare provider should talk regularly (for example every 3 to 6 months) about the dose you are taking and whether you still need treatment with PREMARIN.

Do not give PREMARIN to other people, even if they have the same symptoms you have. It may harm them.

Overdose:

If you think you have taken too much PREMARIN contact your doctor, nurse, pharmacist, hospital emergency department or regional Poison control Centre immediately, even if there are no symptoms.

Overdosage with estrogens may cause nausea and vomiting, breast discomfort, fluid retention, bloating or vaginal bleeding may occur in women.

Overdosage may result in a period of amenorrhea (lack of menses) of a variable length and may be followed by irregular menses for several cycles.

Missed Dose:

If you miss a dose, take it as soon as possible. If it is almost time for your next dose, skip the missed dose and go back to your normal schedule. Do not take 2 doses at the same time.

SIDE EFFECTS AND WHAT TO DO ABOUT THEM

Side effects may include:

- Breast pain, leaking of milk from the nipple
- Inflammation of the vagina, vaginal itching and/or discharge
- Breakthrough bleeding, spotting, changes in menstrual flow, painful periods
- Joint pain, leg pain
- Hair loss
- Changes in weight (increase or decrease)
- Nausea, vomiting, bloating, abdominal pain, diarrhea
- Dizziness
- Headache (including migraine)
- Changes in libido
- Mood disturbances, irritability, problems sleeping
- Rash, itching, hives, tender red nodules on the shins and legs, acne

If any of these affects you severely, tell your doctor, nurse or pharmacist.

SERIOUS SIDE EFFECTS, HOW OFTEN THEY HAPPEN AND WHAT TO DO ABOUT THEM

Frequency	Symptom / possible side effect	Talk with your doctor or pharmacist		Stop taking drug and seek immediate medical help
		Only if severe	In all cases	
Common	Blood clot: Pain or swelling in the leg.			√
	Breast Cancer: Breast lump, unusual discharge.		√	
	Edema: Swelling of the hand and/or feet.	√		
	High Blood Pressure: headaches, dizziness, vision problems, shortness of breath		√	
	Persistent sad mood.		√	
	Unexpected vaginal bleeding.		√	
Rare	Blood clot in the lung: Sharp pain in the chest, coughing blood or sudden shortness of breath.			√
	Stroke: Sudden severe headache or worsening of headache, vomiting, dizziness, fainting, disturbance of vision or speech or weakness or numbness in an arm or leg.			√
Very rare	Blood clot in the eye: Sudden partial or complete loss of vision.			√

SERIOUS SIDE EFFECTS, HOW OFTEN THEY HAPPEN AND WHAT TO DO ABOUT THEM

Frequency	Symptom / possible side effect	Talk with your doctor or pharmacist		Stop taking drug and seek immediate medical help
		Only if severe	In all cases	
Very rare	Liver disorder: Yellowing of the skin or eyes, dark urine, abdominal pain, nausea, vomiting, loss of appetite.		√	
Unknown	Angioedema and Severe Allergic Reactions: swelling of the face, eyes, or tongue, difficulty swallowing, wheezing, hives and generalized itching, rash, fever, abdominal cramps, chest discomfort or tightness, difficulty breathing, unconsciousness.			√
	Cerebrovascular insufficiency: visual disturbances, migraines, trouble speaking, paralysis or loss of consciousness.			√
	Gallbladder disorder: severe pain in the upper right abdomen, pain in the back between the shoulder blades, nausea and vomiting.		√	
	Heart Attack: Crushing chest pain, pain in the arm, back, neck or jaw, shortness of breath, cold sweat, nausea, light-headedness.			√

SERIOUS SIDE EFFECTS, HOW OFTEN THEY HAPPEN AND WHAT TO DO ABOUT THEM

Frequency	Symptom / possible side effect	Talk with your doctor or pharmacist		Stop taking drug and seek immediate medical help
		Only if severe	In all cases	
Unknown	Heart palpitations	√		
	Increased blood sugar: frequent urination, thirst, and hunger.	√		
	Worsening of asthma: wheezing, coughing, shortness of breath, difficulty breathing			√

This is not a complete list of side effects. For any unexpected effects while taking PREMARIN, contact your doctor or pharmacist.

HOW TO STORE IT

Store **PREMARIN** at 15° C to 30° C (room temperature).

Keep out of reach and sight of children.

REPORTING SUSPECTED SIDE EFFECTS

You can report any suspected adverse reactions associated with the use of health products to the Canada Vigilance Program by one of the following 3 ways:

- Report online at www.healthcanada.gc.ca/medeffect
- Call toll-free at 1-866-234-2345
- Complete a Canada Vigilance Reporting Form and:
 - o Fax toll-free to 1-866-678-6789, or
 - o Mail to:
Canada Vigilance Program
Health Canada
Postal Locator 0701E
Ottawa, Ontario
K1A 0K9

Postage paid labels, Canada Vigilance Reporting Form and the adverse reaction reporting guidelines are available on the MedEffect™ Canada Web site at www.healthcanada.gc.ca/medeffect.

NOTE: Should you require information related to the management of side effects, contact your health professional. The Canada Vigilance Program does not provide medical advice.

MORE INFORMATION

This document plus the full product monograph, prepared for health professionals can be found by contacting the sponsor,

Pfizer Canada Inc.
17,300 Trans-Canada Highway
Kirkland, Quebec H9J 2M5

toll-free, at: 1-800-463-6001

or at www.pfizer.ca

This leaflet was prepared by Pfizer Canada Inc.

Last revised: December 1, 2014