

NDA 17-970/S-040

Zeneca Pharmaceuticals  
Attention: W. J. Kennedy, Ph.D.  
Vice President, Drug Regulatory Affairs  
1800 Concord Pike  
P.O. Box 15437  
Wilmington, DE 19850-5437

Dear Dr. Kennedy:

Please refer to your supplemental new drug application dated April 30, 1998, received April 30, 1998, and submitted under section 505(b) of the Federal Food, Drug, and Cosmetic Act for Nolvadex (tamoxifen citrate) Tablets.

We acknowledge receipt of your submissions dated May 7; June 18, 24, and 25; July 1, 2, 16, 17, 20, 21, 27, 29, and 31; August 4, 7, 10, 12, 19, 20, 21, 26, and 27; September 17, 23, 25, and 28; October 5, 13, 15, 20, 21, 22, and 23, 1998. The user fee goal date for this application is October 31, 1998.

This supplemental new drug application provides for the use of Nolvadex (tamoxifen citrate) Tablets, to reduce the incidence of breast cancer in women at high risk for breast cancer.

We have completed the review of this supplemental application, as amended, and have concluded that adequate information has been presented to demonstrate that the drug product is safe and effective for use as recommended in the enclosed labeling text. Accordingly, the supplemental application is approved effective on the date of this letter.

The final printed labeling (FPL) must be identical to the enclosed labeling (text for the package insert, text for the patient package insert). Marketing the product with FPL that is not identical to the approved labeling text may render the product misbranded and an unapproved new drug.

Please submit 20 copies of the FPL as soon as it is available, in no case more than 30 days after it is printed. Please individually mount ten of the copies on heavy-weight paper or similar material. For administrative purposes, this submission should be designated "FPL for approved supplement NDA 17-970/S-040." Approval of this submission by FDA is not required before the labeling is used.

If additional information relating to the safety or effectiveness of this drug becomes available before we receive the final printed labeling, revision of that labeling may be required.

We remind you of your Phase 4 commitments specified in your submission dated October 20, 1998. These commitments, along with any completion dates agreed upon, are listed below.

All Phase 4 studies that may impact the labeling of tamoxifen should be submitted to the Division of Oncology Drug Products and reviewed prior to initiation.

Protocols, data, and final reports should be submitted to your IND for this product and a copy of the cover letter sent to this NDA. If an IND is not required to meet your Phase 4 commitments, please submit protocols, data, and final reports to this NDA as correspondence. In addition, under 21 CFR 314.82(b)(2)(vii), we request that you include a status summary of each commitment in your annual report to this NDA. The status summary should include the number of patients entered in each study, expected completion and submission dates, and any changes in plans since the last annual report. For administrative purposes, all submissions, including labeling supplements, relating to these Phase 4 commitments must be clearly designated "Phase 4 Commitments."

The set of slide rules used to calculate the 5-year absolute risk of breast cancer, using the Gail Model, is considered part of the approved product labeling. Because it is not practical to distribute these tools with all product shipments and promotional materials, FDA will not require that the slide rules be attached to every Nolvadex package insert, patient package insert or to the promotional materials. However, Zeneca must maintain a 1-800 number listed in the label dedicated to processing requests for the Gail Model Risk Assessment Tools in a rapid and efficient manner. The number must not be used for promotional information, adverse event reporting, etc.

Please submit three copies of the introductory promotional materials that you propose to use for this product. All proposed materials should be submitted in draft or mock-up form, not final print. Please send one copy to the Division of Oncology Drug Products and two copies of both the promotional materials and the package insert directly to:

Division of Drug Marketing, Advertising, and Communications, HFD-40  
Food and Drug Administration  
5600 Fishers Lane  
Rockville, Maryland 20857

If a letter communicating important information about this drug product (i.e., a "Dear Health Care Practitioner" letter) is issued to physicians and others responsible for patient care, we request that you submit a copy of the letter to this NDA and a copy to the following address:

MEDWATCH, HF-2  
FDA  
5600 Fishers Lane

Rockville, MD 20857

Please submit one market package of the drug product when it is available.

We remind you that you must comply with the requirements for an approved NDA set forth under 21 CFR 314.80 and 314.81.

If you have any questions, contact Amy Chapman, Consumer Safety Officer, at (301) 594-5768.

Sincerely,

Robert Temple, M.D.  
Director,  
Office of Drug Evaluation I  
Center for Drug Evaluation and Research

Enclosure

**PROFESSIONAL INFORMATION BROCHURE**

**T-10 10/28/98**

**SIC XXXXX-XX**

# Nolvadex<sup>®</sup>

## TAMOXIFEN CITRATE

### DESCRIPTION

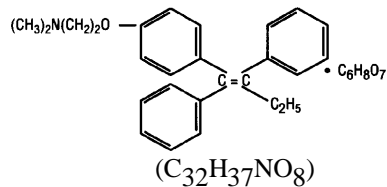
NOLVADEX\_ (tamoxifen citrate) Tablets, a nonsteroidal antiestrogen, are for oral administration. NOLVADEX Tablets are available as:

**10 mg Tablets.** Each tablet contains 15.2 mg of tamoxifen citrate which is equivalent to 10 mg of tamoxifen.

**20 mg Tablets.** Each tablet contains 30.4 mg of tamoxifen citrate which is equivalent to 20 mg of tamoxifen.

Inactive Ingredients: carboxymethylcellulose calcium, magnesium stearate, mannitol and starch.

Chemically, NOLVADEX is the trans-isomer of a triphenylethylene derivative. The chemical name is (Z)-2-[4-(1,2-diphenyl-1-butenyl) phenoxy]-N, N-dimethylethanamine 2-hydroxy-1,2,3- propanetricarboxylate (1:1). The structural and empirical formulas are:



Tamoxifen citrate has a molecular weight of 563.62, the pKa' is 8.85, the equilibrium solubility in water at 37° C is 0.5 mg/mL and in 0.02 N HCl at 37° C, it is 0.2 mg/mL.

## **CLINICAL PHARMACOLOGY**

NOLVADEX is a nonsteroidal agent that has demonstrated potent antiestrogenic properties in animal test systems. The antiestrogenic effects may be related to its ability to compete with estrogen for binding sites in target tissues such as breast. Tamoxifen inhibits the induction of rat mammary carcinoma induced by dimethylbenzanthracene (DMBA) and causes the regression of already established DMBA-induced tumors. In this rat model, tamoxifen appears to exert its anti-tumor effects by binding the estrogen receptors.

In cytosols derived from human breast adenocarcinomas, tamoxifen competes with estradiol for estrogen receptor protein.

Tamoxifen is extensively metabolized after oral administration. Studies in women receiving 20 mg of <sup>14</sup>C tamoxifen have shown that approximately 65% of the administered dose is excreted from the body over a period of 2 weeks with fecal excretion the primary route of elimination. The drug is excreted mainly as polar conjugates, with unchanged drug and unconjugated metabolites accounting for less than 30% of the total fecal radioactivity.

N-desmethyl tamoxifen is the major metabolite found in patients' plasma. The biological activity of N-desmethyl tamoxifen appears to be similar to that of tamoxifen. 4-Hydroxytamoxifen and a side chain primary alcohol derivative of tamoxifen have been identified as minor metabolites in plasma.

Following a single oral dose of 20 mg tamoxifen, an average peak plasma concentration of 40 ng/mL (range 35 to 45 ng/mL) occurred approximately 5 hours after dosing. The decline in plasma concentrations of tamoxifen is biphasic with a terminal elimination half-life of about 5 to 7 days. The average peak plasma concentration of N-desmethyl tamoxifen is 15 ng/mL (range 10 to 20 ng/mL). Chronic administration of 10 mg tamoxifen given twice daily for three months to patients results in average steady-state plasma concentrations of 120 ng/mL (range 67-183 ng/mL) for tamoxifen and 336 ng/mL (range 148-654 ng/mL) for N-desmethyl tamoxifen. The average steady-state plasma concentrations of tamoxifen and N-desmethyl tamoxifen after administration of 20 mg tamoxifen once daily for three months are 122 ng/mL (range 71-183 ng/mL) and 353 ng/mL (range 152-706 ng/mL), respectively. After initiation of therapy, steady state concentrations for tamoxifen are achieved in about 4 weeks and steady state concentrations for N-desmethyl tamoxifen are achieved in about 8 weeks, suggesting a half-life of approximately 14 days for this metabolite.

In a 3-month crossover steady-state bioavailability study with NOLVADEX 10 mg twice a day versus NOLVADEX 20 mg given once daily, NOLVADEX 20 mg taken once daily had similar bioavailability to NOLVADEX 10 mg taken twice a day.

• **Clinical Studies - Metastatic Breast Cancer:**

**Premenopausal Women (NOLVADEX vs. Ablation)** - Three prospective, randomized studies (Ingle, Pritchard, Buchanan) compared NOLVADEX to ovarian ablation (oophorectomy or ovarian irradiation) in premenopausal women with advanced breast cancer. Although the objective response rate, time to treatment failure, and survival were similar with both treatments, the limited patient accrual prevented a demonstration of equivalence. In an overview analysis of survival data from the three studies, the hazard ratio for death (NOLVADEX/ovarian ablation) was 1.00 with two-sided 95% confidence intervals of 0.73 to 1.37. Elevated serum and plasma estrogens have been observed in premenopausal women receiving NOLVADEX, but the data from the randomized studies do not suggest an adverse effect of this increase. A limited number of premenopausal patients with disease progression during NOLVADEX therapy responded to subsequent ovarian ablation.

**Male Breast Cancer** - Published results from 122 patients (119 evaluable) and case reports in 16 patients (13 evaluable) treated with NOLVADEX have shown that NOLVADEX is effective for the palliative treatment of male breast cancer. Sixty-six of these 132 evaluable patients responded to NOLVADEX which constitutes a 50% objective response rate.

• **Clinical Studies - Adjuvant Breast Cancer**

**Overview** - The Early Breast Cancer Trialists' Collaborative Group (EBCTCG) conducted worldwide overviews of systemic adjuvant therapy for early breast cancer in 1985, 1990, and again in 1995. In 1998, 10-year outcome data were reported for 36,689 women in 55 randomized trials of adjuvant NOLVADEX using doses of 20-40 mg/day for 1-5+ years. Twenty-five percent of patients received one year or less of trial treatment, 52% received 2 years, and 23% received about 5 years. Forty-eight percent of tumors were estrogen receptor (ER) positive ( $> 10$  fmol/mg), 21% were ER poor ( $< 10$  fmol/l), and 31% were ER unknown. Among 29,441 patients with ER positive or unknown breast cancer, 58% were entered into trials comparing NOLVADEX to no adjuvant therapy and 42% were entered into trials comparing NOLVADEX in combination with chemotherapy vs. the same chemotherapy alone. Among these patients, 54% had node positive disease and 46% had node negative disease.

Among women with ER positive or unknown breast cancer and positive nodes who received about 5 years of treatment, overall survival at 10 years was 61.4% for NOLVADEX vs. 50.5% for control (logrank  $2p < 0.00001$ ). At ten years, the recurrence rate was 59.7% for NOLVADEX vs. 44.5% for control (logrank  $2p < 0.00001$ ). Among women with ER positive or unknown breast cancer and negative nodes who received about 5 years of treatment, overall survival at 10 years was 78.9% for NOLVADEX vs. 73.3% for control (logrank  $2p < 0.00001$ ). At ten years, the recurrence rate was 79.2% for NOLVADEX vs. 64.3% for control (logrank  $2p < 0.00001$ ).

The effect of the scheduled duration of tamoxifen may be described as follows. In women with ER positive or unknown breast cancer receiving 1 year or less, 2 years or about 5 years of NOLVADEX, the proportional reductions in mortality were 12%, 17% and 26%, respectively (trend significant at  $2p < 0.003$ ). The corresponding reductions in breast cancer recurrence were 21%, 29% and 47% (trend significant at  $2p < 0.00001$ ).

Benefit is less clear for women with ER poor breast cancer in whom the proportional reduction in recurrence was 10% ( $2p=0.007$ ) for all durations taken together, or 9% ( $2p=0.02$ ) if contralateral breast cancers are excluded. The corresponding reduction in mortality was 6% (NS). The effects of about 5 years of NOLVADEX on recurrence and mortality were similar regardless of age and concurrent chemotherapy. There was no indication that doses greater than 20 mg per day were more effective.

**Node Positive - Individual Studies** - Two studies (Hubay and NSABP B-09) demonstrated an improved disease-free survival following radical or modified radical mastectomy in postmenopausal women or women 50 years of age or older with surgically curable breast cancer with positive axillary nodes when NOLVADEX was added to adjuvant cytotoxic chemotherapy. In the Hubay study, NOLVADEX was added to "low-dose" CMF (cyclophosphamide, methotrexate and fluorouracil). In the NSABP B-09 study, NOLVADEX was added to melphalan [L-phenylalanine mustard (P)] and fluorouracil (F).

In the Hubay study, patients with a positive (more than 3 fmol) estrogen receptor were more likely to benefit. In the NSABP B-09 study in women age 50-59 years, only women with both estrogen and progesterone receptor levels 10 fmol or greater clearly benefited, while there was a nonstatistically significant trend toward adverse effect in women with both estrogen and progesterone receptor levels less than 10 fmol. In women age 60-70 years, there was a trend toward a beneficial effect of NOLVADEX without any clear relationship to estrogen or progesterone receptor status.

Three prospective studies (ECOG-1178, Toronto, NATO) using NOLVADEX adjuvantly as a single agent demonstrated an improved disease-free survival following total mastectomy and axillary dissection for postmenopausal women with positive axillary nodes compared to placebo/no treatment controls. The NATO study also demonstrated an overall survival benefit.

**Node Negative - Individual Studies** - NSABP B-14, a prospective, double-blind, randomized study, compared NOLVADEX to placebo in women with axillary node-negative, estrogen-receptor positive ( $\geq 10$  fmol/mg cytosol protein) breast cancer (as adjuvant therapy, following total mastectomy and axillary dissection, or segmental resection, axillary dissection, and breast radiation). After five years of treatment, there was a significant improvement in disease-free survival in women receiving NOLVADEX. This benefit was apparent both in women under age 50 and in women at or beyond age 50.

One additional randomized study (NATO) demonstrated improved disease-free survival for NOLVADEX compared to no adjuvant therapy following total mastectomy and axillary dissection in postmenopausal women with axillary node-negative breast cancer. In this study, the benefits of NOLVADEX appeared to be independent of estrogen receptor status.

**Duration of Therapy** - In the EBCTCG 1995 overview, the reduction in recurrence and mortality was greater in those studies that used tamoxifen for about 5 years than in those that used tamoxifen for a shorter period of therapy.

In the NSABP B-14 trial, in which patients were randomized to NOLVADEX 20 mg/day for 5 years versus placebo and were disease-free at the end of this 5-year period were offered rerandomization to an additional five years of NOLVADEX or placebo. With four years of follow-up after this rerandomization, 92% of the women that received five years of NOLVADEX were alive and disease-free, compared to 86% of the women scheduled to receive 10 years of NOLVADEX ( $p=0.003$ ). Overall survivals were 96% and 94%, respectively ( $p=0.08$ ). Results of the B-14 study suggest that continuation of therapy beyond five years does not provide additional benefit.

A Scottish trial of five years of tamoxifen versus indefinite treatment found a disease-free survival of 70% in the five-year group and 61% in the indefinite group, with 6.2 years median follow-up (HR=1.27, 95% CI 0.87-1.85).



In a large randomized trial conducted by the Swedish Breast Cancer Cooperative Group of adjuvant NOLVADEX 40 mg/day for 2 or 5 years, overall survival at ten years was estimated to be 80% in the patients in the five-year tamoxifen group, compared with 74% among corresponding patients in the two-year treatment group ( $p=0.03$ ). Disease-free survival at ten years was 73% in the five-year group and 67% in the two-year group ( $p=0.009$ ). Compared with two years of tamoxifen treatment, five years of treatment resulted in a slightly greater reduction in the incidence of contralateral breast cancer at ten years, but this difference was not statistically significant.

**Contralateral Breast Cancer** - The incidence of contralateral breast cancer is reduced in breast cancer patients (premenopausal and postmenopausal) receiving NOLVADEX compared to placebo. Data on contralateral breast cancer are available from 32,422 out of 36,689 patients in the 1995 overview analysis of the Early Breast Cancer Trialists Collaborative Group (EBCTCG). In clinical trials with NOLVADEX of 1 year or less, 2 years, and about 5 years duration, the proportional reductions in the incidence rate of contralateral breast cancer among women receiving NOLVADEX were 13% (NS), 26% ( $2p = 0.004$ ) and 47% ( $2p < 0.00001$ ), with a significant trend favoring longer tamoxifen duration ( $2p = 0.008$ ). The proportional reduction in the incidence of contralateral breast cancer were independent of age and ER status of the primary tumor. Treatment with about 5 years of NOLVADEX reduced the annual incidence rate of contralateral breast cancer from 7.6 per 1000 patients in the control group compared with 3.9 per 1000 patients in the tamoxifen group.

In a large randomized trial in Sweden (the Stockholm Trial) of adjuvant NOLVADEX 40 mg/day for 2-5 years, the incidence of second primary breast tumors was reduced 40% ( $p<0.008$ ) on tamoxifen compared to control. In the NSABP B-14 trial in which patients were randomized to NOLVADEX 20 mg/day for 5 years versus placebo, the incidence of second primary breast cancers was also significantly reduced ( $p<0.01$ ). In NSABP B-14, the annual rate of contralateral breast cancer was 8.0 per 1000 patients in the placebo group compared with 5.0 per 1000 patients in the tamoxifen group, at 10 years after first randomization.

**Clinical Studies - Reduction in Breast Cancer Incidence in High Risk Women:** The Breast Cancer Prevention Trial (BCPT, NSABP P-1) was a double-blind, randomized, placebo controlled trial with a primary objective to determine whether five years of NOLVADEX therapy (20 mg/day) would reduce the incidence of invasive breast cancer in women at high risk for the disease. (See INDICATIONS AND USAGE). Secondary objectives included an evaluation of the incidence of ischemic heart disease; the effects on the incidence of bone fractures; and other events that might be associated with the use of

NOLVADEX, including: endometrial cancer, pulmonary embolus, deep vein thrombosis, stroke, and cataract formation and surgery (See WARNINGS).

The Gail Model was used to calculate predicted breast cancer risk for women who were less than 60 years of age and did not have lobular carcinoma in situ (LCIS). The following risk factors were used: age; number of first-degree female relatives with breast cancer; previous breast biopsies; presence or absence of atypical hyperplasia; nulliparity; age at first live birth; and age at menarche. A 5-year predicted risk of breast cancer of  $\geq 1.67\%$  was required for entry into the trial.

In this trial, 13,388 women of at least 35 years of age were randomized to receive either NOLVADEX or placebo for five years. The median duration of treatment was 3.5 years. As of January 31, 1998, follow-up data is available for 13,114 women. Twenty-seven percent of women randomized to placebo (1782) and 24% of women randomized to NOLVADEX (1596) completed 5 years of therapy. The demographic characteristics of women on the trial with follow-up data are shown in Table 1.

Table 1. Demographic Characteristics of Women in the NSABP P-1 Trial

Characteristic	Placebo		Tamoxifen	
	#	%	#	%
Age (yrs.)				
35-39	184	3	158	2
40-49	2,394	36	2,411	37
50-59	2,011	31	2,019	31
60-69	1,588	24	1,563	24
≥70	393	6	393	6
Age at first live birth(yrs.)				
Nulliparous	1,202	18	1,205	18
12-19	915	14	946	15
20-24	2,448	37	2,449	37
25-29	1,399	21	1,367	21
≥30	606	9	577	9
Race				
White	6,333	96	6,323	96
Black	109	2	103	2
Other	128	2	118	2
Age at menarche				
≥14	1,243	19	1,170	18
12-13	3,610	55	3,610	55
≤11	1,717	26	1,764	27
# of first degree relatives with breast cancer				
0	1,584	24	1,525	23
1	3,714	57	3,744	57
2+	1,272	19	1,275	20
Prior Hysterectomy				
No	4173	63.5	4018	62.4
Yes	2397	36.5	2464	37.7
# of previous breast biopsies				
0	2,935	45	2,923	45
1	1,833	28	1,850	28
≥ 2	1,802	27	1,771	27
History of atypical hyperplasia in the breast				
No	5,958	91	5,969	91
Yes	612	9	575	9
History of LCIS at entry				
No	6,165	94	6,135	94
Yes	405	6	409	6
5-year predicted breast cancer risk (%)				
≤2.00	1,646	25	1,626	25
2.01-3.00	2,028	31	2,057	31
3.01-5.00	1,787	27	1,707	26
≥5.01	1,109	17	1,162	18
Total	6,570	100.0	6,544	100.0

Results are shown in Table 2. After a median follow-up of 4.2 years, the incidence of invasive breast cancer was reduced by 44% among women assigned to NOLVADEX (86 cases-NOLVADEX, 156 cases-placebo;  $p < 0.00001$ ; relative risk (RR)=0.56, 95% CI: 0.43-0.72). A reduction in the incidence of breast cancer was seen in each prospectively specified age group ( $\leq 49$ , 50-59,  $\geq 60$ ), in women with or without LCIS, and in each of the absolute risk levels specified in Table 2. A non-significant decrease in the

incidence of ductal carcinoma in situ (DCIS) was seen (23-NOLVADEX, 35-placebo; RR=0.66; 95% CI: 0.39-1.11).

There was no statistically significant difference in the number of myocardial infarctions, severe angina, or acute ischemic cardiac events between the two groups (61-NOLVADEX, 59-placebo; RR=1.04, 95% CI 0.73-1.49).

No overall difference in mortality (53 deaths in NOLVADEX group versus 65 deaths in placebo group) was present. No difference in breast cancer-related mortality was observed (4 deaths in NOLVADEX group versus 5 deaths in placebo group).

Although there was a non-significant reduction in the number of hip fractures (9 on NOLVADEX, 20 on placebo) in the NOLVADEX group, the number of wrist fractures was similar in the two treatment groups (69 on NOLVADEX, 74 on placebo). No information regarding bone mineral density or other markers of osteoporosis is available.

The risks of NOLVADEX therapy include endometrial cancer, DVT, PE, stroke, cataract formation and cataract surgery (See Table 2). In the NSABP P-1 trial, 33 cases of endometrial cancer were observed in the NOLVADEX group versus 14 in the placebo group (RR=2.48, 95% CI 1.27-4.92). Deep vein thrombosis was observed in 30 women receiving NOLVADEX versus 19 in women receiving placebo (RR=1.59, 95% CI 0.86-2.98). Eighteen cases of pulmonary embolism were observed in the NOLVADEX group versus 6 in the placebo group (RR=3.01, 95% CI 1.15-9.27). There were 34 strokes on the NOLVADEX arm and 24 on the placebo arm (RR 1.42; 95% CI 0.82-2.51). Cataract formation in women without cataracts at baseline was observed in 540 women taking NOLVADEX versus 483 women receiving placebo (RR=1.13, 95% CI 1.00-1.28). Cataract surgery (with or without cataracts at baseline) was performed in 201 women taking NOLVADEX versus 129 women receiving placebo (RR=1.51, 95% CI 1.21-1.89) (See WARNINGS).

Table 2 summarizes the major outcomes of the NSABP P-1 trial. For each endpoint, the following results are presented: the number of events and rate per 1000 women per year for the placebo and NOLVADEX groups; and the relative risk (RR) and its associated 95% confidence interval (CI) between NOLVADEX and placebo. Relative risks less than 1.0 indicate a benefit of NOLVADEX therapy. The limits of the confidence intervals can be used to assess the statistical significance of the benefits or risks of NOLVADEX therapy. If the upper limit of the CI is less than 1.0, then a statistically significant benefit exists. For most participants, multiple risk factors would have been required for eligibility. This table considers risk factors individually, regardless of other co-existing risk factors, for women who developed breast cancer. The five-year predicted absolute breast cancer risk accounts for

multiple risk factors in an individual and should provide the best estimate of individual benefit (See INDICATIONS AND USAGE)

**Table 2: Major Outcomes of the NSABP P-1 Trial**

TYPE OF EVENT	# OF EVENTS		RATE/1000 WOMEN/YEAR		95% CI	
	PLACEBO	NOLVADEX	PLACEBO	NOLVADEX	RR	LIMITS
<b>Invasive Breast Cancer</b>	156	86	6.49	3.58	0.56	0.43-0.72
Age ≤49	59	38	6.34	4.11	0.65	0.43-0.98
Age 50-59	46	25	6.31	3.53	0.56	0.35-0.91
Age ≥60	51	23	7.17	3.22	0.45	0.27-0.74
<b>Risk Factors for Breast Cancer</b>						
<b>History, LCIS</b>						
No	140	78	6.23	3.51	0.56	0.43-0.74
Yes	16	8	12.73	6.33	0.50	0.21-1.17
<b>History, Atypical Hyperplasia</b>						
No	138	84	6.37	3.89	0.61	0.47-0.80
Yes	18	2	8.69	1.05	0.12	0.03-0.52
<b>No. First Degree Relatives</b>						
0	32	17	5.97	3.26	0.55	0.30-0.98
1	80	45	5.81	3.31	0.57	0.40-0.82
2	35	18	8.92	4.67	0.52	0.30-0.92
≥3	9	6	13.33	7.58	0.57	0.20-1.59
<b>5-Year Predicted Breast Cancer Risk (as calculated by the Gail Model)</b>						
≤2.00%	31	13	5.36	2.26	0.42	0.22-0.81
2.01-3.00%	39	28	5.25	3.83	0.73	0.45-1.18
3.01-5.00%	36	26	5.37	4.06	0.76	0.46-1.26
≥5.00%	50	19	13.15	4.71	0.36	0.21-0.61
<b>DCIS</b>	35	23	1.47	0.97	0.66	0.39-1.11
<b>Fractures (protocol-specified sites)</b>	92 <sup>1</sup>	76 <sup>1</sup>	3.87	3.20	0.61	0.83-1.12
Hip	20	9 <sup>2</sup>	0.84	0.38	0.45	0.18-1.04
Wrist <sup>2</sup>	74	69	3.11	2.91	0.93	0.67-1.29
<b>Total Ischemic Events</b>	59	61	2.47	2.57	1.04	0.71-1.51
Myocardial Infarction	27	27	1.13	1.13	1.00	0.57-1.78
Fatal	8	7	0.33	0.29	0.88	0.27-2.77
Nonfatal	19	20	0.79	0.84	1.06	0.54-2.09
Angina <sup>33</sup>	12	12	0.50	0.50	1.00	0.41-2.44
Acute Ischemic Syndrome <sup>44</sup>	20	22	0.84	0.92	1.11	0.58-2.13
<b>Invasive Endometrial Cancer (among women without a hysterectomy)</b>	14	33	0.92	2.29	2.48	1.27-4.92
<b>Stroke<sup>55</sup></b>	24	34	1.00	1.43	1.42	0.82-2.51
<b>Transient Ischemic Attack</b>	21	18	0.88	0.75	0.86	0.43-1.70
<b>Pulmonary Emboli<sup>6</sup></b>	6	18	0.25	0.75	3.01	1.15-9.27
<b>Deep-Vein Thrombosis<sup>7</sup></b>	19	30	0.79	1.26	1.59	0.86-2.98
<b>Cataracts Developing on Study<sup>8</sup></b>	483	540	22.51	25.41	1.13	1.00-1.28
<b>Underwent Cataract Surgery<sup>8</sup></b>	63	101	31.43	46.62	1.48	1.08-2.03
<b>Underwent Cataract Surgery<sup>9</sup></b>	129	201	37.58	56.81	1.51	1.21-1.89

<sup>1</sup>Two women had hip and wrist fractures

<sup>2</sup>Includes Colles' and other lower radius fractures

<sup>3</sup>Requiring angioplasty or CABG

<sup>4</sup>New Q-wave on ECG; no angina or elevation of serum enzymes; or angina requiring hospitalization without surgery

<sup>5</sup>Seven cases were fatal; three in the placebo group and four in the NOLVADEX group

<sup>6</sup>Three cases in the NOLVADEX group were fatal

<sup>7</sup>All but three cases in each group required hospitalization

<sup>8</sup>Based on women without cataracts at baseline (6230 Placebo, 6199 NOLVADEX)

<sup>9</sup>All women. (6707-Placebo, 6681-NOLVADEX)

Table 3 describes the characteristics of the breast cancers in the NSABP P-1 trial and includes tumor size, nodal status, ER status. NOLVADEX decreased the incidence of small estrogen receptor positive tumors, but did not alter the incidence of estrogen receptor negative tumors or larger tumors.

**Table 3: Characteristics of Breast Cancer in NSABP P-1 Trial**

<b>Staging Parameter</b>	<b>Placebo N=156154</b>	<b>Tamoxifen N=8685</b>	<b>Total N=242239</b>
<b>Tumor size:</b>			
T1	117	60	177
T2	28	20	48
T3	7	3	10
T4	1	2	3
Unknown	3	10	4
<b>Nodal status:</b>			
Negative	103	56	159
1-3 positive nodes	29	14	43
≥ 4 positive nodes	10	12	22
Unknown	14	4	18
<b>Stage:</b>			
I	88	47	135
II: node negative	15	9	24
II: node positive	33	22	55
III	6	4	10
IV	2 <sup>1</sup>	1	3
Unknown	12	3	15
<b>Estrogen receptor:</b>			
Positive	115	38	153
Negative	27	36	63
Unknown	14	12	26

<sup>1</sup> 1 participant presented with a suspicious bone scan but did not have documented metastases. She subsequently died of metastatic breast cancer..

Interim results from two trials in addition to the NSABP P-1 trial examining the effects of tamoxifen in reducing breast cancer incidence have been reported.

The first was the Italian Tamoxifen Prevention trial. In this trial women between the ages of 35 and 70, who had had a total hysterectomy, were randomized to receive 20 mg tamoxifen or matching placebo for 5 years. The primary endpoints were occurrence of, and death from, invasive breast cancer. Women without any specific risk factors for breast cancer were to be entered. Between 1992 and 1997, 5408 women were randomized. Hormone Replacement Therapy (HRT) was used in 14% of participants. The trial closed in 1997 due to the large number of dropouts during the first year of treatment (26%). After 46 months of follow-up there were 22 breast cancers in women on placebo and 19 in women on tamoxifen. Although no decrease in breast cancer incidence was observed, there was a trend for a reduction in breast cancer among women receiving protocol therapy for at least one year (19-placebo, 11- tamoxifen). The small numbers of participants along with the low level of risk in this otherwise healthy group precluded an adequate assessment of the effect of tamoxifen in reducing the incidence of breast cancer.

The second trial, the Royal Marsden Trial (RMT) was reported as an interim analysis. The RMT was, begun in 1986 as a feasibility study of whether larger scale trials could be mounted. The trial was subsequently extended to a pilot trial to accrue additional participants to further assess the safety of tamoxifen. 2471 women were entered between 1986 and 1996; they were selected on the basis of a family history of breast cancer. HRT was used in 40% of participants. In this trial, with a 70-month median follow-up, 34 and 36 breast cancers (8 noninvasive, 4 on each arm) were observed among women on tamoxifen and placebo, respectively. Patients in this trial were younger than those in the NSABP P-1 trial and may have been more likely to develop ER(-) tumors, which are unlikely to be reduced in number by tamoxifen therapy. Although women were selected on the basis of family history and were thought to have a high risk of breast cancer, few events occurred, reducing the statistical power of the study. These factors are potential reasons why the RMT may not have provided an adequate assessment of the effectiveness of tamoxifen in reducing the incidence of breast cancer.

In these trials, an increased number of cases of deep vein thrombosis, pulmonary embolus, stroke, and endometrial cancer were observed on the tamoxifen arm compared to the placebo arm. The frequency of events was consistent with the safety data observed in the NSABP P-1 trial.

## **INDICATIONS AND USAGE**

**Metastatic Breast Cancer:** NOLVADEX is effective in the treatment of metastatic breast cancer in women and men. In premenopausal women with metastatic breast cancer, NOLVADEX is an alternative to oophorectomy or ovarian irradiation. Available evidence indicates that patients whose tumors are estrogen receptor positive are more likely to benefit from NOLVADEX therapy.

**Adjuvant Treatment of Breast Cancer:** NOLVADEX is indicated for the treatment of node-positive breast cancer in postmenopausal women following total mastectomy or segmental mastectomy, axillary dissection, and breast irradiation. In some NOLVADEX adjuvant studies, most of the benefit to date has been in the subgroup with 4 or more positive axillary nodes.

NOLVADEX is indicated for the treatment of axillary node-negative breast cancer in women following total mastectomy or segmental mastectomy, axillary dissection, and breast irradiation. Data are insufficient to predict which women are most likely to benefit and to determine if NOLVADEX provides any benefit in women with tumors less than 1 cm.

NOLVADEX reduces the occurrence of contralateral breast cancer in patients receiving adjuvant NOLVADEX therapy for breast cancer.

Current data from clinical trials support five years of adjuvant NOLVADEX therapy for patients with breast cancer.

The estrogen and progesterone receptor values may help to predict whether adjuvant NOLVADEX therapy is likely to be beneficial.

**Reduction in Breast Cancer Incidence in High Risk Women:** NOLVADEX is indicated to reduce the incidence of breast cancer in women at high risk for breast cancer. This effect was shown in a study of 5 years planned duration with a median follow-up of 4.2 years. Twenty-five percent of the participants received drug for 5 years. The longer term effects are not known. In this study, there was no impact of tamoxifen on overall or breast cancer-related mortality.

NOLVADEX is indicated only for high-risk women. "High risk" is defined as women at least 35 years of age with a 5-year predicted risk of breast cancer  $\geq 1.67\%$ , as calculated by the Gail model.

Examples of combinations of factors predicting a 5-year risk  $\geq 1.67\%$  are:

**Age 35 or older and any of the following combination of factors:**

- One first degree relative with a history of breast cancer, two or more benign biopsies, and a history of a breast biopsy showing atypical hyperplasia; or
- At least two first degree relatives with a history of breast cancer, and a personal history of at least one breast biopsy; or
- LCIS

**Age 40 or older and any of the following combination of factors:**

- One first degree relative with a history of breast cancer, two or more benign biopsies, age at first live birth 25 or older, and age at menarche 11 or younger; or
- At least two first degree relatives with a history of breast cancer, and age at first live birth 19 or younger; or
- One first degree relative with a history of breast cancer, and a personal history of a breast biopsy showing atypical hyperplasia.

**Age 45 or older and any of the following combination of factors:**



- At least two first degree relatives with history of breast cancer and age at first live birth 24 or younger; or
- One first degree relative with a history of breast cancer with a personal history of a benign breast biopsy, age at menarche 11 or less and age at first live birth 20 or more.

**Age 50 or older and any of the following combination of factors:**

- At least two first degree relatives with a history of breast cancer; or
- History of one breast biopsy showing atypical hyperplasia, and age at first live birth 30 or older and age at menarche 11 or less; or
- History of at least two breast biopsies with a history of atypical hyperplasia, and age at first live birth 30 or more.

**Age 55 and any of the following combination of factors:**

- One first degree relative with a history of breast cancer with a personal history of a benign breast biopsy, and age at menarche 11 or less; or
- History of at least two breast biopsies with a history of atypical hyperplasia, and age at first live birth 20 or older.

**Age 60 or older and:**

- 5 year predicted risk of breast cancer 1.67%, as calculated by the Gail Model.

For women whose risk factors are not described in the above examples, the Gail Model is necessary to estimate absolute breast cancer risk. Health Care Professionals can obtain a Gail Model Risk Assessment Tool by dialing 1-800-456-3669 (Ext. 3838).

There are no data available regarding the effect of NOLVADEX on breast cancer incidence in women with inherited mutations (BRCA1, BRCA2).

After an assessment of the risk of developing breast cancer, the decision regarding therapy with NOLVADEX for the reduction in breast cancer incidence should be based upon an individual assessment of the benefits and risks of NOLVADEX therapy. In the NSABP P-1 trial, NOLVADEX treatment lowered the risk of developing breast cancer during the follow-up period of the trial, but did not eliminate breast cancer risk (See Table 2 in **CLINICAL PHARMACOLOGY**).

## CONTRAINDICATIONS

NOLVADEX is contraindicated in patients with known hypersensitivity to the drug.

**Reduction in Breast Cancer Incidence In High Risk Women:** NOLVADEX is contraindicated in women who require concomitant coumarin-type anticoagulant therapy or in women with a history of deep vein thrombosis or pulmonary embolus.

## WARNINGS

**Effects in Metastatic Breast Cancer Patients:** As with other additive hormonal therapy (estrogens and androgens), hypercalcemia has been reported in some breast cancer patients with bone metastases within a few weeks of starting treatment with NOLVADEX. If hypercalcemia does occur, appropriate measures should be taken and, if severe, NOLVADEX should be discontinued.

**Effects on the Uterus-Endometrial Cancer:** As with other additive hormonal therapy (estrogens), an increased incidence of endometrial cancer has been reported in association with NOLVADEX treatment. The underlying mechanism is unknown, but may be related to the estrogen-like effect of NOLVADEX. Any patients receiving or having previously received NOLVADEX, who report abnormal vaginal bleeding should be promptly evaluated. Patients receiving or having previously received NOLVADEX should have routine gynecological care and they should promptly inform their physician if they experience any abnormal gynecological symptoms, e.g., menstrual irregularities, abnormal vaginal bleeding, changes in vaginal discharge, or pelvic pain or pressure.

In a large randomized trial in Sweden of adjuvant NOLVADEX 40 mg/day for 2-5 years, an increased incidence of uterine cancer was noted. Twenty three of 1,372 patients randomized to receive NOLVADEX versus 4 of 1,357 patients randomized to the observation group developed cancer of the uterus [RR = 5.6 (1.9-16.2),  $p < .001$ ]. One of the patients with cancer of the uterus who was randomized to receive NOLVADEX never took the drug. After approximately 6.8 years of follow-up in the NSABP B-14 trial, 15 of 1,419 women randomized to receive NOLVADEX 20 mg/day for 5 years developed uterine cancer and 2 of the 1,424 women randomized to receive placebo, who subsequently were treated with NOLVADEX, also developed uterine cancer. Most of the uterine cancers were diagnosed at an early stage, but deaths from uterine cancer have been reported.

In the NSABP P-1 trial, among participants randomized to NOLVADEX there was a statistically significant increase in the incidence of endometrial cancer (33 cases of invasive endometrial cancer, compared to 14 cases among participants randomized to placebo (RR 2.48, 95% CI 1.27-4.92). This increase was primarily observed among women at least 50 years of age at the time of randomization (26 cases of invasive endometrial cancer, compared to 6 cases among participants randomized to placebo (RR 4.50, 95% CI 1.78-13.16). Among women  $\leq$  49 years of age at the time of randomization there were 7 cases of invasive endometrial cancer, compared to 8 cases among participants randomized to placebo (RR 0.94, 95% CI 0.28-2.89). If age at the time of diagnosis is considered, there were 4 cases of endometrial cancer among participants  $\leq$  49 randomized to NOLVADEX compared to 2 among participants randomized to placebo (RR 2.21, 95% CI 0.4-12.0). For women  $\geq$  50 at the time of diagnosis, there were 29 cases among participants randomized to NOLVADEX compared to 12 among women on placebo (RR 2.5, 95% CI 1.3-4.9). The risk ratios were similar in the two groups, although fewer events occurred in younger women. Most (29 of 33 cases in the NOLVADEX group) endometrial cancers were diagnosed in symptomatic women; although 5 of 33 cases in the NOLVADEX group occurred in asymptomatic women. Among women receiving NOLVADEX the events appeared between 1 and 61 months (average=32 months) from the start of treatment.

Among participants receiving NOLVADEX, there were 33 cases of FIGO stage I [20 IA, 12 IB, and 1 IC] endometrial cancer. Among participants receiving placebo, there were 13 FIGO stage I cases [8 IA and 5 IB]. There was a single FIGO Stage IV endometrial cancer in a participant receiving placebo. (See Table 2 in CLINICAL PHARMACOLOGY). The distribution of FIGO stage was similar between participants receiving NOLVADEX and placebo. Five women receiving NOLVADEX and 1 receiving placebo with FIGO Stage IB disease received postoperative radiation therapy in addition to surgery.

Endometrial sampling did not alter the endometrial cancer detection rate compared to women who did not undergo endometrial sampling (0.6% with sampling, 0.5% without sampling) for women with an intact uterus. There are no data to suggest that routine endometrial sampling in asymptomatic women taking NOLVADEX to reduce the incidence of breast cancer would be beneficial.

**Non-Malignant Effects on the Uterus:** An increased incidence of endometrial changes including hyperplasia and polyps have been reported in association with NOLVADEX treatment. The incidence and pattern of this increase suggest that the underlying mechanism is related to the estrogenic properties of NOLVADEX.

There have been a few reports of endometriosis and uterine fibroids in women receiving NOLVADEX. The underlying mechanism may be due to the partial estrogenic effect of NOLVADEX. Ovarian cysts have also been observed in a small number of premenopausal patients with advanced breast cancer who have been treated with NOLVADEX.

**Thromboembolic Effects of NOLVADEX:** For treatment of breast cancer, the risks and benefits of NOLVADEX should be carefully considered in women with a history of thromboembolic events.

Data from the P-1 trial show that participants receiving NOLVADEX without a history of pulmonary emboli (PE) had a statistically significant increase in pulmonary emboli (18-Nolvadex, 6-placebo, RR=3.01, 95% CI: 1.15- 9.27). Three of the pulmonary emboli, all in the NOLVADEX arm, were fatal. Eighty-seven percent of the cases of pulmonary embolism occurred in women at least 50 years of age at randomization. Among women receiving NOLVADEX, the events appeared between 2 and 60 months (average=27 months) from the start of treatment.

In this same population, a non-statistically significant increase in deep vein thrombosis (DVT) was seen in the NOLVADEX group (30-NOLVADEX, 19-placebo; RR=1.59, 95% CI: 0.86-2.98). The same increase in relative risk was seen in women  $\leq 49$  and in women  $\geq 50$ , although fewer events occurred in younger women. Women with thromboembolic events were at risk for a second related event (7 out of 25 women on placebo, 5 out of 48 women on NOLVADEX) and were at risk for complications of the event and its treatment (0/25 on placebo, 4/48 on NOLVADEX). Among women receiving NOLVADEX, deep vein thrombosis events occurred between 2 and 57 months (average=19 months) from the start of treatment.

There was a non-statistically significant increase in stroke among patients randomized to NOLVADEX (24- Placebo; 34-NOLVADEX; RR 1.42; 95% CI 0.82-2.51). Six of the 24 strokes in the placebo group were considered hemorrhagic in origin and 10 of the 34 strokes in the NOLVADEX group were categorized as hemorrhagic. Seventeen of the 34 strokes in the NOLVADEX group were considered occlusive and 7 were considered to be of unknown etiology. Fourteen of the 24 strokes on the placebo arm were reported to be occlusive and 4 of unknown etiology. Among these strokes 3 strokes in the placebo group and 4 strokes in the NOLVADEX group were fatal. Eighty-eight percent of the strokes occurred in women at least 50 years of age at the time of randomization. Among women receiving NOLVADEX, the events occurred between 1 and 63 months (average=30 months) from the start of treatment.

**Effects on the liver: Liver cancer:** In the Swedish trial using adjuvant NOLVADEX 40 mg/day for 2-5 years, 3 cases of liver cancer have been reported in the NOLVADEX-treated group versus 1 case in the observation group (See PRECAUTIONS-Carcinogenesis). In other clinical trials evaluating NOLVADEX, no cases of liver cancer have been reported to date.

No cases of liver cancer were reported in NSABP P-1 with a median follow-up of 4.2 years.

**Effects on the liver: Non-malignant effects:** NOLVADEX has been associated with changes in liver enzyme levels, and on rare occasions, a spectrum of more severe liver abnormalities including fatty liver, cholestasis, hepatitis and hepatic necrosis. A few of these serious cases included fatalities. In most reported cases the relationship to NOLVADEX is uncertain. However, some positive rechallenges and dechallenges have been reported.

In the NSABP P-1 trial, few grade 3-4 changes in liver function (SGOT, SGPT, bilirubin, alkaline phosphatase) were observed (10 on placebo and 6 on NOLVADEX). Serum lipids were not systematically collected.

**Other cancers:** A number of second primary tumors, occurring at sites other than the endometrium, have been reported following the treatment of breast cancer with NOLVADEX in clinical trials. Data from the NSABP B-14 and P-1 studies show no increase in other (non-uterine) cancers among patients receiving NOLVADEX. Whether an increased risk for other (non-uterine) cancers is associated with NOLVADEX is still uncertain and continues to be evaluated.

**Effects on the Eye:** Ocular disturbances, including corneal changes, cataracts, the need for cataract surgery, decrement in color vision perception, retinal vein thrombosis, and retinopathy have been reported in patients receiving NOLVADEX.

In the NSABP P-1 trial, an increased risk of borderline significance of developing cataracts among those women without cataracts at baseline (540 NOLVADEX; 483 placebo; RR=1.13, 95% CI 1.00-1.28) was observed. Among these same women, NOLVADEX was associated with an increased risk of having cataract surgery (101 NOLVADEX; 63 placebo; RR=1.62, 95% CI 1.17-2.25). (See Table 2 in **CLINICAL PHARMACOLOGY**) Among all women on the trial (with or without cataracts at baseline), NOLVADEX was associated with an increased risk of having cataract surgery (201 NOLVADEX; 129

placebo; RR=1.51, 95% CI 1.21-1.89). Eye examinations were not required during the study. No other conclusions regarding non-cataract ophthalmic events can be made.

**Pregnancy Category D:** NOLVADEX may cause fetal harm when administered to a pregnant woman. Women should be advised not to become pregnant while taking NOLVADEX and should use barrier or nonhormonal contraceptive measures if sexually active. Effects on reproductive functions are expected from the antiestrogenic properties of the drug. In reproductive studies in rats at dose levels equal to or below the human dose, nonteratogenic developmental skeletal changes were seen and were found reversible. In addition, in fertility studies in rats and in teratology studies in rabbits using doses at or below those used in humans, a lower incidence of embryo implantation and a higher incidence of fetal death or retarded in utero growth were observed, with slower learning behavior in some rat pups when compared to historical controls. Several pregnant marmosets were dosed during organogenesis or in the last half of pregnancy. No deformations were seen and, although the dose was high enough to terminate pregnancy in some animals, those that did maintain pregnancy showed no evidence of teratogenic malformations.

In rodent models of fetal reproductive tract development, tamoxifen (at doses 0.3 to 2.4-fold the human maximum recommended dose on a  $\text{mg}/\text{m}^2$  basis) caused changes in both sexes that are similar to those caused by estradiol, ethynylestradiol and diethylstilbestrol. Although the clinical relevance of these changes is unknown, some of these changes, especially vaginal adenosis, are similar to those seen in young women who were exposed to diethylstilbestrol in utero and who have a 1 in 1000 risk of developing clear-cell adenocarcinoma of the vagina or cervix. To date, in utero exposure to tamoxifen has not been shown to cause vaginal adenosis, or clear-cell adenocarcinoma of the vagina or cervix, in young women. However, only a small number of young women have been exposed to tamoxifen in utero, and a smaller number have been followed long enough (to age 15-20) to determine whether vaginal or cervical neoplasia could occur as a result of this exposure.

There are no adequate and well controlled trials of tamoxifen in pregnant women. There have been a small number of reports of vaginal bleeding, spontaneous abortions, birth defects, and fetal deaths in pregnant women. If this drug is used during pregnancy, or the patient becomes pregnant while taking this drug, or within approximately two months after discontinuing therapy, the patient should be apprised of the potential risks to the fetus including the potential long term risk of a DES-like syndrome.

**Reduction in Breast Cancer Incidence In High Risk Women - Pregnancy Category D:** For sexually active women of child-bearing potential, NOLVADEX therapy should be initiated during

menstruation. In women with menstrual irregularity, a negative B-HCG immediately prior to the initiation of therapy is sufficient. (See **PRECAUTIONS-Information for Patients - Reduction in Breast Cancer Incidence in High Risk Women**).

## **PRECAUTIONS**

**General:** Decreases in platelet counts, usually to 50,000-100,000/mm<sup>3</sup>, infrequently lower, have been occasionally reported in patients taking NOLVADEX for breast cancer. In patients with significant thrombocytopenia, rare hemorrhagic episodes have occurred, but it is uncertain if these episodes are due to NOLVADEX therapy. Leukopenia has been observed, sometimes in association with anemia and/or thrombocytopenia. There have been rare reports of neutropenia and pancytopenia in patients receiving NOLVADEX; this can sometimes be severe.

In the NSABP P-1 trial, 6 women on NOLVADEX and 2 on placebo experienced grade 3-4 drops in platelet counts ( $\leq 50,000^3/\text{mm}$ ).

### **Information for Patients:**

**Reduction in Breast Cancer Incidence In High Risk Women:** Women who are at high risk for breast cancer can consider taking NOLVADEX therapy to reduce the incidence of breast cancer. Whether the benefits of treatment are considered to outweigh the risks depends on a woman's personal health history and on how she weighs the benefits and risks. NOLVADEX therapy to reduce the incidence of breast cancer may therefore not be appropriate for all women at high risk for breast cancer. Women who are considering NOLVADEX therapy should consult their health care professional for an assessment of the potential benefits and risks prior to starting therapy for reduction in breast cancer incidence. (See Table 2 in the CLINICAL PHARMACOLOGY) Women should understand that NOLVADEX reduces the incidence of breast cancer, but may not eliminate risk. NOLVADEX decreased the incidence of small estrogen receptor positive tumors, but did not alter the incidence of estrogen receptor negative tumors or larger tumors. In women with breast cancer who are at high risk of developing a second breast cancer, treatment with about 5 years of NOLVADEX reduced the annual incidence rate of a second breast cancer by approximately 50%.

Women who are pregnant or who plan to become pregnant should not take NOLVADEX to reduce her risk of breast cancer. Effective nonhormonal contraception must be used by all premenopausal women taking NOLVADEX if they are sexually active. For sexually active women of child-bearing potential, NOLVADEX therapy should be initiated during menstruation. In women with menstrual irregularity, a

negative B-HCG immediately prior to the initiation of therapy is sufficient. (See **WARNINGS-Pregnancy Category D.**)

Two European trials of tamoxifen to reduce the risk of breast cancer were conducted and showed no difference in the number of breast cancer cases between the tamoxifen and placebo arms. These studies had trial designs that differed from that of NSABP P-1, were smaller than NSABP P-1, and enrolled women at a lower risk for breast cancer than those in P-1.

**Monitoring During NOLVADEX Therapy:** Women taking or having previously taken NOLVADEX should be instructed to seek prompt medical attention for new breast lumps, vaginal bleeding, gynecologic symptoms (menstrual irregularities, changes in vaginal discharge, or pelvic pain or pressure), symptoms of leg swelling or tenderness, unexplained shortness of breath, or changes in vision. Women should inform all care providers, regardless of the reason for evaluation, that they take NOLVADEX.

Women taking NOLVADEX to reduce the incidence of breast cancer should have a breast examination, a mammogram, and a gynecologic examination prior to the initiation of therapy. These studies should be repeated at regular intervals while on therapy, in keeping with good medical practice. Women taking NOLVADEX as adjuvant breast cancer therapy should follow the same monitoring procedures as for women taking NOLVADEX for the reduction in the incidence of breast cancer. Women taking NOLVADEX as treatment for metastatic breast cancer should review this monitoring plan with their care provider and select the appropriate modalities and schedule of evaluation.

**Laboratory Tests:** Periodic complete blood counts, including platelet counts, and periodic liver function tests should be obtained.

**Drug Interactions:** When NOLVADEX is used in combination with coumarin-type anticoagulants, a significant increase in anticoagulant effect may occur. Where such coadministration exists, careful monitoring of the patient's prothrombin time is recommended.

In the NSABP P-1 trial, women who required coumarin-type anticoagulants for any reason were ineligible for participation in the trial. (See **CONTRAINDICATIONS**).

There is an increased risk of thromboembolic events occurring when cytotoxic agents are used in combination with NOLVADEX.



Tamoxifen, N-desmethyl tamoxifen and 4-hydroxytamoxifen have been found to be potent inhibitors of hepatic cytochrome p-450 mixed function oxidases. The effect of tamoxifen on metabolism and excretion of other antineoplastic drugs, such as cyclophosphamide and other drugs that require mixed function oxidases for activation, is not known.

One patient receiving NOLVADEX with concomitant phenobarbital exhibited a steady state serum level of tamoxifen lower than that observed for other patients (i.e., 26 ng/mL vs. mean value of 122 ng/mL). However, the clinical significance of this finding is not known.

Concomitant bromocriptine therapy has been shown to elevate serum tamoxifen and N-desmethyl tamoxifen.

**Drug/Laboratory Testing Interactions:** During postmarketing surveillance, T<sub>4</sub> elevations were reported for a few postmenopausal patients which may be explained by increases in thyroid-binding globulin. These elevations were not accompanied by clinical hyperthyroidism.

Variations in the karyopyknotic index on vaginal smears and various degrees of estrogen effect on Pap smears have been infrequently seen in postmenopausal patients given NOLVADEX.

In the postmarketing experience with NOLVADEX, infrequent cases of hyperlipidemias have been reported. Periodic monitoring of plasma triglycerides and cholesterol may be indicated in patients with pre-existing hyperlipidemias.

**Carcinogenesis:** A conventional carcinogenesis study in rats (doses of 5, 20, and 35 mg/kg/day for up to 2 years) revealed hepatocellular carcinoma at all doses, and the incidence of these tumors was significantly greater among rats given 20 or 35 mg/kg/day (69%) than those given 5 mg/kg/day (14%). The incidence of these tumors in rats given 5 mg/kg/day (29.5 mg/m<sup>2</sup>) was significantly greater than in controls.

In addition, preliminary data from 2 independent reports of 6-month studies in rats reveal liver tumors which in one study are classified as malignant. (See WARNINGS)

Endocrine changes in immature and mature mice were investigated in a 13-month study. Granulosa cell ovarian tumors and interstitial cell testicular tumors were found in mice receiving NOLVADEX, but not in the controls.

**Mutagenesis:** Although no genotoxic potential was found in a conventional battery of in vivo and in vitro tests with pro- and eukaryotic test systems with drug metabolizing systems present, increased levels of DNA adducts have been found in the livers of rats exposed to tamoxifen. Tamoxifen also has been found to increase levels of micronucleus formation in vitro in human lymphoblastoid cell line (MCL-5). Based on these findings, tamoxifen is genotoxic in rodent and human MCL-5 cells.

**Impairment of Fertility:** Fertility in female rats was decreased following administration of 0.04 mg/kg for two weeks prior to mating through day 7 of pregnancy. There was a decreased number of implantations, and all fetuses were found dead.

Following administration to rats of 0.16 mg/kg from days 7-17 of pregnancy, there were increased numbers of fetal deaths. Administration of 0.125 mg/kg to rabbits during days 6-18 of pregnancy resulted in abortion or premature delivery. Fetal deaths occurred at higher doses. There were no teratogenic changes in either rat or rabbit segment II studies. Several pregnant marmosets were dosed with 10 mg/kg/day either during organogenesis or in the last half of pregnancy. No deformations were seen, and although the dose was high enough to terminate pregnancy in some animals, those that did maintain pregnancy showed no evidence of teratogenic malformations. Rats given 0.16 mg/kg from day 17 of pregnancy to 1 day before weaning demonstrated increased numbers of dead pups at parturition. It was reported that some rat pups showed slower learning behavior, but this did not achieve statistical significance in one study, and in another study where significance was reported, this was obtained by comparing dosed animals with controls of another study.

The recommended daily human dose of 20-40 mg corresponds to 0.4-0.8 mg/kg for an average 50 kg woman.

**Pregnancy Category D:** See WARNINGS.

**Nursing Mothers:** It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk and because of the potential for serious adverse reactions in nursing infants from NOLVADEX, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother.

**Pediatric Use:** The safety and efficacy of NOLVADEX in pediatric patients have not been established.

**Geriatric Use:** In the NSABP P-1 trial, the percentage of women at least 65 years of age was 16%. Women at least 70 years of age accounted for 6% of the participants. A reduction in breast cancer incidence was seen among participants in each of the subsets; A total of 28 and 10 invasive breast cancers were seen among participants 65 and older in the placebo and NOLVADEX groups, respectively. Across all other outcomes, the results in this subset reflect the results observed in the subset of women at least 50 years of age. No overall differences in tolerability were observed between older and younger patients. (See **CLINICAL PHARMACOLOGY - Clinical Studies - Reduction in Breast Cancer Incidence in High Risk Women** section).

## **ADVERSE REACTIONS**

Adverse reactions to NOLVADEX are relatively mild and rarely severe enough to require discontinuation of treatment in breast cancer patients.

Continued clinical studies have resulted in further information which better indicates the incidence of adverse reactions with NOLVADEX as compared to placebo.

**Metastatic Breast Cancer:** Increased bone and tumor pain and, also, local disease flare have occurred, which are sometimes associated with a good tumor response. Patients with increased bone pain may require additional analgesics. Patients with soft tissue disease may have sudden increases in the size of preexisting lesions, sometimes associated with marked erythema within and surrounding the lesions and/or the development of new lesions. When they occur, the bone pain or disease flare are seen shortly after starting NOLVADEX and generally subside rapidly.

In patients treated with NOLVADEX for metastatic breast cancer, the most frequent adverse reaction to NOLVADEX is hot flashes.

Other adverse reactions which are seen infrequently are hypercalcemia, peripheral edema, distaste for food, pruritus vulvae, depression, dizziness, light-headedness, headache, hair thinning and/or partial hair loss, and vaginal dryness.

**Premenopausal Women:** The following table summarizes the incidence of adverse reactions reported at a frequency of 2% or greater from clinical trials (Ingle, Pritchard, Buchanan) which compared NOLVADEX therapy to ovarian ablation in premenopausal patients with metastatic breast cancer.

	NOLVADEX All Effects % of Women	OVARIAN ABLATION All Effects % of Women
Adverse Reactions*	n = 104	n = 100
	%	%
Flush	33	46
Amenorrhea	16	69
Altered Menses	13	5
Oligomenorrhea	9	1
Bone Pain	6	6
Menstrual Disorder	6	4
Nausea	5	4
Cough/Coughing	4	1
Edema	4	1
Fatigue	4	1
Musculoskeletal Pain	3	0
Pain	3	4
Ovarian Cyst(s)	3	2
Depression	2	2
Abdominal Cramps	1	2
Anorexia	1	2

\*Some women had more than one adverse reaction.

**Male Breast Cancer:** NOLVADEX is well tolerated in males with breast cancer. Reports from the literature and case reports suggest that the safety profile of NOLVADEX in males is similar to that seen in women. Loss of libido and impotence have resulted in discontinuation of tamoxifen therapy in male patients. Also, in oligospermic males treated with tamoxifen, LH, FSH, testosterone and estrogen levels were elevated. No significant clinical changes were reported.

**Adjuvant Breast Cancer:** In the NSABP B-14 study, women with axillary node-negative breast cancer were randomized to 5 years of NOLVADEX 20 mg/day or placebo following primary surgery. The reported adverse effects are tabulated below (mean follow-up of approximately 6.8 years) showing adverse

events more common on NOLVADEX than on placebo. The incidence of hot flashes (64% v 48%), vaginal discharge (30% v 15%), and irregular menses (25% v 19%) were higher with NOLVADEX compared with placebo. All other adverse effects occurred with similar frequency in the two treatment groups, with the exception of thrombotic events, a higher incidence was seen in NOLVADEX-treated patients (through 5 years, 1.7% versus 0.4%). Two of the patients treated with NOLVADEX who had thrombotic events died.

**NSABP B-14 Study**

Adverse Effect	% of Women	
	NOLVADEX (n=1422)	Placebo (n=1437)
Hot Flashes	64	48
Fluid Retention	32	30
Vaginal Discharge	30	15
Nausea	26	24
Irregular Menses	25	19
Weight Loss (>5%)	23	18
Skin Changes	19	15
Increased SGOT	5	3
Increased Bilirubin	2	1
Increased Creatinine	2	1
Thrombocytopenia*	2	1
Thrombotic Events		
Deep Vein Thrombosis	0.8	0.2
Pulmonary Embolism	0.5	0.2
Superficial Phlebitis	0.4	0.0

\*Defined as a platelet count of <100,000/mm<sup>3</sup>

In the Eastern Cooperative Oncology Group (ECOG) adjuvant breast cancer trial, NOLVADEX or placebo was administered for 2 years to women following mastectomy. When compared to placebo, NOLVADEX showed a significantly higher incidence of hot flashes (19% versus 8% for placebo). The incidence of all other adverse reactions was similar in the 2 treatment groups with the exception of thrombocytopenia where the incidence for NOLVADEX was 10% versus 3% for placebo, an observation of borderline statistical significance.

In other adjuvant studies, Toronto and NOLVADEX Adjuvant Trial Organization (NATO), women received either NOLVADEX or no therapy. In the Toronto study, hot flashes were observed in 29% of patients, for NOLVADEX versus 1% in the untreated group. In the NATO trial, hot flashes and vaginal

bleeding were reported in 2.8%, and 2.0% of women, respectively, for NOLVADEX versus 0.2% for each in the untreated group.

**Reduction in Breast Cancer Incidence In High Risk Women:** In the NSABP P-1 Trial, there was an increase in five serious adverse effects in the NOLVADEX group: endometrial cancer (33 cases in the NOLVADEX group versus 14 in the placebo group); pulmonary embolism (18 cases in the NOLVADEX group versus 6 in the placebo group); deep vein thrombosis (30 cases in the NOLVADEX group versus 19 in the placebo group); stroke (34 cases in the NOLVADEX group versus 24 in the placebo group); cataract formation (540 cases in the NOLVADEX group versus 483 in the placebo group) and cataract surgery (101 cases in the NOLVADEX group versus 63 in the placebo group). (See **WARNINGS** and Table 2 in **CLINICAL PHARMACOLOGY**)

The following table presents the adverse events observed in NSABP P-1 by treatment arm. Only adverse events more common on NOLVADEX than placebo are shown.

**NSABP P-1 Trial: All Adverse Events**

	% of Women	
	NOLVADEX N=6681	PLACEBO N=6707
<b><u>Self Reported Symptoms</u></b>	<u>N=6441<sup>1</sup></u>	<u>N=6469<sup>1</sup></u>
Hot Flashes	80	68
Vaginal Discharges	55	35
Vaginal Bleeding	23	22
<b><u>Laboratory Abnormalities</u></b>	<u>N=6520<sup>2</sup></u>	<u>N=6535<sup>2</sup></u>
Platelets decreased	0.7	0.3
<b><u>Adverse Effects</u></b>	<u>N=6492<sup>3</sup></u>	<u>N=6484<sup>3</sup></u>
<b><u>Other Toxicities</u></b>		
Mood	11.6	10.8
Infection/Sepsis	6.0	5.1
Constipation	4.4	3.2
Alopecia	5.2	4.4
Skin	5.6	4.7
Allergy	2.5	2.1

<sup>1</sup>Number with Quality of Life Questionnaires

<sup>2</sup>Number with Treatment Follow-up Forms

<sup>3</sup>Number with Adverse Drug Reaction Forms

In the NSABP P-1 trial, 15.0% and 9.7% of participants receiving NOLVADEX and placebo therapy, respectively withdrew from the trial for medical reasons. The following are the medical reasons for withdrawing from NOLVADEX and placebo therapy, respectively: Hot flashes (3.1% vs. 1.5%) and Vaginal Discharge (0.5% vs. 0.1%).

In the NSABP P-1 trial, 8.7 percent and 9.6 percent of participants receiving NOLVADEX and placebo therapy, respectively withdrew for non-medical reasons.

On the NSABP P-1 trial, hot flashes of any severity occurred in 68% of women on placebo and in 80% of women on NOLVADEX. Severe hot flashes occurred in 28% of women on placebo and 45% of women on NOLVADEX. Vaginal discharge occurred in 35% and 55% of women on placebo and NOLVADEX respectively; and was severe in 4.5% and 12.3% respectively. There was no difference in the incidence of vaginal bleeding between treatment arms.”

**Postmarketing experience:** Less frequently reported adverse reactions are vaginal bleeding, vaginal discharge, menstrual irregularities and skin rash. Usually these have not been of sufficient severity to require dosage reduction or discontinuation of treatment. Very rare reports of erythema multiforme, Stevens-Johnson syndrome and bullous pemphigoid have been reported with NOLVADEX therapy.

## **OVERDOSAGE**

Signs observed at the highest doses following studies to determine LD<sub>50</sub> in animals were respiratory difficulties and convulsions.

Acute overdosage in humans has not been reported. In a study of advanced metastatic cancer patients which specifically determined the maximum tolerated dose of NOLVADEX in evaluating the use of very high doses to reverse multidrug resistance, acute neurotoxicity manifested by tremor, hyperreflexia, unsteady gait and dizziness were noted. These symptoms occurred within 3-5 days of beginning NOLVADEX and cleared within 2-5 days after stopping therapy. No permanent neurologic toxicity was noted. One patient experienced a seizure several days after NOLVADEX was discontinued and neurotoxic symptoms had resolved. The causal relationship of the seizure to NOLVADEX therapy is unknown. Doses given in these patients were all greater than 400 mg/m<sup>2</sup> loading dose, followed by maintenance doses of 150 mg/m<sup>2</sup> of NOLVADEX given twice a day.

In the same study, prolongation of the QT interval on the electrocardiogram was noted when patients were given doses higher than 250 mg/m<sup>2</sup> loading dose, followed by maintenance doses of 80 mg/m<sup>2</sup> of NOLVADEX given twice a day. For a woman with a body surface area of 1.5 m<sup>2</sup> the minimal loading dose and maintenance doses given at which neurological symptoms and QT changes occurred were at least 6 fold higher in respect to the maximum recommended dose.

No specific treatment for overdosage is known; treatment must be symptomatic.

### **DOSAGE AND ADMINISTRATION**

For patients with breast cancer, the recommended daily dose is 20-40 mg. Dosages greater than 20 mg per day should be given in divided doses (morning and evening).

In three single agent adjuvant studies in women, one 10 mg NOLVADEX tablet was administered two (ECOG and NATO) or three (Toronto) times a day for two years. In the NSABP B-14 adjuvant study in women with node-negative breast cancer, one 10 mg NOLVADEX tablet was given twice a day for at least five years. Results of the B-14 study suggest that continuation of therapy beyond five years does not provide additional benefit (see CLINICAL PHARMACOLOGY). In the EBCTCG 1995 overview, the reduction in recurrence and mortality was greater in those studies that used tamoxifen for about 5 years than in those that used tamoxifen for a shorter period of therapy. There was no indication that doses greater than 20 mg per day were more effective. Current data from clinical trials support five years of adjuvant NOLVADEX therapy for patients with breast cancer.

**Reduction in Breast Cancer Incidence In High Risk Women:** The recommended dose is NOLVADEX 20 mg daily for five years. There are no data to support the use of NOLVADEX other than for 5 years. (See **CLINICAL PHARMACOLOGY-Clinical Studies - Reduction in Breast Cancer Incidence in High Risk Women.**)

### **HOW SUPPLIED**

**10 mg Tablets** containing tamoxifen as the citrate in an amount equivalent to 10 mg of tamoxifen (round, biconvex, uncoated, white tablet identified with NOLVADEX 600 debossed on one side and a cameo debossed on the other side) are supplied in bottles of 60 tablets and 250 tablets. NDC 0310-0600.



**20 mg Tablets** containing tamoxifen as the citrate in an amount equivalent to 20 mg of tamoxifen (round, biconvex, uncoated, white tablet identified with NOLVADEX 604 debossed on one side and a cameo debossed on the other side) are supplied in bottles of 30 tablets. NDC 0310-0604.

Store at controlled room temperature, 20-25°C (68-77°F) [see USP]. Dispense in a well-closed, light-resistant container.

ZENECA Pharmaceuticals  
A Business Unit of ZENECA Inc.  
Wilmington, DE 19850-5437 USA

**Rev T-10 10/28/98      SIC XXXXX-XX**

**Patient Information about  
NOLVADEX® (tamoxifen citrate) Tablets**  
(Nol ´va dex)

for Breast Cancer Treatment and Reduction in the Incidence of Breast Cancer

Generic Name: Tamoxifen (ta-MOX-i-fen)

Please read this information carefully before you begin taking NOLVADEX. It is important to read this information each time your prescription is filled or refilled in case new information is available. This summary does not tell you everything about NOLVADEX. Your health care professional is the best source of information about this medicine. You should talk with him or her before you begin taking NOLVADEX and at regular checkups. In addition, the professional package insert contains more detailed information on NOLVADEX.

**What are the most important things I should know about NOLVADEX?**

NOLVADEX has been shown to help women with advanced breast cancer and in clinical trials of over 30,000 women with early breast cancer it has been shown to reduce the risk of recurrence. Also in a trial of 13,000 women at high risk of breast cancer, NOLVADEX reduced the risk of developing the disease.

Like all medicines, NOLVADEX has some side effects. Most are mild and relate to its hormonal mode of action. NOLVADEX can, however, also increase the risk of some serious and potentially life-threatening conditions, including uterine cancer, blood clots, and stroke. It can also increase the risk of getting cataracts or of needing cataract surgery.

If you experience any of these, tell your doctor **immediately** (see “What should I avoid or do while taking NOLVADEX?). You and your doctor must carefully discuss your personal medical conditions, history, and preferences to decide whether the good NOLVADEX may do for you outweighs its potential risks. If you and your doctor decide that NOLVADEX therapy is right for you, you should look for symptoms indicating you might be experiencing one NOLVADEX’s known risks.

**What is NOLVADEX?**

- NOLVADEX is a prescription medicine used to reduce the risk of getting breast cancer in women who have a high risk of getting breast cancer.

This effect was shown in the Breast Cancer Prevention Trial (BCPT, NSABP P-1) a large study where over 13,000 women at high risk for breast cancer were to take NOLVADEX or placebo (a pill without tamoxifen) for 5 years. High risk women were those who were at least 35 years old and had a combination of risks that made their chances of developing breast cancer greater than 1.67% in the next five years. The risk factors included early age at first menstrual period, late age at first pregnancy, no pregnancies, close family members with breast cancer (mother, sister, or daughter), history of previous breast biopsies, or high-risk changes in the breast seen on a biopsy. Twenty-five percent of the women in the study completed 5 years of treatment, and most women in this study have been followed for about 4 years. The study showed that NOLVADEX reduced the chance of getting breast cancer by 44%. The longer term effects of NOLVADEX on reducing the chance of getting breast cancer are not known.

We do not know whether taking NOLVADEX for 5 years only delays the appearance of cancer, or actually decreases the number of tumors that will ever develop since long-term studies have not been completed.

Some women in this study also experienced serious side effects of NOLVADEX. They are described in detail in the section, **What are the possible side effects of NOLVADEX?**. Some of these women experienced complications related to the treatment of these side effects. The following table of the major results from the study is intended to be an aid in weighing the potential benefit of a reduction in risk of breast cancer against the potential risk of serious side effects of NOLVADEX.

	<b>Cases per year out of 1000 women taking NOLVADEX</b>	<b>Cases per year out of 1000 women taking PLACEBO</b>
<b>Breast Cancer</b>	<b>3.6</b>	<b>6.5</b>
<b>Endometrial Cancer</b>	<b>2.3</b>	<b>0.9</b>
<b>Blood clot in the lungs</b>	<b>0.8</b>	<b>0.3</b>
<b>Blood clot in the veins</b>	<b>1.3</b>	<b>0.8</b>
<b>Stroke</b>	<b>1.4</b>	<b>1.0</b>
<b>Cataracts</b>	<b>25.4</b>	<b>22.5</b>
<b>Cataract surgery</b>	<b>46.6</b>	<b>31.4</b>

Two European trials of NOLVADEX in women with a high risk of breast cancer were also conducted. They showed no difference in the number of breast cancer cases between the women who took tamoxifen and those who got a placebo. These studies had trial designs that differed from that of NSABP P-1, were smaller than P-1, and enrolled women at a lower risk for breast cancer than those in the P-1 trial.

- NOLVADEX is used to treat advanced breast cancer in women and men.

Three studies compared NOLVADEX to surgery or radiation to the ovaries in premenopausal women with advanced breast cancer and found that NOLVADEX was similar to surgery or radiation in causing tumor shrinkage.

Published studies have demonstrated that NOLVADEX is effective for the treatment of advanced breast cancer in men.

- NOLVADEX is used to reduce the recurrence of breast cancer in women who have had surgery and/or radiation therapy to treat early breast cancer. NOLVADEX is also used in women with breast cancer who are at risk of developing a second breast cancer in the opposite breast.

The Early Breast Cancer Trialists Collaborative Group reviewed the 10-year results of studies of NOLVADEX for early breast cancer. Treatment with NOLVADEX for about 5 years reduced the risk of recurrence of breast cancer and improved overall survival. Treatment with about 5 years of NOLVADEX also reduced the chance of getting a second breast cancer in the opposite breast by approximately 50%, a result similar to that seen in the NSABP P-1 study.

- NOLVADEX is a tablet available in two dosage strengths: 10 mg tablets and 20 mg tablets. The active ingredient in each tablet is tamoxifen citrate.

#### **How does NOLVADEX work?**

NOLVADEX belongs to a group of medicines called anti-estrogens. Anti-estrogens work by blocking the effects of the hormone estrogen in the body. Estrogen may cause the growth of some types of breast tumors. NOLVADEX may block the growth of tumors that respond to estrogen.

#### **Who should not take NOLVADEX?**

- You should not take NOLVADEX to reduce the risk of getting breast cancer if you have ever had blood clots or if you develop blood clots that require medical treatment. However, if you are taking NOLVADEX for treatment of early or advanced breast cancer, the benefits of NOLVADEX may outweigh the risks associated with developing new blood clots. Your health care professional can assist you in deciding whether NOLVADEX is right for you.

- You should not take NOLVADEX if you are taking medicines to thin your blood (anticoagulants) like warfarin (coumadin).
- You should not take NOLVADEX if you plan to become pregnant while taking NOLVADEX or during the two months after you stop taking it because NOLVADEX may harm your unborn child. You should stop taking NOLVADEX if you become pregnant while taking the drug. Please talk with your doctor about birth control recommendations. If you are capable of becoming pregnant, you should start NOLVADEX during a menstrual period or have a negative pregnancy test before beginning to take NOLVADEX.
- You should not take NOLVADEX if you are breast feeding.
- You should not take NOLVADEX if you have ever had an allergic reaction to NOLVADEX or tamoxifen citrate (the chemical name).
- NOLVADEX is not known to reduce the risk of breast cancer in women with changes in breast cancer genes (BRCA1 or BRCA2).
- You should not take NOLVADEX to decrease the chance of getting breast cancer if you are less than age 35, because NOLVADEX has not been tested in younger women.
- You should not take NOLVADEX to reduce the risk of breast cancer unless you are at high risk of breast cancer. Certain conditions put women at high risk and it is possible to calculate this risk for any woman. Breast cancer risk assessment tools to help calculate your risk of breast cancer have been developed and are available to your health professional. You should discuss your risks with your health care professional.
- Children should not take NOLVADEX because treatment for them has not been sufficiently studied.

**How should I take NOLVADEX?**

- Follow your doctor's instructions about when and how to take NOLVADEX. Read the label on the container. If you are unsure or have questions, ask your doctor or pharmacist.
- You will take NOLVADEX differently, depending on your diagnosis.
- For treatment of breast cancer in adult women and men, the usual dose is 20-40 mg a day. Take the tablets once or twice a day depending on the tablet strength prescribed. If your doctor has prescribed a different dose, do not change it unless he or she tells you to do so. For women with early breast cancer, NOLVADEX should be taken for 5 years. For women with advanced cancer, NOLVADEX should be taken until your doctor feels it is no longer indicated.
- For reduction of the risk of breast cancer, the usual dose is 20 mg a day, for five years.
- Take your medicine each day. You may find it easier to remember to take your medicine if you take it at the same time each day. If you forget to take a dose, take it as soon as you remember and then take the next dose as usual.
- Swallow the tablets whole with a drink of water.
- You can take NOLVADEX with or without food.
- Do not stop taking your tablets unless your doctor tells you to do so.

**Are there other important factors to consider before taking NOLVADEX?**

- Tell your doctor if you have ever had blood clots that required medical treatment.
- Because NOLVADEX may affect how other medicines work, always tell your doctor if you are taking any other prescription or non-prescription (over-the-counter) medications, particularly if you are taking warfarin to thin your blood.
  
- You should not become pregnant when taking NOLVADEX or during the two months after you stop taking it as NOLVADEX may harm your unborn child. Please contact your doctor for birth control recommendations.

**What should I avoid/or do while taking NOLVADEX?**

- You should contact your doctor immediately if you notice any of the following symptoms. Some of these symptoms may suggest that you are experiencing a rare but serious side effect associated with NOLVADEX (see “What are the possible side effects of NOLVADEX?”).
  - new breast lumps
  - vaginal bleeding
  - changes in your menstrual cycle
  - changes in vaginal discharge
  - pelvic pain or pressure
  - swelling or tenderness in your calf
  - unexplained breathlessness (shortness of breath)
  - sudden chest pain
  - coughing up blood
  - changes in your vision

If you see a health care professional who is new to you (an emergency room doctor, another doctor in the practice), tell him or her that you take NOLVADEX.

- Because NOLVADEX may affect how other medicines work, always tell your doctor if you are taking any other prescription or non-prescription (over-the-counter) medicines. Be sure to tell your doctor if you are taking warfarin (coumadin) to thin your blood.
  
- You should not become pregnant when taking NOLVADEX or during the two months after you stop

taking it because NOLVADEX may harm your unborn child. Please talk with your doctor about birth control recommendations. If you are taking NOLVADEX to reduce your risk of getting breast cancer, and you are sexually active, NOLVADEX should be started during your menstrual period. If you have irregular periods, you should have a negative pregnancy test before you start NOLVADEX.

- If you are taking NOLVADEX to reduce your risk of getting breast cancer, you should know that NOLVADEX does not prevent all breast cancers. While you are taking NOLVADEX and in keeping with your doctor's recommendation, you should have annual gynecological check-ups which should include breast exams and mammograms. If breast cancer occurs, there is no guarantee that it will be detected at an early stage. This is why it is important to continue with regular check-ups.

#### **What are the possible side effects of NOLVADEX?**

Like many medicines, NOLVADEX causes side effects in many patients. The majority of the side effects seen with NOLVADEX have been mild and do not usually cause breast cancer patients to stop taking the medication. In women with breast cancer, withdrawal from NOLVADEX therapy is about 5%. Approximately 15% of women who took NOLVADEX to reduce the chance of getting breast cancer stopped treatment because of side effects.

The most common side effects reported with NOLVADEX are: hot flashes; vaginal discharge or bleeding; and menstrual irregularities (these side effects may be mild or may be a sign of a more serious side effect). Women may experience hair loss or skin rashes; however, hair loss is uncommon and is usually mild.

A rare but serious side effect of NOLVADEX is a blood clot in the veins. Blood clots stop the flow of blood and can cause serious medical problems, disability or death. Women who take NOLVADEX are at increased risk for developing blood clots in the lungs and legs. Some women may develop more than one blood clot, even if NOLVADEX is stopped. Women may also have complications from treating the clot, such as bleeding from thinning the blood too much. Symptoms of a blood clot in the lungs may include sudden chest pain, shortness of breath or coughing up blood. Symptoms of a blood clot in the legs are pain or swelling in the calves. A blood clot in the legs may move to the lungs. If you experience any of these symptoms of a blood clot, contact your doctor immediately.

NOLVADEX increases the chance of having a stroke, which can cause serious medical problems, disability, or death. If you experience any symptoms of stroke, such as weakness, difficulty walking or



talking, or numbness, contact your doctor immediately.

Nolvadex increases the chance of changes occurring in the lining of your uterus (endometrium), which can be serious and could include cancer of the uterus. If you have not had a hysterectomy (removal of the uterus), it is important for you to contact your doctor immediately if you experience any unusual vaginal discharge, vaginal bleeding, or menstrual irregularities; or pain or pressure in the pelvis (lower stomach). These may be caused by changes to the lining of your uterus (endometrium). It is important to bring them to your doctor's attention without delay as they can occasionally indicate the start of something more serious, and could include cancer of the uterus or other changes to the uterus.

NOLVADEX may cause cataracts or changes to parts of the eye known as the cornea or retina. NOLVADEX can increase the chance of needing cataract surgery, and can cause blood clots in the veins of the eye. NOLVADEX can result in difficulty in distinguishing different colors. If you experience any changes in your vision, tell your doctor immediately.

Rare side effects, which may be serious, include certain liver problems such as jaundice (which may be seen as yellowing of the whites of the eyes).

If you are a woman receiving NOLVADEX for treatment of advanced breast cancer, and you experience excessive nausea, vomiting or thirst, tell your doctor immediately. This may mean that there are changes in the amount of calcium in your blood (hypercalcemia). Your doctor will evaluate this.

In patients with breast cancer, a temporary increase in the size of the tumor may occur and sometimes results in muscle aches/bone pain and skin redness. This condition may occur shortly after starting NOLVADEX and may be associated with a good response to treatment.

Many of these side effects happen only rarely. However, you should contact your doctor if you think you have any of these or any other problems with your NOLVADEX. Some side effects of NOLVADEX may become apparent soon after starting the drug, but others may first appear at any time during therapy.

This summary does not include all possible side effects with NOLVADEX. It is important to talk to your health care professional about possible side effects. If you want to read more, ask your doctor or pharmacist to give you the professional labeling.

**How should I store NOLVADEX?**

NOLVADEX Tablets should be stored at room temperature (68-77°F). Keep in a well-closed, light-resistant container. Keep out of the reach of children.

Do not take your tablets after the expiration date on the container. Be sure that any discarded tablets are out of the reach of children.

This leaflet provides you with a summary of information about NOLVADEX. Medicines are sometimes prescribed for uses other than those listed. NOLVADEX has been prescribed specifically for you by your doctor. Do not give your medicine to anyone else, even if they have a similar condition, because it may harm them.

If you have any questions or concerns, contact your doctor or pharmacist. Your pharmacist also has a longer leaflet about NOLVADEX written for health care professionals that you can ask to read. For more information about NOLVADEX or breast cancer, call the Professional Services Department at Zeneca Pharmaceuticals at XXX-XXX-XXXX

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