**POLICY:** Gonadotropin-Releasing Hormone (GnRH) Agonists – Injectable Long-Acting Products

- Lupron Depot® (leuprolide acetate suspension for intramuscular [IM] injection – Abbott Laboratories)
- Lupron Depot-Ped® (leuprolide acetate suspension for IM injection – Abbott Laboratories)
- Eligard® (leuprolide acetate suspension for subcutaneous [SC] injection – Sanofi-Aventis)
- Lupaneta Pack® (leuprolide acetate for depot suspension; norethindrone acetate tablets co-packaged for IM use and oral use, respectively – AbbVie Inc.)
- Triptodur™ (triptorelin for extended-releaseinjectable suspension – Arbor Pharmaceuticals)

**TAC APPROVAL DATE:** 04/25/2018; selected revision 10/3/2018

**OVERVIEW**

This policy includes only the long-acting leuprolide acetate suspension products that are administered intramuscularly (IM) [Lupron Depot, Lupaneta Pack, and Lupron Depot-Ped],1-6 subcutaneously (SC) [Eligard],5 and the triptorelin extended-release IM injectable (Triptodur) indicated for central precocious puberty (CPP).48 Lupaneta Pack contains a combination pack of leuprolide acetate depot suspension administered IM and norethindrone 5 mg tablets.6 This policy does not cover the short-acting leuprolide products (Lupron® and Lupron® for pediatric use) or the other GnRH agonists injectables. The indication(s) and dosing for the long-acting leuprolide products are in Table 1.

<table>
<thead>
<tr>
<th>Products</th>
<th>Dosing and Administration</th>
<th>Indication(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lupron Depot® (leuprolide acetate IM for depot suspension)</td>
<td>7.5 mg IM every 1 month</td>
<td>Prostate cancer: palliative treatment of advanced prostate cancer</td>
</tr>
<tr>
<td></td>
<td>22.5 mg IM every 3 months</td>
<td></td>
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<tr>
<td></td>
<td>30 mg IM every 4 months</td>
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<tr>
<td></td>
<td>45 mg IM every 6 months</td>
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</tr>
<tr>
<td>Eligard® (leuprolide acetate suspension for SC injection)</td>
<td>7.5 mg SC every 1 month</td>
<td>Prostate cancer: palliative treatment of advanced prostate cancer</td>
</tr>
<tr>
<td></td>
<td>22.5 mg SC every 3 months</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 mg SC every 4 months</td>
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<tr>
<td></td>
<td>45 mg SC every 6 months</td>
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</tbody>
</table>
Table 1 (continued). Indications, Dosage and Administration for Lupron-Depot, Lupaneta Pack, Eligard, and Lupron Depot-Ped.¹⁶

<table>
<thead>
<tr>
<th>Products</th>
<th>Dosing and Administration</th>
<th>Indication(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lupron Depot® (leuprolide acetate IM for depot suspension)</td>
<td>3.75 mg IM every 1 month 11.25 mg IM every 3 months</td>
<td>Endometriosis: initial management and for recurrence of symptoms (including pain relief and reduction of endometriotic lesions). Limitation of Use: Duration of initial treatment or re-treatment should be limited to 6 months. Uterine leiomyomata (Fibroids): preoperative hematologic improvement of patients with anemia caused by uterine leiomyomata; taken with iron therapy. Recommended duration of therapy is up to 3 months.</td>
</tr>
<tr>
<td>Lupaneta Pack® (leuprolide acetate for IM depot suspension; norethindrone acetate oral tablets co-packaged)</td>
<td>11.25 mg IM for 3 months Norethindrone acetate 5 mg tablets</td>
<td>Endometriosis: initial management and for recurrence of painful symptoms of endometriosis. Limitation of Use: Duration of use is limited due to adverse impact on bone mineral density. The initial treatment course is limited to 6 months. A single retreatment course of not more than 6 months may be administered if symptoms recur. Use of Lupaneta Pack for longer than total of 12 months is not recommended.</td>
</tr>
<tr>
<td>Lupron Depot-Ped® (leuprolide acetate for depot suspension)</td>
<td>Starting dose of 7.5 mg, 11.25 mg, or 15 mg IM for 1 month administration; starting dose based on child’s weight 11.25 mg IM for 3 months 30 mg IM for 3 months</td>
<td>Central precocious puberty</td>
</tr>
<tr>
<td>Triptodur™ (triptorelin extended-release injectable suspension)</td>
<td>22.5 mg IM for 24 weeks (6 months)</td>
<td>Central precocious puberty</td>
</tr>
</tbody>
</table>

IM – Intramuscular; SC – Subcutaneous.

In addition to the approved indications, GnRH agonists such as leuprolide long-acting, have been used for other conditions and various guidelines (e.g., guidelines from the National Comprehensive Cancer Center [NCCN]) discuss its use.⁷⁻⁹

**Policy Statement**

Prior authorization is recommended for prescription benefit coverage of leuprolide long-acting products (e.g., Lupron-Depot, Eligard, Lupron Depot-Ped, and Lupaneta Pack) and Triptodur. All approvals are for the duration noted below. In cases where the approval is authorized in months, 1 month is equal to 30 days.

**Automation:** None.

**Recommended Authorization Criteria**

Coverage of Lupron Depot, Lupron Depot-Ped, Lupaneta Pack, Eligard, and Triptodur are recommended in those who meet the following criteria:
FDA-Approved Indications

1. **Prostate Cancer.** Approve Lupron Depot or Eligard for 1 year.

   Lupron Depot (45 mg [6-month], 30 mg [4-month], 22.5 mg [3-month] and 7.5 mg [1-month])\(^1\) and Eligard (7.5 mg [1 month], 22.5 mg [3 month], 30 mg [4 month] and 45 mg [6 month])\(^5\) are indicated for this condition.

2. **Endometriosis.** Approve Lupron Depot or Lupaneta Pack for 6 months if the patient meets the following criteria (A, B and C):
   A) The patient has tried one of the following: a contraceptive (e.g., combination oral contraceptives, levonorgestrel-releasing intrauterine systems [e.g., Mirena\(^6\), Liletta\(^2\)]) or a progesterone product (e.g., norethindrone tablets, depo-medroxyprogesterone injection), unless contraindicated; AND
   
   **NOTE:** An exception to the requirement for a trial of the above therapies can be made if the patient has previously used a gonadotropin-releasing hormone [GnRH] agonist (e.g., Lupron-Depot retreatment) or antagonist (e.g., Orilissa).
   B) The patient has continued to experience moderate to severe pain associated with endometriosis after treatment with an agent in “A” above; AND
   C) The medication is prescribed by or in consultation with an obstetrician-gynecologist or a health care practitioner who specializes in the treatment of women’s health.

   According to the American College of Obstetricians and Gynecologists (ACOG) practice bulletin on the management of the endometriosis (2010, reaffirmed 2018), after an appropriate pretreatment evaluation (to exclude other causes of chronic pelvic pain) and failure of initial treatment with oral contraceptives and NSAIDs, empiric therapy with a 3-month course of a GnRH agonist is appropriate.\(^5\)

   The recommended duration of continuous therapy (initial and recurrence) is limited to a total of 12 months. Lupron Depot and Lupaneta Pack (3.75 mg and 11.25 mg [3-month]) are both indicated for endometriosis.\(^2,3,6\) Per the prescribing information, the duration of initial treatment is for 6 months. If symptoms recur, a single retreatment course of not more than 6 months may be administered after the initial course. Use of Lupron Depot or Lupaneta Pack for longer than a total of 12 months is not recommended.

3. **Uterine Leiomyomata (fibroids).** Approve Lupron Depot for 6 months.

   Lupron Depot (3.75 mg, and 11.25 mg [3-month]) is indicated for this condition.\(^2,3\) The recommended duration of therapy with Lupron Depot 3.75 mg is up to 3 months. Experience with Lupron Depot 11.25 mg (3 months) in females has been limited to women \(\geq \) 18 years of age treated for no more than 6 months.

4. **Central Precocious Puberty (CPP).** Approve Lupron Depot-Ped or Triptodur for 1 year.

   **Note:** Lupron Depot-Ped and Triptodur are only indicated for **central** precocious puberty. **Peripheral** precocious puberty is not treated with Lupron Depot-Ped or Triptodur.

   Lupron Depot-Ped (7.5 mg, 11.25 mg, and 15 mg [1-month]) and (11.25 mg and 30 mg [3-month]) and Triptodur (22.5 mg [6 months]) are indicated for this condition.\(^4,48\) The mainstay of treatment for CPP is GnRH analogs.\(^4\) In contrast to CPP, treatment of peripheral precocious puberty (PPP), or GnRH-
independent precocious puberty, depends on the cause (genetic or acquired causes), and is generally not a result of central activation of the hypothalamic-pituitary-gonadal axis.\textsuperscript{11}

**Other Uses with Supportive Evidence**

5. **Gender Reassignment (Female-To-Male [FTM] or Male-To-Female [MTF]).** Approve Lupron Depot for 1 year if prescribed by or in consultation with an endocrinologist or a physician who specializes in the treatment of transgender patients.

The Endocrine Society guideline (2009) for treatment of transsexual persons recommends that adolescents who fulfill eligibility criteria for gender reassignment initially undergo treatment to suppress pubertal development.\textsuperscript{12} The guidelines recommend that suppression of pubertal hormones start when girls and boys first exhibit physical changes of puberty, but no earlier than Tanner stages 2 to 3 (early puberty). According to the guidelines, suppression of pubertal development and gonadal function is most effectively accomplished by GnRH analogs and antagonists. However, since no long-acting GnRH antagonists are available, long-acting analogs are the currently preferred treatment option. An advantage of GnRH therapy is noted to be its reversibility; pubertal suppression can be discontinued and spontaneous pubertal development will resume immediately after stopping GnRH analog therapy. The World Professional Association for Transgender Health (WPATH) Standards of Care (version 7) document also recommends the use of GnRH analogs in both male and female adolescents as a fully reversible intervention for pubertal suppression.\textsuperscript{13} Although too late to block endogenous pubertal development, GnRH analogs can also be used in late pubertal patients to suppress the hypothalamic-pituitary-gonadal axis, potentially allowing for lower doses of cross-sex hormones.\textsuperscript{14} In addition to use in adolescents, GnRH analog therapy is also used in adults, particularly MTF patients.\textsuperscript{15} In the professional opinion of a practicing specialist physician reviewing the available guidelines, we have adopted this criterion.

6. **Ovarian Cancer.** Approve Lupron Depot for 1 year.

In an open-label, prospective trial, women with ovarian cancer (n = 32) that was considered resistant to cytotoxic drugs received leuprolide long-acting 3.75 mg IM once monthly until tumor progression.\textsuperscript{9} Nine patients (28%) experienced clinical benefit (i.e., partial response or remission). In a case series,\textsuperscript{16} leuprolide long acting 7.5 mg IM once monthly was given to five evaluable women with persistent ovarian granulosa cell tumors and led to a partial response in two patients (40%). This response lasted 3 and 11 months, respectively. The NCCN guidelines for ovarian cancer (version 1.2016) recommend leuprolide as a hormonal therapy option in various settings (e.g., adjuvant therapy, recurrence).\textsuperscript{9}

7. **Breast Cancer.** Approve Lupron Depot for 1 year.

In an open-label study, a total of 50 pre- or perimenopausal women with early or late stage breast cancer were randomly allocated to receive either 3.75 mg leuprolide long-acting IM monthly or 11.25 mg IM every 3 months for up to 24 months.\textsuperscript{17} Both preparations suppressed estrogen to a similar extent. In another trial, breast cancer patients with estrogen-receptor positive tumors received endocrine therapy with a variety of products, including leuprolide long-acting (3.75 mg SC every 4 weeks).\textsuperscript{18} GnRH analogues and other LHRH analogs are used for the estrogen-suppressive effects in pre- and perimenopausal women with breast cancer.\textsuperscript{19,20} The NCCN guidelines for breast cancer (version 1.2017) note that LHRH agonist, such as leuprolide, can be used for ovarian suppression.\textsuperscript{8} It is recommended to given leuprolide as monthly injections as the 3-month depots do not reliably suppress estrogen levels in all patients.
8. **Preserve Ovarian Function/Fertility in Patients undergoing Chemotherapy.** Approve Lupron Depot for 1 year.

A case series provided information on leuprolide long-acting 3.75 mg IM monthly which has been used to prevent ovarian insufficiency in premenopausal women undergoing chemotherapy.21 Another prospective, non-randomized study assessed the efficacy of GnRH analogues administered before and in conjunction with chemotherapy conditioning prior to stem cell transplantation.22 The results showed a significant difference in recovery of cyclic ovarian function in patients who received GnRH agonist compared with those who did not receive co-treatment (38.3% vs. 11.1%, respectively; P = 0.006). A Phase II randomized study also demonstrated that leuprolide acetate 3.75 mg IM administered monthly while receiving chemotherapy reduced the risk of developing premature ovarian failure in premenopausal women (n = 220) with breast cancer.23 Approximately 29% of patients in the chemotherapy-only group compared with 17% of patients in the combination chemotherapy and leuprolide group had early menopause (P < 0.01). Results from two meta-analysis demonstrated that temporary ovarian suppression with GnRH agonists can reduce the risk of chemotherapy-induced premature ovarian failure (POF) in young patients with cancer.24-25 The NCCN breast cancer guidelines (version 1.2017) states that randomized trials have shown that ovarian suppression with GnRH agonist therapy administered during adjuvant chemotherapy in premenopausal women with ER-negative tumors may preserve ovarian function and diminish the likelihood of chemotherapy-induced amenorrhea.8 A retrospective cohort study compared 286 patients who had received GnRH agonist therapy with chemotherapy to 188 women who received chemotherapy alone.26 Overall, 87% of the patients who received GnRH therapy with chemotherapy retained cyclic ovarian function (COF) and 13% of patients suffered POF. In the control group 49% of the patients retained COF and 51% of patients suffered POF. Also, 69.3% of patients in the GnRH group vs. 42.3% of patients in the control group conceived; spontaneous pregnancies occurred in 65.6% of women in the GnRH group compared with 37.9% of women in the control group. The NCCN guidelines for breast cancer8 (version 1.2018) and adolescent and young adult oncology (version 2.2018) lists GnRH agonists as one of the fertility preservation options by suppressing menstrual cycles and/or protecting ovaries.

9. **Prophylaxis or Treatment of Uterine Bleeding in Patients with Hematologic Malignancy or Prior to Bone Marrow/Stem Cell Transplantation (BMT/SCT).** Approve Lupron Depot for 1 year.

A clinical practice guideline from the Society of Obstetricians and Gynaecologists of Canada notes that leuprolide acetate or combined hormonal contraception should be considered highly effective in preventing abnormal uterine bleeding when initiated prior to cancer treatment in premenopausal women at risk of thrombocytopenia.28 A commentary published on hormone use for therapeutic amenorrhea and contraception for hematopoietic stem cell transplantation recommends leuprolide 11.25 mg IM every 3 months as the preferred dosing.29 Alternatively, leuprolide 3.75 mg IM can be used if tolerability is a concern, and if tolerated, can redose with leuprolide 11.25 mg IM after 3 weeks. The American College of Obstetricians and Gynecologists (ACOG) committee opinion on prevention and management of heavy menstrual bleeding in adolescent patients undergoing cancer treatment lists leuprolide as an option for patients.27

10. **Abnormal Uterine Bleeding.** Approve for up to 6 months of therapy of Lupron Depot.

Abnormal uterine bleeding (aub) can be classified by the acronym PALM-COEIN (polyp, adenomyosis, leiomyoma, malignancy and hyperplasia, coagulopathy, ovulatory dysfunction, endometrial, iatrogenic, and not yet classified) and classifies uterine bleeding abnormalities by bleeding
pattern as well as by etiology.\textsuperscript{30} The term AUB can also be paired with descriptive terms that describe the associated bleeding pattern such as heavy menstrual bleeding (AUB/HMB) or intermenstrual bleeding (AUB/IMB). GnRH analogues are used as short-term preoperative therapy to reduce uterine and leiomyoma volume; long-term therapy should be limited to patients who have contraindications to other medical or surgical treatments.\textsuperscript{31} They can also be used for acute AUB with an aromatase inhibitor or antagonist to prevent initial estrogen flare and for the treatment of HMB caused by leiomyoma-associated hormonal imbalance.\textsuperscript{32} First-line therapies for medical management include combined oral contraceptives (OCs), conjugated equine estrogen intravenous, and oral progestins. In addition, for long-term management, tranexamic acid, levonorgestrel intrauterine system, and non-steroidal anti-inflammatory drugs (NSAIDs) can also be used.\textsuperscript{33-34}

**CONDITIONS NOT RECOMMENDED FOR APPROVAL**

Lupron Depot, Lupron Depot-Ped, Lupaneta Pack, Eligard, and Triptodur have not been shown to be effective, or there are limited or preliminary data or potential safety concerns that are not supportive of general approval for the following conditions. Rationale for non-coverage for these specific conditions is provided below. (Note: This is not an exhaustive list of Conditions Not Recommended for Approval.)

1. **Hirsutism.** Patients with hirsutism, either idiopathic or due to polycystic ovarian syndrome (PCOS), have received leuprolide long-acting, usually 3.75 mg or 7.5 mg IM monthly.\textsuperscript{35-37} Sometimes conjunctive therapy with estrogen replacement or OCs was used. Patients receiving leuprolide long-acting for up to 6 months experienced positive benefits such as decreases in the Ferriman-Gallwey scores, in hair growth rate and/or in the percentage hair growth rate.\textsuperscript{38-39} The Endocrine Society guidelines (2008) on the treatment of hirsutism in premenopausal women suggest against using GnRH agonists except in women with severe forms of hyperandrogenemia, such as ovarian hyperthecosis, who have had a suboptimal response to OCs and antiandrogens.\textsuperscript{40}

2. **Menstrual Migraine.** Therapies such as NSAIDs, triptans, and propranolol have been used for the treatment or prophylaxis of menstrual migraines.\textsuperscript{39-40} A nonrandomized, 10-month prospective trial\textsuperscript{41} assessed the effects of leuprolide long-acting 3.75 mg IM monthly in five women with severe menstrual migraines who were not responsive to previous treatment. Treatment led to a reduction in mean cumulative monthly headache score. Also, patient global assessment of therapy was positive and a decrease in the use of analgesic medication for headache was noted. A review article notes that GnRH analogues are effective in eliminating menstrual migraines, but their use is limited due to the significant adverse effects of estrogen deficiency, including severe vasomotor symptoms, sleep disruption, and a marked reduction in bone density.\textsuperscript{42}

3. **Polycystic Ovarian Syndrome (PCOS).** Leuprolide long-acting has been used in women with PCOS.\textsuperscript{43} Patients with PCOS receiving leuprolide long acting 3.75 mg IM every 4 weeks plus an OC for six months experienced a restoration of normal ovulatory cycles and a greater reduction in ovarian volume compared with women just receiving an OC. PCOS guidelines from the Endocrine Society (2013)\textsuperscript{44} and review articles\textsuperscript{45-46} do not recommend this as a treatment modality.

4. **Premenstrual Syndrome (PMS).** For PMS, low-dose selective serotonin reuptake inhibitors (SSRIs) [e.g., fluoxetine, sertraline] are recommended as first-line agents for severe PMS.\textsuperscript{47} Other first-line options for PMS include exercise, vitamin B6, combined contraceptive pills, and cognitive behavioral therapy. Use of GnRH analogues results in profound cycle suppression and elimination of PMS symptoms, but these agents should not be used routinely. It is recommended sometimes to aid in the
diagnosis of PMS. Otherwise it is recommended only as a third-line treatment or for the most refractory patients.

5. Coverage is not recommended for circumstances not listed in the Recommended Authorization Criteria. Criteria will be updated as new published data are available.
REFERENCES
1. Lupron Depot® – 1 Month 7.5 mg, 3 Month 22.5 mg, 4 Month 30 mg, 6 Month 45 mg [prescribing information]. North Chicago, IL: AbbVie Inc.; June 2014.
5. Eligard® 7.5 mg, 22.5 mg, 30 mg, and 45 mg [prescribing information]. New York, NY: Sanofi-Synthelabo Inc.; February 2013.

04/25/2018
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OTHER REFERENCES UTILIZED
## HISTORY

<table>
<thead>
<tr>
<th>Type of Revision</th>
<th>Summary of Changes</th>
<th>TAC Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected revision</td>
<td>Added Lupaneta Pack as a target drug. Also added criterion to approve Lupron Depot or Lupaneta Pack for 6 months for recurrence of symptoms.</td>
<td>02/05/2014</td>
</tr>
<tr>
<td>Annual revision</td>
<td>No criteria changes</td>
<td>06/04/2014</td>
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<tr>
<td>Annual revision</td>
<td>Deleted BPH, Functional bowel syndrome/IBS, Orchitis/epididymo-Orchitis from Conditions Not Recommended for Approval due to lack of new studies.</td>
<td>6/10/2015</td>
</tr>
<tr>
<td>Early annual revision</td>
<td>Added approval condition for gender reassignment use. Also added note to central precocious puberty indication to highlight central vs. peripheral precocious puberty.</td>
<td>03/16/2016</td>
</tr>
<tr>
<td>Selected revision</td>
<td>Under Other uses with Supportive Evidence, for “Preserve ovarian function/fertility in women undergoing chemotherapy” and “Prophylaxis or treatment of uterine bleeding in women with hematologic malignancy or prior to bone marrow/stem cell transplantation”, changed “women” to “patients”. Only wording change; no change in clinical intent.</td>
<td>08/11/2016</td>
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<tr>
<td>Annual revision</td>
<td>No criteria changes</td>
<td>04/05/2017</td>
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<tr>
<td>Selected revision</td>
<td>Added Triptodur to drug targets and for approval in central precocious puberty. Deleted approval of Lupron-Depot Ped for off-label uses.</td>
<td>10/04/2017</td>
</tr>
<tr>
<td>Annual revision</td>
<td>No criteria changes</td>
<td>04/25/2018</td>
</tr>
<tr>
<td>Selected revision</td>
<td>Updated Lupron Depot and Lupaneta Pack endometriosis criterion: removed initial and recurrent management of symptoms. Added a requirement for a trial of a contraceptive or progesterone product, continuing pain after treatment with these agents, and prescribing by an obstetrician-gynecologist or a health care practitioner who specializes in the treatment of women’s health. Also removed Eligard from the approval condition for gender reassignment use.</td>
<td>10/03/2018</td>
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</table>

TAC – Therapeutic Assessment Committee; * For a further summary of criteria changes, refer to respective TAC minutes available at: [http://esidepartments/sites/Dep043/Committees/TAC/Forms/AllItems.aspx](http://esidepartments/sites/Dep043/Committees/TAC/Forms/AllItems.aspx); BPH – Benign prostatic hyperplasia; IBS – Irritable bowel syndrome.