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## Treatment of Hyperhidrosis

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### Policy

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#### Primary Focal Hyperhidrosis

Treatment of primary (focal) hyperhidrosis using the following therapies (see Table 1) may be considered **medically necessary** when 1 or more of the following medical conditions are present:

- Acrocyanosis of the hands or
- History of persistent eczematous dermatitis in spite of medical treatments with topical dermatological or systemic anticholinergic agents or
- History of recurrent secondary infections or
- History of recurrent skin maceration with bacterial or fungal infections

**Table 1. Treatment of primary hyperhidrosis considered medically necessary or investigational**

Focal Regions	Treatments that may be considered Medically Necessary (if a medical condition from the list above is present)	Treatments Considered Investigational (but not limited to):
<i>Axillary (underarm)</i>	<ul style="list-style-type: none"> <li>• Aluminum chloride 20% topical solution*</li> <li>• Botulinum toxin (if not adequately managed with topical agents, in patients 18 years old and older)</li> <li>• Endoscopic transthoracic sympathectomy [ETS] if conservative treatment has failed (i.e., aluminum chloride or botulinum toxin, individually and in combination)</li> <li>• Iontophoresis</li> <li>• Surgical excision of axillary sweat glands, if conservative treatment has failed (i.e., aluminum chloride or botulinum toxin, individually and in combination)</li> </ul>	<ul style="list-style-type: none"> <li>• Axillary liposuction</li> <li>• Microwave treatment</li> </ul>
<i>Palmar (palm of hand)</i>	<ul style="list-style-type: none"> <li>• Aluminum chloride 20% topical solution*</li> <li>• Botulinum toxin type A products (if not adequately managed with topical agents, in patients 18 years and older)</li> <li>• ETS, if conservative treatment has failed (i.e., aluminum chloride or botulinum toxin type A, individually and in combination)</li> <li>• Iontophoresis</li> </ul>	<ul style="list-style-type: none"> <li>• RimabotulinumtoxinB</li> <li>• Microwave treatment</li> <li>• Radiofrequency ablation</li> </ul>

<i>Plantar (sole of foot)</i>	<ul style="list-style-type: none"> <li>Aluminum chloride 20% topical solution*</li> <li>Botulinum toxin type A (if not adequately managed with topical agents)</li> <li>Iontophoresis</li> </ul>	<ul style="list-style-type: none"> <li>Lumbar sympathectomy</li> <li>Microwave treatment</li> </ul>
<i>Craniofacial (head/face)</i>	<ul style="list-style-type: none"> <li>Aluminum chloride 20% topical solution*</li> <li>Botulinum toxin type A products (if not adequately managed with topical agents)</li> <li>ETS, if conservative treatment has failed (i.e., aluminum chloride)</li> </ul>	<ul style="list-style-type: none"> <li>Iontophoresis</li> <li>Microwave treatment</li> </ul>

Aluminum chloride solution is approved by FDA for treatment of primary hyperhidrosis. At least 1 botulinum toxin product is FDA-approved for treatment in adults of severe axillary hyperhidrosis inadequately managed by topical agents.

ETS: endoscopic transthoracic sympathectomy; FDA: Food and Drug Administration.

Ongoing/repeat treatments may be considered **medically necessary** to maintain improvements in physical function.

Treatment of primary (focal) hyperhidrosis is considered **not medically necessary** in the absence of physical functional impairment or any of the medical conditions in the list above.

## Secondary Hyperhidrosis

Treatment of severe secondary (gustatory) hyperhidrosis may be considered **medically necessary** when 1 or more of the following medical conditions are present:

- Diabetic neuropathies
- Encephalitis
- Frey syndrome
- Herpes zoster parotitis
- Parotid abscess
- Syringomyelia

## Table 2. Treatment of secondary hyperhidrosis considered medically necessary or investigational

Treatments that may be considered Medically Necessary (if a medical condition from the list above is present)	Treatments considered Investigational (but not limited to):
<ul style="list-style-type: none"> <li>Aluminum chloride 20% topical solution*</li> <li>Botulinum toxin type A</li> <li>Surgical options, (i.e. tympanic neurectomy), if conservative treatment has failed</li> </ul>	<ul style="list-style-type: none"> <li>Iontophoresis</li> </ul>

\*FDA approved indication.

Treatment of secondary (gustatory) hyperhidrosis is considered **not medically necessary** in the absence of a physical functional impairment or for other medical conditions not listed above.

## Related Policies

None

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## Policy Guidelines

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A multispecialty working group defines primary focal hyperhidrosis as a condition characterized by visible, excessive sweating of at least 6 months' duration without apparent cause and with 2 or more of the following features:

- Age at onset younger than 25 years old
- Bilateral and relatively symmetric sweating

- Family history of focal hyperhidrosis
- Focal sweating stops during sleep
- Frequency of focal hyperhidrosis is at least once per week
- Impairment of daily activities

## Disease Severity Measurement using the Hyperhidrosis Disease Severity Scale (HDSS)

The HDSS questionnaire provides a quantitative measure of severity and impact on daily life before and after treatment for hyperhidrosis. Patients rate their symptom severity using the following scale:

1. My underarm sweating is never noticeable and never interferes with my daily activities.
2. My underarm sweating is tolerable but sometimes interferes with my daily activities.
3. My underarm sweating is barely tolerable and frequently interferes with my daily activities.
4. My underarm sweating is intolerable and always interferes with my daily activities.

Scoring: 1:mild, 2:moderate, 3-4:severe

## Coding

CPT	
32664	Thoracoscopy, surgical; with thoracic sympathectomy

Botulinum toxin products are unique biologic agents and are not interchangeable with each other. (See [Regulatory Status](#)).

**Note:** This policy provides medical guidelines that are appropriate for the majority of individuals with a particular disease, illness, or condition. Unique clinical circumstances may warrant individual consideration, based on a review of applicable medical records.

## Definition of Terms

- **Cosmetic:** In this policy, cosmetic services are those which are primarily intended to preserve or improve appearance. Cosmetic surgery is performed to reshape normal structures of the body in order to improve the patient's appearance or self-esteem.
- **Physical Functional Impairment:** In this policy, physical functional impairment means a limitation from normal (or baseline level) of physical functioning that may include, but is not limited to, problems with ambulation, mobilization, communication, respiration, eating, swallowing, vision, facial expression, skin integrity, distortion of nearby body parts or obstruction of an orifice. The physical functional impairment can be due to structure, congenital deformity, pain, or other causes. Physical functional impairment excludes social, emotional and psychological impairments or potential impairments.
- **Reconstructive Surgery:** In this policy, reconstructive surgery refers to surgeries performed on abnormal structures of the body, caused by congenital defects, developmental abnormalities, trauma, infection, tumors or disease. It is generally performed to improve function.

## Description

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Hyperhidrosis, or excessive sweating, can lead to impairments in psychological and social functioning. Various treatments for hyperhidrosis are available, such as topical agents, oral medications, botulinum toxin, and surgical procedures.

## Background

Hyperhidrosis has been defined as excessive sweating, beyond a level required to maintain normal body temperature, in response to heat exposure or exercise. It can be classified as primary or secondary. Primary focal hyperhidrosis is idiopathic in nature, typically involving the hands (palmar), feet (plantar), or axillae (underarms). Secondary hyperhidrosis can result from a variety of drugs (eg, tricyclic antidepressants, selective serotonin reuptake inhibitors) or underlying diseases/conditions (eg, febrile diseases, diabetes mellitus, menopause). Secondary hyperhidrosis is usually generalized or craniofacial sweating.

Secondary gustatory hyperhidrosis is excessive sweating on ingesting highly spiced foods. This trigeminovascular

reflex typically occurs symmetrically on the scalp or face and predominately over the forehead, lips, and nose. Secondary facial gustatory hyperhidrosis occurs independently of the nature of the ingested food. This phenomenon frequently occurs after injury or surgery in the region of the parotid gland.

Frey syndrome is an uncommon type of secondary gustatory hyperhidrosis that arises from injury to or surgery near the parotid gland resulting in damage to the secretory parasympathetic fibers of the facial nerve. After injury, these fibers regenerate, and miscommunication occurs between them and the severed postganglionic sympathetic fibers that supply the cutaneous sweat glands and blood vessels. The aberrant connection results in gustatory sweating and facial flushing with mastication. Aberrant secondary gustatory sweating follows up to 73% of surgical sympathectomies and is particularly common after bilateral procedures.

The consequences of hyperhidrosis are primarily psychosocial in nature. Symptoms such as fever, night sweats, or weight loss require further investigation to rule out secondary causes. Sweat production can be assessed with the Minor starch iodine test, which is a simple qualitative measure to identify specific sites of involvement.

## **Therapeutic Options**

A variety of therapies have been investigated for primary hyperhidrosis, including topical therapy with aluminum chloride, oral anticholinergic medications, iontophoresis, intradermal injections of botulinum toxin, endoscopic transthoracic sympathectomy, and surgical excision of axillary sweat glands. Treatment of secondary hyperhidrosis focuses on treatment of the underlying cause, such as discontinuing certain drugs or hormone replacement therapy as a treatment of menopausal symptoms.

### ***Botulinum Toxin***

Botulinum toxin is a potent neurotoxin that blocks cholinergic nerve terminals; symptoms of botulism include cessation of sweating. Therefore, intracutaneous injections have been investigated as a treatment of gustatory hyperhidrosis and focal primary hyperhidrosis, most frequently involving the axillae or palms. The drawback of this approach is the need for repeated injections, which have led some to consider surgical approaches.

### ***Surgical Intervention***

Surgical treatment options include removal of the eccrine glands and/or interruption of the sympathetic nerves. Eccrine sweat glands produce an aqueous secretion, the overproduction of which is primarily responsible for hyperhidrosis. These glands are innervated by the sympathetic nervous system. Surgical removal has been performed in patients with severe isolated axillary hyperhidrosis.

Various surgical techniques of sympathectomy have been tested. The second (T2) and third (T3) thoracic ganglia are responsible for palmar hyperhidrosis, the fourth (T4) thoracic ganglion controls axillary hyperhidrosis, and the first (T1) thoracic ganglion controls craniofacial hyperhidrosis. Thoracic sympathectomy has been investigated as a potentially curative procedure, primarily for combined palmar and axillary hyperhidrosis unresponsive to nonsurgical treatments. While accepted as an effective treatment, sympathectomy is not without complications. In addition to the immediate surgical complications of pneumothorax or temporary Horner syndrome, compensatory sweating on the trunk generally occurs in most patients, with different degrees of severity. Medical researchers have investigated whether certain approaches (eg, T3 sympathectomy vs T4 sympathectomy) result in less compensatory sweating, but there remains a lack of consensus about which approach best minimizes the risk of this adverse effect. In addition, with lumbar sympathectomy for plantar hyperhidrosis, there has been concern about the risk of postoperative sexual dysfunction in both men and women.

### ***Iontophoresis***

Topical iontophoresis (the use of an electric current to introduce various ions through the skin) is a long-standing treatment of palmar or plantar hyperhidrosis and recently adapted for axillary hyperhidrosis. The mechanism of action is not precisely known, but is thought to be related to plugging of the sweat gland pores. The U.S. Food and Drug Administration (FDA) regulates iontophoresis devices via the 510(k) process.

In tap water iontophoresis (TWI) treatment, the patient places his/her hands or feet into a tap water bath that contains two electrodes, or positions an electrode device in the armpit(s). A small electric current passes through the electrodes. Patients are treated for 20-30 minutes, with treatments every 2 to 3 days for 5 to 10 sessions before an effect is observed. After euhidrosis (perspiration cessation) is achieved, maintenance therapy may

consist of treatment every 1-4 weeks after the initial therapy. Iontophoresis is primarily used for focal palmo-plantar hyperhidrosis, since the hands and feet are the easiest body parts to submerge in water.

Outcomes from different surgical and medical treatment modalities are best assessed using a combination of tools. Quantitative tools include gravimetry, evaporimetry, and the Minor starch iodine test. Qualitative assessment tools include general health surveys and hyperhidrosis-specific surveys. Of these, the Hyperhidrosis Disease Severity Scale (see Policy Guidelines) has had good correlation to other assessment tools and is practical in the clinical setting.

## Regulatory Status

Drysol™ (aluminum chloride [hexahydrate] 20% topical solution, Person and Covey, Inc.) is approved by the U.S. Food and Drug Administration (FDA) to be used as an aid in the management of hyperhidrosis in the axillae (underarms), palmar (palms of hands), plantar (bottom of feet), and craniofacial (head and face) areas; it is available by prescription.

In 2004 the FDA approved botulinum toxin type A (Botox®) to treat primary axillary hyperhidrosis (severe underarm sweating) that cannot be managed by topical agents. In 2009, this product was renamed to OnabotulinumtoxinA. FDA-approved botulinum toxin\* products include:

- 2000: RimabotulinumtoxinB, marketed as Myobloc® (Solstice Neurosciences)
- 2004/2009: OnabotulinumtoxinA, marketed as Botox® (Allergan, Inc.)
- 2009: AbobotulinumtoxinA, marketed as Dysport® (Medicis Pharmaceutical Corporation, Scottsdale, AZ)
- 2010: IncobotulinumtoxinA, marketed as Xeomin® (Merz Pharmaceuticals)

**Note:** Not all of these botulinum toxin products are indicated for treatment of hyperhidrosis.

On July 31, 2009, the FDA approved the following revisions to the prescribing information of botulinum toxin products:

- A Boxed Warning highlighting the possibility of experiencing potentially life-threatening distant spread of toxin effect from injection site after local injection.
- A Risk Evaluation and Mitigation Strategy (REMS) that includes a Medication Guide to help patients understand the risk and benefits of botulinum toxin products.
- Changes to the established drug names to reinforce individual potencies and prevent medication errors. The potency units are specific to each botulinum toxin product, and the doses or units of biological activity cannot be compared or converted from one product to any other botulinum toxin product. The new established names reinforce these differences and the lack of interchangeability among products.

In January 2011, the miraDry® System (Miramar Labs, Inc.; Sunnydale, CA) was cleared by the FDA through the 510(k) process for treating primary axillary hyperhidrosis. This is a microwave device designed to heat tissue at the dermal-hypodermal interface, the location of the sweat glands. Treatment consists of two sessions of approximately one hour in duration. Sessions occur in a physician's office and local anesthetic is used. FDA Product Codes: NEY, OUB, MWY.

The U.S. Food and Drug Administration (FDA) regulates iontophoresis devices via the 510(k) process. Some machines are only for use by professionals in the office setting. Two devices, commercially available by prescription for home use, are the Drionic® device (General Medical Co., Los Angeles, CA) and the Fisher™ MD-1a Galvanic Unit (R.A. Fischer Co., Northridge, CA). FDA Product Code: EGJ

## Scope

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Medical policies are systematically developed guidelines that serve as a resource for Company staff when determining coverage for specific medical procedures, drugs or devices. Coverage for medical services is subject to the limits and conditions of the member benefit plan. Members and their providers should consult the member benefit booklet or contact a customer service representative to determine whether there are any benefit limitations applicable to this service or supply. This medical policy does not apply to Medicare Advantage.

# Benefit Application

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Nonsurgical agents may be covered under a pharmacy benefit.

## Rationale

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Populations	Interventions	Comparators	Outcomes
Individuals: • With primary focal hyperhidrosis (ie, axillary, palmar, plantar, craniofacial)	Interventions of interest are: • Iontophoresis	Comparators of interest are: • Topical antiperspirant • Oral medication • Botulinum toxin	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With primary axillary hyperhidrosis	Interventions of interest are: • Botulinum toxin type A or B	Comparators of interest are: • Topical antiperspirant • Oral medication	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With primary palmar hyperhidrosis	Interventions of interest are: • Botulinum toxin type A	Comparators of interest are: • Topical antiperspirant • Oral medication	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With primary palmar hyperhidrosis	Interventions of interest are: • Botulinum toxin type B	Comparators of interest are: • Topical antiperspirant • Oral medication	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With primary plantar hyperhidrosis	Interventions of interest are: • Botulinum toxin type A or B	Comparators of interest are: • Topical antiperspirant • Oral medication	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With primary focal hyperhidrosis (ie, axillary, palmar, plantar, craniofacial)	Interventions of interest are: • Microwave treatment	Comparators of interest are: • Topical antiperspirant • Oral medication • Botulinum toxin	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With primary focal hyperhidrosis (ie, axillary, palmar, plantar, craniofacial)	Interventions of interest are: • Radiofrequency ablation	Comparators of interest are: • Topical antiperspirant • Oral medication • Botulinum toxin	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With primary axillary hyperhidrosis	Interventions of interest are: • Surgical excision of axillary sweat glands	Comparators of interest are: • Topical antiperspirant • Oral medication • Botulinum toxin	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With primary axillary and palmar hyperhidrosis	Interventions of interest are: • Endoscopic transthoracic sympathectomy	Comparators of interest are: • Topical antiperspirant • Oral medication • Botulinum toxin	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With primary plantar hyperhidrosis	Interventions of interest are: • Lumbar sympathectomy	Comparators of interest are: • Topical antiperspirant • Oral medication	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With severe secondary gustatory hyperhidrosis	Interventions of interest are: • Iontophoresis • Botulinum toxin	Comparators of interest are: • Diet • Topical medications	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity
Individuals: • With severe secondary gustatory hyperhidrosis	Interventions of interest are: • Tympanic neurectomy	Comparators of interest are: • Diet • Topical medications	Relevant outcomes include: • Symptoms • Quality of life • Treatment-related morbidity

This policy was created in 1999 and has been reviewed/updated annually with searches of the MEDLINE database. The most recent literature search was performed through April, 2016. Following is a summary of the key literature to date.

## **Treatment for Primary Focal Hyperhidrosis (ie, Axillary, Palmar, Plantar, Craniofacial)**

### ***Iontophoresis***

The published literature on iontophoresis as a treatment of hyperhidrosis is sparse. A 2003 TEC Assessment on iontophoresis for a variety of medical conditions concluded that the evidence was insufficient to determine whether its impact on the treatment of any type of hyperhidrosis exceeded those of placebo or an alternative treatment. (1) TEC Assessment investigators identified only 3 small studies (range, N-18 patients), all of which were conducted in patients with palmar hyperhidrosis.

Several case series and 1 randomized controlled trial (RCT) have been identified since 2003. The RCT compared iontophoresis to an alternative intervention but did not provide data on the efficacy of this therapy compared with placebo. (2) In 2014, Rajagopal et al in India compared iontophoresis to botulinum toxin in patients with palmar hyperhidrosis. The trial included 60 patients with had a baseline Hyperhidrosis Disease Severity Scale (HDSS) score of 3 or 4 (see Appendix Table 1 for scoring). (3) Patients were randomized to treatment with iontophoresis 3 times weekly or to 1 botulinum toxin injection in each hand, with 2 weeks between treatments. HDSS scores were recorded at 4 weeks; nonresponders were permitted to crossover to the other treatment arm. At the end of the initial 4 weeks, improvement (defined as decrease of at least 1 point in HDSS score) was identified in 24 (80%) of 30 patients in the botulinum toxin group and 14 (47%) of 30 patients in the iontophoresis group ( $p=0.007$ ). Sixteen patients in the iontophoresis arm crossed over to the botulinum toxin arm, with 12 showing excellent improvement after an additional 4 weeks. In contrast, only 1 of the 6 patients who crossed over to the iontophoresis arm showed improvement after a second 4-week treatment period. In this relatively small sample with a relatively short intervention period, iontophoresis was less effective than botulinum toxin.

Among the case series is a 2014 retrospective study from Turkey that included 21 pediatric patients under age 18. (4) Most patients ( $n=16$ ) had palmoplantar hyperhidrosis. Nineteen patients completed the course of 21 tap water iontophoresis sessions. Among study completers, mean self-report treatment effectiveness score, rated on a 0-to-10 visual analog scale, was 6.36 at the end of treatment. Seventeen (89.5%) of 19 patients reported a 50% or more decrease in sweating at the end of treatment. Another representative series is a 2013 study from Ireland that included 28 patients. (5) Patients received a minimum of 9 treatments over 21 days in a clinical setting. Twenty (80%) of the 25 patients for whom data were available after hospital administration of tap water iontophoresis reported a moderate or great amount of improvement in symptoms and a moderate or great improvement in quality of life,

### **Section Summary: Iontophoresis**

It is acknowledged that only small case series provide limited evidence that iontophoresis is an effective treatment of focal hyperhidrosis. The single RCT found that iontophoresis was less effective than botulinum toxin in the short-term treatment of palmar hyperhidrosis. RCTs are needed to show that iontophoresis is more effective than placebo treatment and/or appropriately designed trials to demonstrate that iontophoresis is at least as effective as alternative therapies. However, after topical aluminum chloride, iontophoresis is a second line treatment that may be considered for palmar or plantar focal hyperhidrosis, but is frequently too irritating for regular use in the axilla, and craniofacial applications.

### **Botulinum Toxins**

Several RCTs address botulinum toxin injections for treatment of axillary and palmar hyperhidrosis. (6-10) The discussion will be grouped by region and toxin type as dictated by trial.

### ***Primary Axillary Hyperhidrosis Treated With Botulinum Toxin Type A or B***

One of the larger RCTs was published in 2007. (6) This trial was an industry-sponsored, multicenter, double-blind, placebo-controlled efficacy and safety study of botulinum toxin type A in patients with persistent bilateral primary axillary hyperhidrosis. Enrollment criteria included a resting sweat production of at least 50 mg/axilla in 5 minutes and an HDSS score of 3 or 4 (see Policy Guidelines). A total of 322 patients were randomized to botulinum toxin

type A (onabotulinumtoxinA) 50 U or 75 U or placebo. Retreatment after 4 weeks was allowed in patients with at least 50 mg of sweat (per axilla) over 5 minutes and an HDSS score of 3 or 4. Following the first injection, 75% of patients in the botulinum toxin type A groups showed at least a 2-point improvement in HDSS score, compared with 25% of patients in the placebo group. Sweat production decreased by 87% (75 U), 82% (50 U), and 33% (placebo). (Similar results were obtained in patients requiring a second treatment.) Median duration of effect was 197 (75 U), 205 (50 U), and 96 days (placebo). Seventy-eight percent (n=252) of patients completed the 52-week trial: 96 (87%) of 110 in the 75-U group, 83 (80%) of 104 in the 50-U group, and 73 (68%) of 108 in the control group. Intention-to-treat analysis at 52 weeks showed more than 2-point improvement on HDSS score in 54 (49%) patients in the 75-U group, 57 (55%) in the 50-U group, and 6 (6%) in the placebo group. Injection-site pain was reported in approximately 10% of all groups, with a mean pain duration of 2.4 days (10-day maximum).

In 2005 Baumann et al reported on a placebo-controlled RCT evaluating use of botulinum toxin type B for axillary hyperhidrosis. Like another Baumann trial (reported below), this RCT did not address whether patients had failed previous treatments for hyperhidrosis. The axillary hyperhidrosis trial included 20 patients who received subcutaneous injections of rimabotulinumtoxinB 2500 U or 0.5 mL per axilla (n=15) or placebo (n=5).<sup>(8)</sup> Patients who received placebo were offered botulinum toxin type B, at subsequent injections. Data were available on efficacy for the 18 patients (15 in the initial botulinum toxin B group and 3 crossovers). There was a statistically significant improvement in axillary hyperhidrosis from baseline (before receiving an active injection) to day 30, according to patient and physician assessment. Details on efficacy outcomes were not reported. Mean length of time to return to baseline sweating levels in these 18 patients was 151 days (range, 66-243 days). Sixteen patients reported 61 adverse events during the study. Five (8%) of 61 adverse events were determined to be trial related: 4 axillary bruising events and 1 instance of injection-site pain. Eleven (18%) adverse events were determined to be probably related to the trial: dry eyes (n=3), dry mouth (n=5), and indigestion (n=3). Flu-like symptoms were reported by 6 (30%) of 20 patients; however, the trial period coincided with flu season. In 2010, Dresser et al published an RCT including 46 patients with bilateral axillary hyperhidrosis and a previously stable onabotulinumtoxin A treatment for at least 2 years. (11) Patients received onabotulinumtoxinA 50 U in 1 randomly selected axilla and incobotulinumtoxinA 50 MU in the other axilla. All patients completed the study. According to patient self-report in structured interviews, there were no between-group differences in therapeutic effect, including onset latency, extent, and duration, and no differences in injection-site pain. Moreover, clinical examination did not identify any differences between the 2 sides in the diffuse sweating pattern.

A small, double-blind RCT published in 2007 by Talarico-Filho et al included 20 patients with primary axillary hyperhidrosis who had sweat production greater than 50 mg/minute.<sup>(12)</sup> Patients received injections of 2 types of botulinum toxin A: onabotulinumtoxinA 50 U in 1 axilla and abobotulinumtoxinA 150 U in the other. Outcomes did not differ significantly between groups (eg, sweat rate was reduced by a mean of 98% in the onabotulinumtoxinA group and 99% in the abobotulinumtoxinA group;  $p>0.05$ ).

A few RCTs have compared botulinum toxin types A and B in patients with primary axillary hyperhidrosis. In 2011, Frasson et al conducted a small randomized trial of axillary hyperhidrosis treated with botulinum toxin type A and type B.<sup>(13)</sup> This trial included 10 patients with idiopathic focal axillary hyperhidrosis unresponsive to other nonsurgical treatments. Patients received onabotulinumtoxinA 50U in 1 axilla and rimabotulinumtoxinB 2500 U in the contralateral axilla. Gravimetry was performed at baseline and follow-up as an objective measure sweat production. At each follow-up point, the decrease in sweat weight from baseline was significantly greater on the type B side than on the type A side. For example, after 1 month, the sweat weight in 5 minutes was 13% of the baseline value on the type A side and 4% of the baseline value on the type B side ( $p=0.049$ ). By 6 months, the sweat weight returned to 91% of baseline on the type A side and to 56% of baseline weight on the type B side ( $p=0.02$ ). Findings were similar for sweating area. All patients tolerated injections of types A and B well, and none reported systemic adverse effects. This trial did use a higher dosage of botulinum toxin type B than previous studies.

A 2015 RCT by An et al randomly assigned 24 patients with symmetrical axillary hyperhidrosis to receive injections of onabotulinumtoxinA 50 U in 1 axilla and rimabotulinumtoxinB 1500 U in the other (ie, a conversion rate of 1:30 was used).<sup>14</sup> Baseline HDSS scores were 2 (n=9), 3 (n=14), and 4 (n=1); those who scored 3 or 4 were categorized as having severe axillary hyperhidrosis. The primary efficacy outcome (the proportion of patients with an HDSS score of 1 or 2 at the 2-week follow-up) was 100% in each group ( $p=1.00$ ). At 12 weeks, all patients still had a score of 1 or 2 on the HDSS ( $p=1.00$ ) and at 20 weeks, 80% in each group had an HDSS score of 1 or 2 ( $p=1.00$ ). A decrease of 2 points or more from baseline on the HDSS was reported at week 2 in 86.7% in each group ( $p=1.00$ ); at week 12, the same decrease was reported in 80.0% in the botulinum toxin type A group and 86.7% in the botulinum toxin type B group ( $p=0.64$ ); and at week 20, the same decrease was only reported in 13.3% of the botulinum toxin type A group and in 6.7% of the botulinum toxin type B group ( $p=0.56$ ). No major systemic adverse effects were reported in any patients.



### ***Primary Palmar Hyperhidrosis Treated With Botulinum Toxin Type A***

Two double-blind randomized trials compared onabotulinumtoxinA and incobotulinumtoxinA. In 2014, Campanati et al included 25 patients with moderate-to-severe primary palmar hyperhidrosis resistant to aluminum chloride or iontophoresis. (15) Patients received injections of incobotulinumtoxinA in a randomly selected hand and onabotulinumtoxinA in the other hand. Botulinum toxin was given at a fixed dosage per square centimeter of the hand. There were no statistically significant differences in outcomes between groups. This included changes in HDSS score and the extent of sweating assessed using the Minor test.

### ***Primary Palmar Hyperhidrosis Treated With Botulinum Toxin Type B***

In another 2005 placebo-controlled, randomized, Baumann et al evaluated botulinum toxin type B for palmar hyperhidrosis. Like the previous Baumann trial, this RCT did not discuss whether patients had failed previous treatments for hyperhidrosis. This RCT included 20 patients with excessive palmar sweating. (7) Fifteen patients received injections of rimabotulinumtoxinB, 50,000 U per palm and 5 received placebo. Nonresponders were offered an injection of botulinum toxin type B at day 30. At day 30, the 2 quality-of-life measures were significantly better in the botulinum toxin group than in the control group. However, the difference was not statistically significant for efficacy in physician analysis of the palmar iodine starch test at day 30 ( $p=0.56$ ). No further details were provided on the efficacy outcome measures. Mean duration of action according to self-report in 17 patients (15 in the initial treatment group, 2 who crossed over from the placebo group) was 3.8 months (range, 2.3-4.9 months). Patients were asked about specific adverse events: 18 (90%) of 20 reported dry mouth/throat, 12 (60%) reported indigestion, 12 (60%) reported excessively dry hands, 12 (60%) reported muscle weakness, and 10 (50%) reported decreased grip strength.

### ***Primary Plantar Hyperhidrosis Treated With Botulinum Toxin Type A or B***

There is a lack of RCTs on use of any botulinum toxin formulation for plantar hyperhidrosis.

### **Section Summary: Botulinum Toxins**

Evidence from RCTs supports the efficacy and safety of botulinum toxin for treating axillary hyperhidrosis. In addition, RCTs have found similar outcomes among botulinum type A formulations and between botulinum type A and B. For palmar hyperhidrosis, evidence from RCTs supports the efficacy and safety of botulinum toxin type A for treating palmar hyperhidrosis but 1 small RCT did not clearly demonstrate efficacy of botulinum toxin type B. There is a lack of RCTs on use of any botulinum toxin formulation for plantar hyperhidrosis.

### **Microwave Treatment**

A 2012 RCT evaluated a microwave device for treating primary focal hyperhidrosis.(16) This device applies microwave energy to superficial skin structures with the intent of inducing thermolysis of the eccrine and apocrine sweat glands. This industry-sponsored, double-blind trial randomized 120 adults with primary axillary hyperhidrosis 2:1 to active ( $n=81$ ) or sham ( $n=39$ ) treatment. Treatment consisted of 2 sessions, separated by approximately 2 weeks. Patients who responded adequately after 1 session or declined further treatment did not undergo the second session; a third procedure was allowed within 30 days for patients who still had a high level of sweating after 2 sessions. All patients in the sham group had 2 sessions. In the active treatment group, 11 (9%) patients had 1 session, 60 (74%) had 2 sessions, and 10 (8%) patients had 3 sessions. The primary efficacy end point was an HDSS score of 1 or 2 (see Appendix Table 1) at the 30-day follow-up; HDSS score at 6 months was a secondary outcome. A total of 101 (84%) of 120 patients completed the study. At 30 days, 89% of the active treatment group and 54% of the sham group had an HDSS score of 1 or 2 ( $p<0.001$ ). At 6 months, 67% of the active treatment group versus 44% of the sham group had an HDSS score of 1 or 2 ( $p=0.02$ ). Unblinding occurred at 6 months. Twelve-month data were available for the active treatment group only; 69% reported an HDSS score of 1 or 2. There were 45 procedure-related adverse events in 23 (28%) of the active treatment group versus 5 (13%) of the sham group. The most frequently reported adverse event was altered sensation; no serious adverse events were reported. Compensatory sweating was reported by 2 patients in each group (mean duration, 52 days). The authors noted that study data provided an opportunity to identify areas for improvement in the treatment protocol including waiting longer between treatments and using a higher dose of energy at the second session.

A 2012 industry-sponsored case series reported on 31 patients with primary axillary hyperhidrosis treated with

microwave therapy using the miraDry system.(17) All patients had an HDSS score of 3 or 4 at baseline. The primary efficacy outcome (the proportion of patients whose HDSS score decreased to 1 or 2) was 28 (90%) at 6 and 12 months posttreatment. Longer term skin-related adverse effects (that all resolved over time) were altered sensation in the skin of the axillae (65% of patients; median duration, 37 days) and palpable bumps under the skin of the axillae (71% of patients; median duration, 41 days).

### **Section Summary: Microwave Treatment**

One RCT and case series provide insufficient evidence that microwave treatment improves the health outcome for primary focal hyperhidrosis. The RCT reported short-term benefit of microwave treatment in reducing hyperhidrosis, but also reported a high rate of skin-related adverse effects (eg, pain, altered sensation). Additional controlled trials with long-term follow-up in the treatment and control groups, a longer period of blinding, and a consistent treatment protocol are needed to confirm the efficacy of this treatment and to better define the risk-benefit ratio.

### **Radiofrequency Ablation**

A 2013 study evaluated radiofrequency ablation (RFA) as a treatment for patients with severe bilateral palmar hyperhidrosis resistant to conservative treatment.(18) The study was conducted in Turkey and retrospectively reviewed outcomes after RFA (n=48) or transthoracic sympathectomy (n=46). Patients were not randomized to treatment group. After a mean follow-up of 15 months, palmar hydrosis was absent in 36 (75%) patients in the RFA group versus 44 (96%) patients in the surgery group. The difference in outcomes between groups was statistically significant, favoring the surgical intervention ( $p<0.01$ ). Six patients in each group reported moderate or severe compensatory sweating ( $p=0.78$ ).

### **Section Summary: Radiofrequency Ablation**

One nonrandomized comparative study represents insufficient evidence for RFA as a treatment of hyperhidrosis. In this single available study, RFA was inferior to surgical sympathectomy.

### **Surgical Interventions**

#### **Surgical Excision of Axillary Sweat Glands**

Surgery may involve removal of the subcutaneous axillary sweat glands without removal of any skin, limited excision of skin, and removal of surrounding subcutaneous sweat glands, or a more radical excision of skin and subcutaneous tissue en bloc. (19) Depending on the completeness of surgical excision, treatment is effective in 50% to 95% of patients.

#### **Endoscopic Transthoracic Sympathectomy**

Several RCTs and 1 meta-analysis have compared different surgical approaches; there were no sham-controlled RCTs. In 2011, Deng et al published a meta-analysis of data from RCTs and observational studies published to 2010 that evaluated endoscopic thoracoscopic sympathectomy for patients with palmar hyperhidrosis.(20) The authors pooled outcome data from different approaches to sympathectomy (ie, single-ganglia blockage [T2, T3, T4], multiganglia blockage [T2-3, T2-4, T3-4]). (Note that T refers to rib.) Based on these analyses, the reviewers concluded that T3 (11 studies) and T3-4 (2 studies) had the “best” clinical efficacy (ie, postoperative resolution of symptoms). The T3 approach resulted in a 97.9% pooled efficacy rate, and the T3-4 approach resulted in a 100% pooled efficacy rate. In the studies for which data were available, the pooled rate of postoperative compensatory sweating was 40% after T3 surgery. Data on compensatory sweating after T3-4 surgery were available from only 1 study (60 patients); a pooled analysis could not be performed.

Subsequent RCTs have compared levels of sympathectomy. These trials tended to have relatively small sample sizes (ie, <100 patients). For example, a 2011 study by Baumgartner et al in the United States included 121 patients with disabling palmoplantar hyperhidrosis.(21) Patients were randomized to receive bilateral sympathectomy over T2 (n=61 patients) or T3 (n=60 patients). Six (5%) of 121 patients (3 in each group) were considered treatment failures (ie, had recurrent palmar sweating to a bothersome level). There were no significant differences between groups in the reported subjective change in plantar or axillary sweating after surgery. At 6 months, the mean (SD) level of compensatory sweating (0-10 severity scale) was 4.7 (2.7) for the T2 group and 3.8 (2.8) for the T3 group ( $p=NS$ ). Similarly, at 1 year, the mean (SD) severity rating of compensatory sweating

was 4.7 (2.5) in the T2 group and 3.7 (2.8) in the T3 group ( $p=0.09$ ). A 2013 trial by Yuncu et al in Turkey included 60 patients with axillary hyperhidrosis; 17 were assigned to T3-4 surgery and 43 to T3 surgery. (22) There were no significant differences between groups in postoperative satisfaction. At 1-year follow-up, the incidence of compensatory sweating was lower in the T3 group (79%) than in the T3-4 group (100%).

There also are case series on transthoracic sympathectomy for treating primary focal hyperhidrosis. (23-26) Case series have generally reported high success rates for palmar and axillary hyperhidrosis, although there are potential adverse effects, most commonly compensatory sweating. For example, in 2014, Karamustafoglu et al in Turkey reported on 80 patients with primary hyperhidrosis (axillary and/or palmar). (24) All 80 patients responded to a questionnaire a mean of 35 months after surgery. Seventy-one (89%) of the 80 patients were very satisfied with the surgical outcome, and the other 11% were dissatisfied. Compensatory sweating was reported by 62 (78%) patients. Moreover, a 2013 series reported on complications after thoracic sympathectomy in 1731 patients with palmar, axillary, or craniofacial hyperhidrosis. (23) Thirty days after surgery, 1531 (88%) of patients reported compensatory sweating. Among the 1531 patients, compensatory sweating was mild in 473 (31%), moderate in 642 (42%), and severe in 416 (27%). Gustatory sweating was reported by 334 (19%) of the 1731 patients.

### ***Lumbar Sympathectomy***

No RCTs on the use of lumbar sympathectomy to treat primary plantar hyperhidrosis were identified, but several case series were identified. A 2009 series by Rieger et al from Austria evaluated surgical results in 90 patients (59 men, 31 women with severe plantar hyperhidrosis). (27) Thirty-seven (41%) patients had only plantar hyperhidrosis and 53 (59%) had plantar and palmar hyperhidrosis. All patients had previously used other treatments including topical antiperspirant (ie aluminum chloride). There were a total of 178 procedures, 90 on the right side and 88 on the left side. The technique involved resecting a segment of the sympathetic trunk between the third and fourth lumbar bodies together with the ganglia (L3 and/or L4). After a mean follow-up of 24 months (range, 3-45 months), hyperhidrosis was eliminated in 87 (97%) of 90 patients. Postoperative neuralgia occurred in 38 (42%) patients between the seventh and eighth day. The pain lasted less than 4 weeks in 11 patients, 1 to 3 months in 19 patients, 4 to 12 months in 5 patients, and more than 12 months in 3 patients. Three men reported temporary sexual symptoms; 1 was incapable of ejaculation for 2 months. None of the women reported postoperative sexual dysfunction.

In 2010, Reisfeld reported on a study of bilateral endoscopic lumbar sympathectomy in 63 patients with focal plantar hyperhidrosis from a specialized hyperhidrosis clinic in the United States. (28) Thirteen (21%) patients were male and 50 (79%) were female. A clamping method was used in which clamps were placed at L3 (47%), L4 (52%), and L2 (1%). There was a learning curve with this procedure, and 5 early cases were converted to an open procedure. Fifty-six (89%) patients had previously undergone some form of thoracic sympathectomy, and all had tried conservative measures. After a mean follow-up of 7 months, all patients considered their plantar hyperhidrosis symptoms to be "cured" or "improved"; 97% reported "cure." All patients with previous thoracic sympathectomy had some degree of compensatory sweating. After lumbar sympathectomy, 51 (91%) of the 56 patients reported that their compensatory sweating was unchanged. In the 7 patients who did not have a previous thoracic sympathectomy, 1 reported mild and 6 reported moderate compensatory sweating. Male patients reported no sexual problems; investigators did not report possible sexual problems among female patients.

It is worth noting that, in contrast to earlier concerns about this procedure being associated with risks of permanent sexual dysfunction in men and women, these case series found no instances of permanent sexual dysfunction. A 2004 review from a multispecialty working group on hyperhidrosis stated that lumbar sympathectomy is not recommended for plantar hyperhidrosis because of associated sexual dysfunction; this article did not cite any data documenting sexual dysfunction. (29) To date, there are very few studies on endoscopic lumbar sympathectomy for focal plantar hyperhidrosis and no comparative studies.

### **Section Summary: Surgical Interventions**

Sweat gland excision has been found to be effective in 50% to 95% of appropriately selected patients.

RCTs and a meta-analysis of RCTs support the efficacy of endoscopic transthoracic sympathectomy at various levels for palmar and axillary hyperhidrosis. These data are complemented by case series, which have found high efficacy rates, but also high rates of compensatory sweating for these conditions.

There is insufficient evidence in support of lumbar sympathectomy for treating plantar hyperhidrosis; case series

have found lower rates of efficacy for plantar compared to axillary or palmar hyperhidrosis, and there are concerns for adverse effects in sexual functioning. There are insufficient data to conclude that any particular approach to surgery results in lower rates of compensatory sweating.

## Treatment for Severe Secondary Gustatory Hyperhidrosis

### ***Iontophoresis***

As noted in the section on primary focal hyperhidrosis, a 2003 TEC Assessment on iontophoresis for a variety of medical conditions concluded that the evidence was insufficient to determine whether iontophoresis for the treatment of any type of hyperhidrosis improves outcomes.(1) Neither the TEC Assessment nor subsequent literature searches have identified any RCTs evaluating iontophoresis for gustatory hyperhidrosis.

### ***Botulinum Toxin***

A 2015 Cochrane review did not identify any RCTs or quasi-randomized RCTs evaluating the efficacy of botulinum toxin injections for the treatment of gustatory hyperhidrosis as a result of Frey syndrome. (30) No RCTs were identified in literature searches.

### ***Tympanic Neurectomy***

Review articles by Clayman et al in 2006 (31) and de Bree et al in 2007 (32) have described various medical and surgical treatments for Frey syndrome. Tympanic neurectomy is described as a treatment for Frey syndrome, with satisfactory control reported in 82% of patients. In addition, this surgical treatment is generally definitive without a need for repeated interventions.

### ***Aluminum Chloride Topical Treatment***

Topical products are the first line of therapy in treating primary (focal) hyperhidrosis. Aluminum chloride, like other metallic salts, exerts its anhidrotic effect by obstructing the distal sweat ducts within the acrosyringium by facilitating the formation of a precipitate. (33) Common side effects usually limit the efficacy of the modality to mild cases of hyperhidrosis. For those patients who respond to antiperspirants, long-term use can sometimes result in degeneration of the eccrine unit and resolution of the localized hyperhidrosis. Drysol & Xerac AC are brand names for topical aluminum chloride solution available by prescription. Aluminum chloride is predominantly used to treat axillary hyperhidrosis, however additional indications include use on the hands, feet and scalp.

### **Ongoing and Unpublished Clinical Trials**

Some currently unpublished trials that might influence this review are listed in Table 1.

**Table 1. Summary of Key Trials**

NCT No.	Trial Name	Planned Enrollment	Completion Date
<b>Ongoing</b>			
NCT01930604	Botulinum Toxin Treatment in Craniofacial, Inguinal, Palmar, Plantar and Truncal Hyperhidrosis	274	Oct 2017

NCT: national clinical trial.

### **Summary of Evidence**

For individuals who have primary focal hyperhidrosis (ie, axillary, palmar, plantar, craniofacial) who receive iontophoresis, the evidence includes 1 randomized controlled trial (RCT) and case series. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. The RCT found that iontophoresis was less effective than botulinum toxin in the short-term treatment of palmar hyperhidrosis. Additional RCTs are needed comparing iontophoresis to sham or active treatment in patients with various types of primary focal hyperhidrosis. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have primary axillary hyperhidrosis who receive botulinum toxin type A or B, the evidence includes RCTs. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. Placebo-controlled RCTs have generally found better outcomes in the botulinum toxin groups. Several RCTs have

compared botulinum toxin type A formulations in patients with primary axillary hyperhidrosis and have compared botulinum toxin type A and B formulations in patients with axillary hyperhidrosis. Although these studies had small sample sizes, their findings suggest that, with appropriate dosage adjustments, there are similar levels of efficacy and adverse events. The evidence is sufficient to determine qualitatively that the technology results in a meaningful improvement in the net health outcome.

For individuals who have primary palmar hyperhidrosis who receive botulinum toxin type A, the evidence includes RCTs. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. Placebo-controlled RCTs have generally found better outcomes in the botulinum toxin groups. RCTs comparing botulinum toxin type A formulations in patients with primary palmar hyperhidrosis have generally found no significant difference in outcomes. Although these studies had small sample sizes, their findings suggest that, with appropriate dosage adjustments, there are similar levels of efficacy and adverse events. The evidence is sufficient to determine qualitatively that the technology results in a meaningful improvement in the net health outcome.

For individuals who have primary palmar hyperhidrosis who receive botulinum toxin type B, the evidence includes 1 RCT. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. One small placebo-controlled RCT did not clearly demonstrate the efficacy of botulinum toxin type B in patients with palmar hyperhidrosis. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have primary plantar hyperhidrosis who receive botulinum toxin type A or B, the evidence includes no RCTs. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. RCTs are needed comparing botulinum toxin to placebo or active treatment in patients with primary plantar hyperhidrosis. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have primary focal hyperhidrosis (ie, axillary, palmar, plantar, craniofacial) who receive microwave treatment, the evidence includes 1 RCT and case series. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. The RCT, conducted in patients with primary axillary hyperhidrosis, found short-term benefit of microwave treatment versus sham therapy, but there was a high rate of skin-related adverse effects. Additional RCTs are needed comparing radiofrequency ablation to sham or active treatment in patients with various types of primary focal hyperhidrosis. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have primary focal hyperhidrosis (ie, axillary, palmar, plantar, craniofacial) who receive radiofrequency ablation, the evidence includes a nonrandomized cohort study. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. The cohort study, conducted in patients with palmar hyperhidrosis, found a higher cure rate in the surgery group than in the radiofrequency ablation group, and found a similar rate of compensatory sweating in both groups. RCTs are needed comparing radiofrequency ablation to sham or active treatment in patients with various types of primary focal hyperhidrosis. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have primary axillary hyperhidrosis who receive surgical excision of axillary sweat glands, the evidence includes review articles. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. This treatment is considered standard of care for this indication. The evidence is sufficient to determine qualitatively that the technology results in a meaningful improvement in the net health outcome.

For individuals who have primary axillary and palmar hyperhidrosis who receive endoscopic transthoracic sympathectomy, the evidence includes several RCTs, a meta-analysis, and case series. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. The meta-analysis found a high rate of clinical efficacy after endoscopic transthoracic sympathectomy, although the rate of postoperative compensatory sweating was substantial; other studies had similar findings. The evidence is sufficient to determine qualitatively that the technology results in a meaningful improvement in the net health outcome.

For individuals who have primary plantar hyperhidrosis who receive lumbar sympathectomy, the evidence includes case series. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. Case series have reported high rates of clinical efficacy, but findings are inconclusive due to lack of control groups. Moreover, there have been substantial rates of compensatory sweating and concerns about adverse effects on sexual functioning. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have severe secondary gustatory hyperhidrosis who receive iontophoresis or botulinum toxin, the evidence includes uncontrolled studies and systematic reviews. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. The systematic reviews did not identify any relevant RCTs; RCTs are

needed to evaluate the safety and efficacy of these conditions for treatment of severe secondary gustatory hyperhidrosis. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have severe secondary gustatory hyperhidrosis who receive tympanic neurectomy, the evidence includes uncontrolled studies and systematic reviews. Relevant outcomes are symptoms, quality of life, and treatment-related morbidity. This treatment is considered standard of care for this indication, and has high success rates, without need for repeated interventions. The evidence is sufficient to determine qualitatively that the technology results in a meaningful improvement in the net health outcome.

## Practice Guidelines and Position Statements

### ***Society of Thoracic Surgeons***

In 2011, an expert consensus statement on the surgical treatment of hyperhidrosis was published by a task force of the Society of Thoracic Surgeons. (34) The document states that endoscopic thoracic sympathectomy is the treatment of choice for patients with primary hyperhidrosis. They further recommend the following treatment strategies (with R referring to rib and the number to which rib):

- R3 interruption for palmar hyperhidrosis; an R4 interruption is also reasonable. The authors note a slightly higher rate of compensatory sweating with an R3 but R3 is also more effective at treating hyperhidrosis.
- R4 or R5 interruption for palmar-axillary, palmar-axillary-plantar or axillary hyperhidrosis alone; R5 interruption is also an option for axillary hyperhidrosis alone.
- R3 interruption for craniofacial hyperhidrosis without blushing; an R2 and R3 procedure is an option but may lead to a higher rate of compensatory sweating, and also increases the risk of Horner's syndrome.

### **American Academy of Neurology (AAN)**

In 2008, the AAN created guidelines for use of botulinum neurotoxin for the treatment of autonomic disorders and pain. (35) These guidelines include the following recommendations for botulinum toxin injection as a treatment of hyperhidrosis:

- Should be offered as a treatment option to patients with axillary hyperhidrosis (Level A)
- Should be considered as a treatment option for palmar hyperhidrosis and drooling (Level B)
- May be considered for gustatory sweating (Level C).

### **National Institute for Health and Care Excellence (NICE)**

The U.K.'s National Institute for Health and Care Excellence issued guidance in 2014 stating that there is sufficient evidence for the efficacy and safety of endoscopic thoracic sympathectomy for primary facial blushing to support the use of the procedure.(36)

### **U.S. Preventive Services Task Force Recommendations**

Not applicable.

### **Medicare National Coverage (NCD)**

There is no NCD. In the absence of an NCD, coverage decisions are left to the discretion of local Medicare carriers.

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## Appendix

[TOP]

N/A

## History

[TOP]

Date	Reason
09/07/99	Add to Therapy Section - New Policy
11/12/02	Replace Policy - Policy reviewed without literature review; new review date only.
09/12/03	Replace Policy - Policy updated regarding iontophoresis as a treatment for hyperhidrosis based on 2003 TEC Assessment; policy statement revised to indicate that this is considered investigational (previously considered medically necessary). Policy changed from "AR" to "BC."
03/09/04	Replace Policy - Policy revised regarding surgical treatments of axillary hyperhidrosis; surgical excision considered medically necessary, axillary liposuction considered investigational.
06/08/04	Replace Policy - Correction to policy statement to remove surgical excision of axillary sweat glands from investigative statement in Policy Section.
03/08/05	Replace Policy - Policy updated with literature search; policy statement unchanged.
02/06/06	Codes updated - No other changes.
06/02/06	Disclaimer and Scope updates - No other changes.
06/12/07	New PR Policy - Policy replaces BC.8.01.19. In the treatment of primary hyperhidrosis, treatment is considered medically necessary when physical functional impairment exists; and cosmetic when no physical functional impairment is present; axillary liposuction is considered investigational. Botox is indicated as medically necessary treatment for secondary gustatory hyperhidrosis. Definitions of physical functional impairment, cosmetic and reconstructive surgery added to Benefit Application section.
11/12/07	Code updated - CPT code 89230 removed as directed by RPIW 11/8/07.
04/08/08	Replace Policy - Policy statement regarding aluminum chloride, iontophoresis, botulinum toxin,



- endoscopic transthoracic sympathectomy and surgical excision of axillary sweat glands changed from “cosmetic” to “not medically necessary” when there is no physical functional impairment. Description, Rationale and Reference sections updated.
- 05/12/09 Replace Policy - Policy updated with literature search; no change to policy statement. References added.
- 08/11/09 Code update - 68409 & 64818 added, no other changes.
- 12/08/09 Code Update - 89230 added back to policy.
- 02/09/10 Code Update - New 2010 code added.
- 04/13/10 Replace Policy - Policy updated with literature search; no change to policy statement.
- 11/15/10 Codes Updated - Additional J Codes added.
- 05/10/11 Replace Policy - Policy updated with literature search; no change to policy statement. Reference added.
- 07/10/12 Replace policy. An extensive reformatting of policy statement was done to mirror the layout of Blue Cross Policy 8.01.19 Treatment of Hyperhidrosis. Added Microwave treatment as investigational for primary focal hyperhidrosis. The Description and Rationale sections have been updated. Reference 2 replaced. Added CPT 69676 tympanic neurectomy and 97033 application of modality iontophoresis. Added ICD-9 procedure 99.27 Iontophoresis, added J3490 unclassified drugs, J0588 Injection, incobotulinumtoxinA, 1 unit.
- 10/09/12 Update Coding Section – ICD-10 codes are now effective 10/01/2014.
- 07/08/13 Replace policy. Policy statement has addition of *radiofrequency ablation* as investigational for treatment of palmer hyperhidrosis. Rationale updated based on a literature review through May 2013. References 4, 19, 20 and 32 added; other references renumbered or removed. Some policy sections reformatted for readability. Policy statement changed as noted.
- 07/31/14 Annual Review. Policy updated with literature search through May, 2014. References 5, 15, 20, 41 added; others renumbered/removed. Policy statements unchanged.
- 07/14/15 Annual Review. Policy updated with literature search through April, 2015. Policy statements reformatted and edited for clarity. The word “complications” changed to “conditions” in the policy statements. References 5, 33 added, reference 30 removed; others renumbered. Policy statements clarified, intent is unchanged. Coding update: CPT codes 64650, 64653, 64809, 64818, 95923, 97033, and HCPCS codes J0585, J0586, J0587, J0588 & J3490 removed. Retained only CPT code 32664 that specifically relates to this policy. ICD-9 and ICD-10 procedure codes removed; they were listed for informational purposes only. Policy 5.01.512 removed from Related Policies section.
- 07/12/16 Annual Review. Policy updated with literature review through March 22, 2016; references 14, 30 and 37 added. Policy statements unchanged. Code table revised in the Policy Guidelines section, only CPT 32664 is retained for review purposes.

**Disclaimer:** This medical policy is a guide in evaluating the medical necessity of a particular service or treatment. The Company adopts policies after careful review of published peer-reviewed scientific literature, national guidelines and local standards of practice. Since medical technology is constantly changing, the Company reserves the right to review and update policies as appropriate. Member contracts differ in their benefits. Always consult the member benefit booklet or contact a member service representative to determine coverage for a specific medical service or supply. CPT codes, descriptions and materials are copyrighted by the American Medical Association (AMA).  
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You can file a grievance in person or by mail, fax, or email. If you need help filing a grievance, the Civil Rights Coordinator is available to help you.

You can also file a civil rights complaint with the U.S. Department of Health and Human Services, Office for Civil Rights, electronically through the Office for Civil Rights Complaint Portal, available at <https://ocrportal.hhs.gov/ocr/portal/lobby.jsf>, or by mail or phone at: U.S. Department of Health and Human Services  
200 Independence Avenue SW, Room 509F, HHH Building  
Washington, D.C. 20201, 1-800-368-1019, 800-537-7697 (TDD)  
Complaint forms are available at <http://www.hhs.gov/ocr/office/file/index.html>.

**Getting Help in Other Languages**

**This Notice has Important Information.** This notice may have important information about your application or coverage through Premera Blue Cross. There may be key dates in this notice. You may need to take action by certain deadlines to keep your health coverage or help with costs. You have the right to get this information and help in your language at no cost. Call 800-722-1471 (TTY: 800-842-5357).

**አማርኛ (Amharic):**

ይህ ማስታወቂያ አስፈላጊ መረጃ ይዟል። ይህ ማስታወቂያ ስለ ማመልከቻዎ ወይም የ Premera Blue Cross ሽፋን አስፈላጊ መረጃ ሊኖረው ይችላል። በዚህ ማስታወቂያ ውስጥ ቁልፍ ቀዳሾች ሊኖሩ ይችላሉ። የጤና ሽፋንዎን ለመጠበቅና በአስፋፈል እርዳታ ለማግኘት በተውሰኑ የጊዜ ገደቦች እርምጃ መውሰድ ይገባዎት ይሆናል። ይህን መረጃ እንዲያገኙ እና የለምንም ክፍያ በቋንቋዎ እርዳታ እንዲያገኙ መሰታ አለዎት። በስልክ ቁጥር 800-722-1471 (TTY: 800-842-5357) ይደውሉ።

**العربية (Arabic):**

يحتوي هذا الإشعار على معلومات هامة. قد يحتوي هذا الإشعار على معلومات مهمة بخصوص طلبك أو التغطية التي تزيد الحصول عليها من خلال Premera Blue Cross. قد تكون هناك تواريخ مهمة في هذا الإشعار. وقد تحتاج لاتخاذ إجراء في تاريخ معينه للحفاظ على تغطيتك الصحية أو المساعدة في دفع التكاليف. يحق لك الحصول على هذه المعلومات والمساعدة بلغتك دون تكبد أية تكلفة. اتصل بـ 800-722-1471 (TTY: 800-842-5357)

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**Beeksisni kun odeeffannoo barbaachisaa qaba.** Beeksisti kun sagantaa yookan karaa Premera Blue Cross tiin tajaajila keessan ilaalchisee odeeffannoo barbaachisaa qabaachuu danda'a. Guyyaawwan murteessaa ta'an beeksisa kana keessatti ilaalaa. Tarii kaffaltiidhaan deeggaramuuf yookan tajaajila fayyaa keessaniif guyyaa dhumaa irratti wanti raawwattan jiraachuu danda'a. Kaffaltii irraa bilisa haala ta'een afaan keessaniin odeeffannoo argachuu fi deeggarsa argachuuf mirga ni qabaattu. Lakkoofsa bilbilaa 800-722-1471 (TTY: 800-842-5357) tii bilbilaa.

**Français (French):**

**Cet avis a d'importantes informations.** Cet avis peut avoir d'importantes informations sur votre demande ou la couverture par l'intermédiaire de Premera Blue Cross. Le présent avis peut contenir des dates clés. Vous devez peut-être prendre des mesures par certains délais pour maintenir votre couverture de santé ou d'aide avec les coûts. Vous avez le droit d'obtenir cette information et de l'aide dans votre langue à aucun coût. Appelez le 800-722-1471 (TTY: 800-842-5357).

**Kreyòl ayisyen (Creole):**

**Avi sila a gen Enfòmasyon Enpòtan ladann.** Avi sila a kapab genyen enfòmasyon enpòtan konsènan aplikasyon w lan oswa konsènan kouvèti asirans lan atravè Premera Blue Cross. Kapab genyen dat ki enpòtan nan avi sila a. Ou ka gen pou pran kèk aksyon avan sèten dat limit pou ka kenbe kouvèti asirans sante w la oswa pou yo ka ede w avèk depans yo. Se dwa w pou resewva enfòmasyon sa a ak asistans nan lang ou pale a, san ou pa gen pou peye pou sa. Rele nan 800-722-1471 (TTY: 800-842-5357).

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**Diese Benachrichtigung enthält wichtige Informationen.** Diese Benachrichtigung enthält unter Umständen wichtige Informationen bezüglich Ihres Antrags auf Krankenversicherungsschutz durch Premera Blue Cross. Suchen Sie nach eventuellen wichtigen Terminen in dieser Benachrichtigung. Sie könnten bis zu bestimmten Stichtagen handeln müssen, um Ihren Krankenversicherungsschutz oder Hilfe mit den Kosten zu behalten. Sie haben das Recht, kostenlose Hilfe und Informationen in Ihrer Sprache zu erhalten. Rufen Sie an unter 800-722-1471 (TTY: 800-842-5357).

**Hmoob (Hmong):**

**Tsawm ntawv tshaj xo no muaj cov ntshiab lus tseem ceeb.** Tej zaum tsawm ntawv tshaj xo no muaj cov ntshiab lus tseem ceeb txog koj daim ntawv thov kev pab los yog koj qhov kev pab cuam hnuv ntawm Premera Blue Cross. Tej zaum muaj cov hnuv tseem ceeb uas sau rau hauv daim ntawv no. Tej zaum koj kuj yuav tau ua qee yam uas peb kom koj ua tsis pub dhau cov caij nyoog uas teev tseg rau hauv daim ntawv no mas koj thiaj yuav tau txais kev pab cuam kho mob los yog kev pab them tej nqi kho mob ntawd. Koj muaj cai kom lawv muab cov ntshiab lus no uas tau muab sau ua koj hom lus pub dawb rau koj. Hu rau 800-722-1471 (TTY: 800-842-5357).

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**Daytoy a Pakdaar ket naglaon iti Napateg nga Impormasion.** Daytoy a pakdaar mabalin nga adda ket naglaon iti napateg nga impormasion maipanggep iti aplikasyonyo wenna coverage babaen iti Premera Blue Cross. Daytoy ket mabalin dagiti importante a petsa iti daytoy a pakdaar. Mabalin nga adda rumbeng nga aramidenyo nga addang sakbay dagiti partikular a naituding nga aldaw tapno mapagtalinaedyo ti coverage ti salun-atyto wenna tulong kadagiti gastos. Adda karbenganyo a mangala iti daytoy nga impormasion ken tulong iti bukodyo a pagsasao nga awan ti bayadanyo. Tumawag iti numero nga 800-722-1471 (TTY: 800-842-5357).

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**ភាសាខ្មែរ (Khmer):**

សេចក្តីជូនដំណឹងនេះមានព័ត៌មានយ៉ាងសំខាន់។ សេចក្តីជូនដំណឹងនេះប្រហែលជាមានព័ត៌មានយ៉ាងសំខាន់អំពីទម្រង់បែបបទ ឬការរៀបចំរបស់អ្នកកាមរយ: Premera Blue Cross ។ ប្រហែលជាមាន កាលបរិច្ឆេទសំខាន់នៅក្នុងសេចក្តីជូនដំណឹងនេះ។ អ្នកប្រហែលជាត្រូវការបញ្ជាក់សមត្ថភាព ដល់កិច្ចការផ្ទៃក្នុងដូចជា ឆ្លើយតបនឹងសុំឱ្យអ្នកកាមរយនាំគ្នា ដើម្បីនឹងអនុវត្តការងារនាំគ្នាអនុវត្តការងាររបស់អ្នក ឬប្រាក់ជំនួយចេញថ្លៃ។ អ្នកមានសិទ្ធិទទួលបានព័ត៌មាននេះ និងជំនួយនៅក្នុងភាសារបស់អ្នកដោយមិនអស់លុយឡើយ។ សូមទូរស័ព្ទ 800-722-1471 (TTY: 800-842-5357)។

**ਪੰਜਾਬੀ (Punjabi):**

ਇਸ ਨੋਟਿਸ ਵਿਚ ਖਾਸ ਜਾਣਕਾਰੀ ਹੈ. ਇਸ ਨੋਟਿਸ ਵਿਚ Premera Blue Cross ਵਲੋਂ ਤੁਹਾਡੀ ਕਵਰੇਜ ਅਤੇ ਅਰਜੀ ਬਾਰੇ ਮਹੱਤਵਪੂਰਨ ਜਾਣਕਾਰੀ ਹੋ ਸਕਦੀ ਹੈ . ਇਸ ਨੋਟਿਸ ਨਵ ਖਾਸ ਤਾਰੀਖਾਂ ਹੋ ਸਕਦੀਆਂ ਹਨ. ਜੇਕਰ ਤੁਸੀਂ ਜਸਰਤ ਕਵਰੇਜ ਰਿੱਖਣੀ ਹੋਵੇ ਜਾਂ ਓਸ ਦੀ ਲਾਗਤ ਜਵਿੱਚ ਮਦਦ ਦੇ ਇਕੱਠ ਹੋ ਤਾਂ ਤੁਹਾਨੂੰ ਅੰਤਮ ਤਾਰੀਖ ਤੋਂ ਪਹਿਲਾਂ ਢੁੱਝ ਖਾਸ ਕਰਮ ਚੁੱਕਣ ਦੀ ਲੋੜ ਹੋ ਸਕਦੀ ਹੈ ,ਤੁਹਾਨੂੰ ਮੁਫਤ ਵਿੱਚ ਤੋਂ ਅਪਣੀ ਭਾਸ਼ਾ ਵਿੱਚ ਜਾਣਕਾਰੀ ਅਤੇ ਮਦਦ ਪ੍ਰਾਪਤ ਕਰਨ ਦਾ ਅਧਿਕਾਰ ਹੈ ,ਕਾਲ 800-722-1471 (TTY: 800-842-5357).

**فارسی (Farsi):**

این اعلامیه حاوی اطلاعات مهم میباشد. این اعلامیه ممکن است حاوی اطلاعات مهم درباره فرم تقاضا و یا پوشش بیمه ای شما از طریق Premera Blue Cross باشد. به تاریخ های مهم در این اعلامیه توجه نمایید. شما ممکن است برای حفظ پوشش بیمه تان یا کمک در پرداخت هزینه های درمانی تان، به تاریخ های مشخصی برای انجام کارهای خاصی احتیاج داشته باشید. شما حق این را دارید که این اطلاعات و کمک را به زبان خود به طور رایگان دریافت نمایید. برای کسب اطلاعات با شماره 800-722-1471 (کلیران TTY تماس باشماره 800-842-5357) تماس برقرار نمایید.

**Polskie (Polish):**

To ogłoszenie może zawierać ważne informacje. To ogłoszenie może zawierać ważne informacje odnośnie Państwa wniosku lub zakresu świadczeń poprzez Premera Blue Cross. Prosimy zwrócić uwagę na kluczowe daty, które mogą być zawarte w tym ogłoszeniu aby nie przekroczyć terminów w przypadku utrzymania polisy ubezpieczeniowej lub pomocy związanej z kosztami. Macie Państwo prawo do bezpłatnej informacji we własnym języku. Zadzwońcie pod 800-722-1471 (TTY: 800-842-5357).

**Português (Portuguese):**

Este aviso contém informações importantes. Este aviso poderá conter informações importantes a respeito de sua aplicação ou cobertura por meio do Premera Blue Cross. Poderão existir datas importantes neste aviso. Talvez seja necessário que você tome providências dentro de determinados prazos para manter sua cobertura de saúde ou ajuda de custos. Você tem o direito de obter esta informação e ajuda em seu idioma e sem custos. Ligue para 800-722-1471 (TTY: 800-842-5357).

**Română (Romanian):**

Prezenta notificare conține informații importante. Această notificare poate conține informații importante privind cererea sau acoperirea asigurării dumneavoastră de sănătate prin Premera Blue Cross. Pot exista date cheie în această notificare. Este posibil să fie nevoie să acționați până la anumite termene limită pentru a vă menține acoperirea asigurării de sănătate sau asistența provizorie la costuri. Aveți dreptul de a obține gratuit aceste informații și ajutor în limba dumneavoastră. Sunați la 800-722-1471 (TTY: 800-842-5357).

**Русский (Russian):**

Настоящее уведомление содержит важную информацию. Это уведомление может содержать важную информацию о вашем заявлении или страховом покрытии через Premera Blue Cross. В настоящем уведомлении могут быть указаны ключевые даты. Вам, возможно, потребуется принять меры к определенным предельным срокам для сохранения страхового покрытия или помощи с расходами. Вы имеете право на бесплатное получение этой информации и помощь на вашем языке. Звоните по телефону 800-722-1471 (TTY: 800-842-5357).

**Fa'asamoa (Samoan):**

Atonu ua iai i lenei fa'asilasilaga ni fa'amatalaga e sili ona taua e tatau ona e malamalama i ai. O lenei fa'asilasilaga o se fesoasoani e fa'amatala atili i ai i le tulaga o le polokalame, Premera Blue Cross, ua e tau fia maua atu i ai. Fa'amolemole, ia e iloilo fa'alelei i aso fa'apitoa olo'o iai i lenei fa'asilasilaga taua. Masalo o le'a iai ni feau e tatau ona e faia ao le'i aulia le aso ua ta'ua i lenei fa'asilasilaga ina ia e iai pea ma maua fesoasoani mai ai i le polokalame a le Malo olo'o e iai i ai. Olo'o iai iate oe le aia tatau e maua atu i lenei fa'asilasilaga ma lenei fa'matalaga i legagana e te malamalama i ai aunoa ma se togiga tupe. Vili atu i le telefoni 800-722-1471 (TTY: 800-842-5357).

**Español (Spanish):**

Este Aviso contiene información importante. Es posible que este aviso contenga información importante acerca de su solicitud o cobertura a través de Premera Blue Cross. Es posible que haya fechas clave en este aviso. Es posible que deba tomar alguna medida antes de determinadas fechas para mantener su cobertura médica o ayuda con los costos. Usted tiene derecho a recibir esta información y ayuda en su idioma sin costo alguno. Llame al 800-722-1471 (TTY: 800-842-5357).

**Tagalog (Tagalog):**

Ang Paunawa na ito ay naglalaman ng mahalagang impormasyon tungkol sa iyong aplikasyon o pagsakop sa pamamagitan ng Premera Blue Cross. Maaaring may mga mahalagang petsa dito sa paunawa. Maaring mangailangan ka na magsagawa ng hakbang sa ilang mga itinakdang panahon upang mapanatili ang iyong pagsakop sa kalusugan o tulong na walang gastos. May karapatan ka na makakuha ng ganiitong impormasyon at tulong sa iyong wika ng walang gastos. Tumawag sa 800-722-1471 (TTY: 800-842-5357).

**ไทย (Thai):**

ประกาศนี้มีข้อมูลสำคัญ ประกาศนี้อาจมีข้อมูลที่สำคัญเกี่ยวกับกาการสมัครหรือขอบเขตประกันสุขภาพของคุณผ่าน Premera Blue Cross และอาจมีกำหนดการในประกาศนี้ คุณอาจจะต้องดำเนินการภายในกำหนดระยะเวลาที่แน่นอนเพื่อจะรักษาการประกันสุขภาพของคุณหรือการช่วยเหลือที่มีค่าใช้จ่าย คุณมีสิทธิที่จะได้รับข้อมูลและความช่วยเหลือในภาษาของคุณโดยไม่มีค่าใช้จ่าย โทร 800-722-1471 (TTY: 800-842-5357)

**Український (Ukrainian):**

Це повідомлення містить важливу інформацію. Це повідомлення може містити важливу інформацію про Ваше звернення щодо страховального покриття через Premera Blue Cross. Зверніть увагу на ключові дати, які можуть бути вказані у цьому повідомленні. Існує імовірність того, що Вам треба буде здійснити певні кроки у конкретні кінцеві строки для того, щоб зберегти Ваше медичне страхування або отримати фінансову допомогу. У Вас є право на отримання цієї інформації та допомоги безкоштовно на Вашій рідній мові. Дзвоніть за номером телефону 800-722-1471 (TTY: 800-842-5357).

**Tiếng Việt (Vietnamese):**

Thông báo này cung cấp thông tin quan trọng. Thông báo này có thông tin quan trọng về đơn xin tham gia hoặc hợp đồng bảo hiểm của quý vị qua chương trình Premera Blue Cross. Xin xem ngày quan trọng trong thông báo này. Quý vị có thể phải thực hiện theo thông báo đúng trong thời hạn để duy trì bảo hiểm sức khỏe hoặc được trợ giúp thêm về chi phí. Quý vị có quyền được biết thông tin này và được trợ giúp bằng ngôn ngữ của mình miễn phí. Xin gọi số 800-722-1471 (TTY: 800-842-5357).