

<b>7.01.69</b>	<b>Sacral Nerve Neuromodulation/Stimulation</b>		
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<b>Section:</b>	7.0 Surgery	<b>Page:</b>	Page 1 of 22

## Policy Statement

### Urinary Incontinence and Nonobstructive Retention

#### Criteria A

A trial period of sacral nerve neuromodulation with either percutaneous nerve stimulation or a temporarily implanted lead may be considered **medically necessary** in patients who meet **all** of the following criteria:

- There is a diagnosis of at least **one** of the following:
  - Urge incontinence
  - Urgency-frequency syndrome
  - Nonobstructive urinary retention
  - Overactive bladder
- There is documented failure or intolerance to at least 2 conventional conservative therapies (e.g., behavioral training such as bladder training, prompted voiding, or pelvic muscle exercise training, pharmacologic treatment for at least a sufficient duration to fully assess its efficacy, and/or surgical corrective therapy)
- The patient is an appropriate surgical candidate
- Incontinence is not related to a neurologic condition

#### Criteria B

Permanent implantation of a sacral nerve neuromodulation device may be considered **medically necessary** in patients who meet **all** of the following criteria:

- **All** of criteria A for percutaneous nerve stimulation or a temporarily implanted lead are met (listed above)
- A trial stimulation period demonstrates at least 50% improvement in symptoms over a period of at least 48 hours

Other urinary/voiding applications of sacral nerve neuromodulation are considered **investigational**, including but not limited to treatment of stress incontinence or urge incontinence due to a neurologic condition (e.g., detrusor hyperreflexia, multiple sclerosis, spinal cord injury, other types of chronic voiding dysfunction).

### Fecal Incontinence

#### Criteria A

A trial period of sacral nerve neuromodulation with either percutaneous nerve stimulation or a temporarily implanted lead may be considered **medically necessary** in patients who meet **all** of the following criteria:

- There is a diagnosis of chronic fecal incontinence of more than 2 incontinent episodes on average per week for more than 6 months or for more than 12 months after vaginal childbirth
- There is documented failure or intolerance to conventional conservative therapy (e.g., dietary modification, the addition of bulking and pharmacologic treatment) for at least a sufficient duration to fully assess its efficacy
- The patient is an appropriate surgical candidate
- The condition is not related to an anorectal malformation (e.g., congenital anorectal malformation; defects of the external anal sphincter over 60 degrees; visible sequelae of pelvic radiation; active anal abscesses and fistulae) or chronic inflammatory bowel disease
- Incontinence is not related to a neurologic condition
- The patient has not had rectal surgery in the previous 12 months or, in the case of cancer, the patient has not had rectal surgery in the past 24 months

### Criteria B

Permanent implantation of a sacral nerve neuromodulation device may be considered **medically necessary** in patients who meet **all** of the following criteria:

- **All** of criteria A for percutaneous nerve stimulation or a temporarily implanted lead are met (listed above)
- A trial stimulation period demonstrates at least 50% improvement in symptoms over a period of at least 48 hours

Sacral nerve neuromodulation is considered **investigational** in the treatment of **either** of the following:

- Chronic constipation
- Chronic pelvic pain

### Sacral Anterior Root Stimulation for Neurogenic Bladder

Sacral anterior root stimulation using an implantable device (e.g., VOCARE® Bladder System) to provide urination on demand and reduce post-void residual volume may be considered **medically necessary** in patients with spinal cord injury when **all** of the following criteria are met:

- Patients with a complete suprasacral spinal cord lesion
- Condition is associated with a neurogenic bladder
- When used in conjunction with posterior rhizotomy

## Policy Guidelines

The International Continence Society has defined that overactive bladder syndrome as "urinary urgency, with or without urgency urinary incontinence, usually with increased daytime frequency and nocturia..." (available at <http://wiki.ics.org/Overactive+Bladder>).

### Coding

Sacral nerve neuromodulation involves several steps identified by the codes listed below.

#### Peripheral Nerve Evaluation

Peripheral nerve evaluation to determine candidacy for permanent implantation would be reported using the following codes:

- **HCPCS Codes**
  - **A4290**: Sacral nerve stimulation test lead, each
  - **E0745**: Neuromuscular stimulator, electronic shock unit
  - **E1399**: Durable medical equipment, miscellaneous (Bulk leads, needles, and cables)
- **CPT Code**
  - **64561**: Percutaneous implantation of neurostimulator electrode array; sacral nerve (transforaminal placement) including image guidance, if performed

#### Open Implantation of the Electrode Array

Open implantation of the electrode array, whether as the first stage of the 2-stage implantation procedure, or as the final implantation of the electrode array after a positive percutaneous test, would be reported using the following codes:

- **HCPCS Codes**
  - **L8680**: Implantable neurostimulator electrode, each
- **CPT Code**
  - **64581**: Incision for implantation of neurostimulator electrode array; sacral nerve (transforaminal placement)

#### Open Implantation of the Neurostimulator Pulse Generator

Open implantation of the neurostimulator pulse generator would be reported using the following codes:

- **HCPCS Codes**
  - **L8685:** Implantable neurostimulator pulse generator, single array, rechargeable, includes extension
  - **L8686:** Implantable neurostimulator pulse generator, single array, nonrechargeable, includes extension
  - **L8687:** Implantable neurostimulator pulse generator, dual array, rechargeable, includes extension
  - **L8688:** Implantable neurostimulator pulse generator, dual array, nonrechargeable, includes extension
- **CPT Code**
  - **64590:** Insertion or replacement of peripheral or gastric neurostimulator pulse generator or receiver, direct or inductive coupling

### Analysis and Reprogramming of the Implanted Device

Some patients will require analysis and reprogramming of the device once implanted. A site of service differential may apply. The following CPT codes may be used:

- **CPT Codes**
  - **95970:** Electronic analysis of implanted neurostimulator pulse generator system (e.g., rate, pulse amplitude, pulse duration, configuration of wave form, battery status, electrode selectability, output modulation, cycling, impedance and patient compliance measurements); simple or complex brain, spinal cord, or peripheral (i.e., cranial nerve, peripheral nerve, sacral nerve, neuromuscular) neurostimulator pulse generator/transmitter, without reprogramming
  - **95972:** Electronic analysis of implanted neurostimulator pulse generator system (e.g., rate, pulse amplitude, pulse duration, configuration of wave form, battery status, electrode selectability, output modulation, cycling, impedance and patient compliance measurements); complex spinal cord, or peripheral (i.e., peripheral nerve, sacral nerve, neuromuscular) (except cranial nerve) neurostimulator pulse generator/transmitter, with intraoperative or subsequent programming

### Revision or Removal of the Implanted Electrodes or Stimulator

Some patients may require revision or removal of the implanted electrodes or pulse stimulator. The following CPT codes may be used:

- **CPT Codes**
  - **64585:** Revision or removal of peripheral neurostimulator electrode array
  - **64595:** Revision or removal of peripheral or gastric neurostimulator pulse generator or receiver

Note: HCPCS code L8680 is reported with 1 unit for each contact point on the implanted lead.

### Sacral Anterior Root Stimulation for Neurogenic Bladder

Note: Requesting the brand name and manufacturer of the device being requested and its intended use will aid in determining need and uses of the device.

*Any specific product referenced in this Medical Policy or the Table below are just examples and are intended for illustrative purposes only. It is not intended to be a recommendation of one product over another and is not intended to represent a complete listing of all products available. **The following example** is contained in the parenthetical (e.g.) statement in the Policy Statement.*

Table

Type of Stimulation/ Stimulation Device	Product/Manufacturer Examples	Codes
Sacral Anterior Root Stimulation (VOCARE® System)	VOCARE® Bladder System (also known as the FineTech-Brindley Bladder Control System) (FineTech Medical Ltd., England)	<b>Rhizotomy Proc:</b> 63185 63190 63655

Type of Stimulation/ Stimulation Device	Product/Manufacturer Examples	Codes
See contraindications to this procedure and further pre- and post-operative testing codes below under VOCARE Bladder System.		<b>Device HCPCS:</b> L8680 L8682 L8684

### VOCARE Bladder System

The VOCARE Bladder System is contraindicated for patients with the following characteristics:

- Active or recurrent pressure ulcers
- Active sepsis
- Implanted cardiac pacemaker
- Poor or inadequate bladder reflexes

All of the following are separately reimbursable for pre-and post-operative testing for the implantation of a sacral anterior root stimulator combined with rhizotomy:

- **51600:** Injection procedure for cystography or voiding urethrocytography
- **51726:** Complex cystometrogram (i.e., calibrated electronic equipment);
- **51741:** Complex uroflowmetry (e.g., calibrated electronic equipment)
- **51797:** Voiding pressure studies, intra-abdominal (i.e., rectal, gastric, intraperitoneal) (List separately in addition to code for primary procedure)
- **72148:** Magnetic resonance (e.g., proton) imaging, spinal canal and contents, lumbar; without contrast material
- **72149:** Magnetic resonance (e.g., proton) imaging, spinal canal and contents, lumbar; with contrast material(s)
- **74420:** Urography, retrograde, with or without KUB
- **74430:** Cystography, minimum of 3 views, radiological supervision and interpretation

### Description

Sacral nerve neuromodulation (SNM), also known as sacral nerve stimulation, involves the implantation of a permanent device that modulates the neural pathways controlling bladder or rectal function. This evidence review addresses the use of SNM to treat urinary or fecal incontinence, fecal nonobstructive retention, and chronic pelvic pain in patients with intact neural innervation of the bladder and/or rectum.

### Related Policies

- Biofeedback as a Treatment of Fecal Incontinence or Constipation
- Biofeedback as a Treatment of Urinary Incontinence in Adults
- Pelvic Floor Stimulation as a Treatment of Urinary and Fecal Incontinence
- Percutaneous Tibial Nerve Stimulation
- Transanal Radiofrequency Treatment of Fecal Incontinence

### Benefit Application

Benefit determinations should be based in all cases on the applicable contract language. To the extent there are any conflicts between these guidelines and the contract language, the contract language will control. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

Some state or federal mandates [e.g., Federal Employee Program (FEP)] prohibits plans from denying Food and Drug Administration (FDA)-approved technologies as investigational. In these instances, plans may have to consider the coverage eligibility of FDA-approved technologies on the basis of medical necessity alone.

## **Regulatory Status**

In 1997, the InterStim® Sacral Nerve Stimulation system (Medtronic) was approved by the U.S. Food and Drug Administration (FDA) through the premarket approval process for the indication of urinary urge incontinence in patients who have failed or could not tolerate more conservative treatments. In 1999, the device received FDA approval for the additional indications of urgency-frequency and urinary retention in patients without mechanical obstruction. In 2006, the InterStim II® System (Medtronic) was approved by the FDA through the premarket approval process for treatment of intractable cases of overactive bladder and urinary retention. The new device is smaller and lighter than the original and is reported to be suited for those with lower energy requirements or small stature. The device also includes updated software and programming options.

In 2011, the InterStim® System was approved by the FDA through the premarket approval process for the indication of chronic fecal incontinence in patients who have failed or could not tolerate more conservative treatments.

The InterStim® device has not been specifically approved by the FDA for treatment of chronic pelvic pain.

FDA product code: EZW.

## **Rationale**

### **Background**

#### **Urinary and Fecal Incontinence**

Urge incontinence is defined as leakage of urine when there is a strong urge to void. Urgency-frequency is an uncontrollable urge to urinate, resulting in very frequent, small volumes and is a prominent symptom of interstitial cystitis (also called bladder pain syndrome). Urinary retention is the inability to empty the bladder of urine completely. Fecal incontinence can arise from a variety of mechanisms, including rectal wall compliance, efferent and afferent neural pathways, central and peripheral nervous systems, and voluntary and involuntary muscles. Fecal incontinence is more common in women, due mainly to muscular and neural damage that may occur during vaginal delivery.

### **Treatment**

Treatment using sacral nerve neuromodulation, also known as indirect sacral nerve stimulation, is one of several alternative modalities for patients with urinary or fecal incontinence (urge incontinence, significant symptoms of urgency-frequency, nonobstructive urinary retention) who have failed behavioral (e.g., prompted voiding) and/or pharmacologic therapies.

The sacral nerve neuromodulation device consists of an implantable pulse generator that delivers controlled electrical impulses. This pulse generator is attached to wire leads that connect to the sacral nerves, most commonly the S3 nerve root. Two external components of the system help control the electrical stimulation. A control magnet, kept by the patient, is used to turn the device on or off. A console programmer is kept by the physician and used to adjust the settings of the pulse generator.

Before implantation of the permanent device, patients undergo an initial testing phase to estimate potential response to treatment. The first type of testing developed was percutaneous nerve evaluation (PNE). This procedure is done with the patient under local anesthesia, using a

test needle to identify the appropriate sacral nerve(s). Once identified, a temporary wire lead is inserted through the test needle and left in place for 4 to 7 days. This lead is connected to an external stimulator, which is carried by patients in their pocket or on their belt. The results of this test phase are used to determine whether patients are appropriate candidates for the permanent device. If patients show a 50% or greater reduction in symptom frequency, they are deemed eligible for the permanent device.

The second type of testing is a 2-stage surgical procedure. In the first stage, a quadripolar-tined lead is implanted (stage 1). The testing phase can last as long as several weeks, and if patients show a 50% or greater reduction in symptom frequency, they can proceed to stage 2 of the surgery, which is permanent implantation of the neuromodulation device. The 2-stage surgical procedure has been used in various ways. They include its use instead of PNE, for patients who failed PNE, for patients with an inconclusive PNE, or for patients who had a successful PNE to refine patient selection further.

The permanent device is implanted with the patient under general anesthesia. The electrical leads are placed in contact with the sacral nerve root(s) via an incision in the lower back, and the wire leads are extended through a second incision underneath the skin, across the flank to the lower abdomen. Finally, a third incision is made in the lower abdomen where the pulse generator is inserted and connected to the wire leads. Following implantation, the physician programs the pulse generator to the optimal settings for that patient. The patient can switch the pulse generator on and off by placing the control magnet over the area of the pulse generator for 1 to 2 seconds.

Note: This evidence review does not address pelvic floor stimulation, which refers to electrical stimulation of the pudendal nerve. Pelvic floor stimulation is addressed separately (see Blue Shield of California Medical Policy: Pelvic Floor Stimulation as a Treatment of Urinary and Fecal Incontinence). Also, this review does not address devices that provide direct sacral nerve stimulation in patients with spinal cord injuries.

### Literature Review

The original review was based on Blue Cross Blue Shield Association Technology Evaluation Center (TEC) Assessments from 1998 and 2000, which focused on sacral nerve neuromodulation (SNM) for urge incontinence and urinary urgency/frequency, respectively.<sup>1,2</sup>

Evidence reviews assess the clinical evidence to determine whether the use of a technology improves the net health outcome. Broadly defined, health outcomes are length of life, quality of life, and ability to function—including benefits and harms. Every clinical condition has specific outcomes that are important to patients and to managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of a technology, 2 domains are examined: the relevance and the quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

## Urinary Incontinence

### Randomized Controlled Trials

Several RCTs on SNM for urinary incontinence have been conducted. One was sponsored by Medtronic and submitted to the U.S. Food and Drug Administration as part of the device approval process.<sup>3</sup> Findings have not otherwise been published. Based on this RCT, the 1998 Blue Cross Blue Shield Association Technology Evaluation Center (TEC) Assessment concluded that SNM reduced urge incontinence compared with control patients.<sup>1</sup> The trial was well-designed, using standardized clinical and functional status outcomes measurements, and enrolled patients with severe urge incontinence who had failed extensive prior treatments. The magnitude of effect (approximately one-half of patients became dry, three-quarters experienced at least 50% reduction in incontinence) was fairly large, probably at least as great as with surgical procedures, and larger than expected from a placebo effect or conservative measures such as behavioral therapy or drugs. The therapy evaluation test, in which the device was turned off (i.e., sham treatment was provided) and patients thus served as their controls, provided further evidence that the effect on incontinence was due to electrical stimulation and demonstrated that the effect of SNM is reversible. The cohort analysis of the clinical trial provided some evidence that the effect of SNM could be maintained for up to 2 years. There was a high rate of adverse events reported in this trial. Most were minor and reversible; however, approximately one-third of patients required surgical revision for pain at the operative sites or migration of the leads.

In this RCT, 177 of 581 patients had urinary retention. Patients with urinary retention reported significant improvements regarding volume per catheterization, a decrease in the number of catheterizations per day, and increased total voided volume per day. At 12 months postimplant, 61% of patients had ceased use of catheterization. At baseline, 220 (38%) of 581 had significant urgency-frequency symptoms. After 6 months, 83% of patients with urgency-frequency symptoms reported increased voiding volumes with the same or reduced degree of frequency. At 12 months, 81% of patients had reached normal voiding frequency. Compared with a control group, patients with implants reported significant improvements in quality of life (QOL), as evaluated by the Short-Form 36-Item Health Survey.

An additional prospective RCT of 44 patients with urge incontinence was published by Weil et al (2000).<sup>4</sup> At 6 months, the implant group showed significantly greater improvements in standardized clinical outcomes, compared with those receiving conservative therapy. The magnitude of effect was substantial.

Siegel et al (2015) published results of an industry-sponsored, Food and Drug Administration–mandated, postapproval study known as the Insite trial. This RCT compared SNM using a 2-stage surgical procedure with standard medical therapy.<sup>5</sup> Study inclusion criteria were a diagnosis of overactive bladder (at least 8 voids per day and/or at least 2 involuntary leaking episodes in 72 hours) and a failed trial of at least 1 anticholinergic or antimuscarinic medication. Also, there needed to be at least 1 such medication that had not yet been prescribed. Patients with neurologic diseases and with primary stress incontinence were excluded. Seventy patients were allocated to SNM and 77 to standard medical therapy. Of the 70 patients in the SNM group, 11 elected not to receive test stimulation with the tined lead and 8 received the lead but did not receive a full system implant due to lack of response to a 14-day test stimulation period (response was defined as  $\geq 50\%$  reduction in average leaks and/or voids). Patients in the medical treatment group tried the next recommended medication or restarted a discontinued medication. Therapeutic success was defined as at least a 50% improvement in average leaks per day or at least a 50% improvement in the number of voids per day or a return to fewer than 8 voids per day. In intention-to-treat (ITT) analysis, the therapeutic success rate at 6 months was 61% in the SNM group and 42% in the standard treatment group; the difference between groups was statistically significant ( $p=0.02$ ). QOL at 6 months was a secondary outcome. Several validated QOL scales were used, and all favored the SNM group compared with the standard treatment group ( $p<0.002$  for all comparisons).

Twelve-month follow-up of the Insite trial was published by Noblett et al (2016).<sup>6</sup> They analyzed patients from in the sacral nerve stimulation (SNS) group of initial RCT plus additional patients enrolled and implanted in the interim. A total of 340 patients underwent test stimulation, 272 underwent implantation, and 255 completed 12 months of follow-up. In a modified completers' analysis, the therapeutic success rate was 82%. This modified completers' analysis included patients who were implanted and had either a baseline or 12-month evaluation or withdrew from the trial due to a device-related adverse event or lack of efficacy. In an analysis limited to study completers, the therapeutic response rate was 85%. The Noblett analysis did not include data from the control group of patients receiving only standard medical therapy.

Amundsen et al (2016) reported on an RCT comparing intradetrusor injection of onabotulinumtoxin A (n=192) with SNM (n=189) in women with refractory urgency urinary incontinence, defined as at least 1 supervised behavioral or physical therapy intervention and the use of a minimum of 2 anticholinergics (or inability to tolerate or contraindications to the medication).<sup>7</sup> In ITT analysis, patients in the onabotulinumtoxinA-treated group had greater reductions in urge incontinence per day (3.9 per day) than in the SNM-treated group (3.3 per day; mean difference, 0.63; 95% confidence interval [CI], 0.13 to 1.14; p=0.01). OnabotulinumtoxinA-treated patients had greater reductions in some overactive bladder-related QOL questionnaire-related measures, although the clinical meaningfulness of the changes was uncertain. Patients in the onabotulinumtoxinA-treated group were more likely to have urinary tract infections (35% vs 11%; risk difference, -23%; 95% CI, -33% to -13%; p<0.001).

### Case Series

Case series have provided longer follow-up data than the RCTs. For example, a series by Groen et al (2011) in The Netherlands reported the longest follow-up.<sup>8</sup> Sixty patients had at least 5 years of follow-up after SNM for refractory idiopathic urge urinary incontinence. Success was defined as at least a 50% decrease in the number of incontinent episodes or pads used per day. The success rate was 52 (87%) of 60 at 1 month and gradually decreased to 37 (62%) at 5 years. The number of women who were completely continent was 15 (25%) at 1 month and 9 (15%) at 5 years. At the 5-year follow-up, SNM was still used by 48 (80%) of 60 women. Fifty-seven adverse events were reported in 32 (53%) of 60 patients. The most frequent were hardware-related or pain or discomfort. There were 23 reoperations in 15 patients. In most cases, the pain was managed conservatively.

Findings from a large prospective series were reported by White et al (2009).<sup>9</sup> The series focused on complications associated with SNM in 202 patients with urge incontinence, urinary urgency, or urinary retention. At a mean follow-up of 37 months (range, 7-84 months), 67 (30%) patients had experienced adverse events that required either lead or implantable pulse generator revisions. Complications included pain (3%), device malfunction secondary to trauma (9%), infection (4%), postoperative hematoma (2%), and lead migration (6%). Also, 5% of patients underwent elective removal, 4% had device removal due to lack of efficacy, and 2% required removal due to battery expiration. At the last follow-up, 172 (85%) patients had functional implanted units.

### Section Summary: Urinary Incontinence

Data from RCTs and case series with long-term follow-up have suggested that SNM reduces symptoms of urge incontinence, urgency-frequency syndrome, nonobstructive urinary retention, and overactive bladder in selected patients.

### Fecal Incontinence Systematic Reviews

Thaha et al (2015) conducted a Cochrane review assessing SNS for fecal incontinence and constipation in adults, which included randomized, quasi-randomized, and crossover trials.<sup>10</sup> For fecal incontinence, reviewers included 6 trials of SNM (n=219 patients), 2 of which used parallel-group designs (Thin et al [2015], Tjandra et al [2008]; the latter described below); the others used crossover designs. The primary methodologic quality issue noted was a lack of clarity involving



randomization techniques and allocation concealment. Reviewers concluded: "The limited evidence from the included trials suggests that SNS can improve continence in a proportion of patients with faecal incontinence."

Thin et al (2013) published a systematic review of randomized trials and observational studies evaluating SNM for treating fecal incontinence.<sup>11</sup> Sixty-one studies met the following eligibility criteria: assessed at least 10 patients, had a clear follow-up interval and reported the success rate of therapy based on a 50% or greater reduction in fecal incontinence episodes. Only 2 studies were RCTs (Tjandra et al [2008], Leroi et al [2005]; described next) and 50 were prospective case series. Data from 2 studies with long-term follow-up were pooled to calculate median success rates using ITT analysis. These median success rates were 63% in the short term ( $\leq 12$  months of follow-up), 58% in the medium term (12-36 months), and 54% in the long-term ( $> 36$  months). The per-protocol short-, medium-, and long-term success rates were 79%, 80%, and 84%, respectively.

Previously, Tan et al (2011) published a meta-analysis of studies SNM for treating fecal incontinence.<sup>12</sup> They identified 34 studies that reported on at least 1 of their outcomes of interest and documented how many patients underwent temporary and permanent SNM. Only 1 study was an RCT (Tjandra et al [2008]). In the 34 studies, 944 patients underwent temporary SNS, and 665 subsequently underwent permanent SNS implantation. There were 279 patients who did not receive permanent implantation, and 154 of them were lost to follow-up. Follow-up in the studies ranged from 2 to 35 weeks. In a pooled analysis of findings of 28 studies, there was a statistically significant decrease in the number of incontinence episodes per week with SNM compared with maximal conservative therapy (weighted mean difference, -6.83; 95% CI, -8.05 to -5.60;  $p < 0.001$ ). Fourteen studies reported incontinence scores, and when these results were pooled, there was also a significantly greater improvement in scores with SNS than with conservative therapy (weighted mean difference, -10.57; 95% CI, -11.89 to -9.24;  $p < 0.001$ ).

Maeda et al (2011) published a systematic review of studies on complications following permanent implantation of an SNS device for fecal incontinence and constipation.<sup>13</sup> Reviewers identified 94 articles. Most addressed fecal incontinence. A combined analysis of data from 31 studies on SNS for fecal incontinence reported a 12% suboptimal response to therapy (149/1232 patients). A review of complications reported in the studies found that the most commonly reported complication was pain around the site of implantation, with a pooled rate of 13% (81/621 patients). The most common response to this complication was repositioning the stimulator, followed by device explantation and reprogramming. The second most common adverse event was an infection, with a pooled rate of 4% (40/1025 patients). Twenty-five (63%) of the 40 infections led to device explantation.

### Randomized Controlled Trials

Tjandra et al (2008) published an RCT assessing 120 patients with severe fecal incontinence.<sup>14</sup> Patients were randomized to SNS or best supportive therapy, consisting of pelvic floor exercises with biofeedback, bulking agents, and dietary management with a team of dietitians. Exclusion criteria included neurologic disorders and external anal sphincter defects of more than 120° of the circumference, although a "high proportion" of the patients had pudendal neuropathy. The trial was not blinded. Of the 60 patients randomized to SNS, 54 (90%) had successful test stimulation and 53 proceeded with the implant of the pulse generator. At baseline, the SNS group had an average of 9.5 incontinent episodes per week, and the controls had 9.2. Both groups had an average of 3.3 days per week with incontinence. At 12-month follow-up, episodes had decreased to 1 day per week, with 3.1 episodes in the SNS group, but no change in the control group (mean, 3.1 d/wk), with 9.4 episodes. Complete continence was achieved in 22 (42%) of the 53 SNS patients and 13 (24%) patients improved by 75% to 99%. None of the patients had worsening of fecal continence. Adverse events included pain at implant site (6%), seroma (2%), and excessive tingling in the vaginal region (9%).

Leroi et al (2005) in France published an industry-supported, double-blind, randomized crossover study.<sup>15</sup> Thirty-four patients had successful temporary percutaneous stimulation and underwent permanent implantation of an SNM device. Following a 1- to 3-month postimplantation period in which the device was turned on, patients had their device turned on for 1 month and off for 1 month, in random order. Twenty-four (71%) randomized patients completed the trial. There was a statistically significant greater decrease in fecal incontinence episodes with the device turned on ( $p=0.03$ ). However, there was also a large decrease in incontinent episodes for the placebo group. The median frequency of fecal incontinence episodes decreased by 90% when the device was in the on position; it decreased by 76% when the device was in the off position.

### Prospective Noncomparative Studies

A key multicenter prospective trial is the 16-site multicenter Food and Drug Administration investigational device exemption study of SNS in 120 patients with fecal incontinence. Findings were initially reported by Wexner et al (2010).<sup>16</sup> To be included, patients had to have chronic fecal incontinence for more than 6 months or more than 12 months after vaginal childbirth, defined as more than 2 incontinent episodes on average per week. All patients had failed or were not candidates for more conservative treatments. Exclusion criteria included congenital anorectal malformation; previous rectal surgery, if performed within the last 12 months (or 24 months in case of cancer); defects of the external anal sphincter over 60°; chronic inflammatory bowel disease; visible sequelae of pelvic radiotherapy; active anal abscesses and fistulae; neurologic diseases such as clinically significant peripheral neuropathy or complete spinal cord injury; and anatomic limitations preventing the successful placement of an electrode. A total of 285 patients were screened; 133 were enrolled and underwent acute test stimulation, and 120 showed at least 50% improvement during the test phase and received a permanent stimulator. Thirty-four of the 120 patients exited the study for various reasons both related (i.e., lack of efficacy in 6, implant site infection or skin irritation in 5) and unrelated to the implant (i.e., the death of a local principal investigator). Analysis based on the initial 133 patients showed a 66% success rate ( $\geq 50\%$  improvement), while analysis based on 106 patients considered completed cases at 12 months showed an 83% success rate. The success rate based on the 120 patients who received a permanently implanted stimulator would fall between these 2 rates. Of 106 cases included in the 12-month results, perfect continence (100% improvement) was reported in approximately 40%, while an additional 30% of patients achieved 75% or greater reduction in incontinent episodes. Success was lower in patients with an internal anal sphincter defect (65% [ $n=20$ ]) than in patients without a defect (87% [ $n=86$ ]).

Three- and 5-year findings were subsequently published. Mellgren et al (2011) reported on the 120 patients who received a permanently implanted stimulator.<sup>17</sup> Mean length of follow-up was 3.1 years, and 83 (69%) completed at least part of the 3-year follow-up assessment. In ITT analysis using the last observation carried forward, 79% of patients experienced at least a 50% reduction in the number of incontinent episodes per week compared with baseline, and 74% experienced at least a 50% reduction in the number of incontinent days per week. In a per-protocol analysis at 3 years, 86% of patients experienced at least a 50% reduction in the number of incontinent episodes per week, and 78% experienced at least a 50% reduction in the number of incontinent days per week. By the 3-year follow-up, 334 adverse events considered potentially device-related had been reported in 99 patients; 67% of these occurred within the first year. The most frequently reported adverse events among the 120 patients were implant site pain (28%), paresthesia (15%), implant site infection (10%), diarrhea (6%), and extremity pain (6%). Six infections required surgical intervention (5 device removals, 1 device replacement). Hull et al (2013) reported on outcomes in 72 patients (60% of the 120 implanted patients) who had completed a 5-year follow-up visit.<sup>18</sup> Sixty-four (89%) of the patients who contributed bowel diary data at 5 years had at least a 50% improvement from baseline in weekly incontinent episodes, and 26 (36%) of the 72 patients had achieved total continence. It is uncertain whether outcomes differed in the 40% of patients missing from the 5-year analysis.

A study by Altomare et al (2015) also reported on long-term outcome (minimum, 60-month follow-up; median, 84-month follow-up) in patients implanted with a sacral nerve stimulator for

fecal incontinence.<sup>19</sup> Patients were identified from a European registry and surveyed. Long-term success was defined as maintaining the temporary stimulation success criteria, i.e., at least 50% reduction in the number of fecal incontinence episodes (or fecal incontinence symptom score) at last follow-up, compared with baseline. A total of 272 patients underwent permanent implantation of an SNS device, and 228 were available for follow-up. A total of 194 (71.3%) of the 272 patients with implants, maintained improvement in the long-term.

### **Section Summary: Fecal Incontinence**

The evidence base consists of 2 RCTs, observational studies including several with long-term follow-up, and systematic reviews of RCTs and uncontrolled studies. Collectively, findings from these studies have suggested that SNM and SNS improve outcomes when used to treat chronic fecal incontinence in well-selected patients who have failed conservative therapy.

### **Constipation**

#### **Systematic Reviews**

The Cochrane review by Thaha et al (2015) assessed SNS for constipation and fecal incontinence in adults.<sup>10</sup> Two trials on SNM for constipation were included (Dinning et al [2015], and a crossover trial). In 1 trial, the time with abdominal pain and bloating decreased during the “on” period from 79% to 33%. However, in the larger Dinning trial (discussed below), there was no improvement with SNM during the “on” period. Reviewers concluded: “SNS did not improve symptoms in patients with constipation.”

Thomas et al (2013) published a systematic review of controlled and uncontrolled studies evaluating SNS for treatment of chronic constipation.<sup>20</sup> Reviewers identified 11 case series and 2 blinded crossover studies. Sample sizes for the case series ranged from 4 to 68 patients implanted with a permanent SNS device; in 7 of the 11 studies, fewer than 25 patients underwent SNS implantation. Among the 2 crossover studies, one included 2 patients implanted with an SNS device. The other, a study by Knowles et al (2012),<sup>21</sup> evaluated temporary stimulation in only 14 patients (see below). Patients were included if they were diagnosed with evacuatory dysfunction and rectal hyposensitivity and had failed maximal conservative treatment. They were randomized to 2 weeks of stimulation with the SNS device turned on and 2 weeks with the SNS device turned off, in random order. There was no wash-out period between treatments. The primary efficacy outcome was change in rectal sensitivity, which was assessed using 3 measures of rectal sensory thresholds. The trial found a statistically significantly greater increase in rectal sensitivity with the device turned on for 2 of the 3 measures. Among the secondary outcome measures, there was a significantly greater benefit of active treatment on the percentage of successful bowel movements per week and the percentage of episodes with a sense of complete evacuation. In addition to its small sample size, the trial lacked a washout period between treatments (i.e., there could have been a carryover effect when the device was used first in the on position). Moreover, the patients were highly selected; only 14 of the approximately 1800 patients approached met the eligibility criteria and agreed to participate in the study.

#### **Randomized Controlled Trials**

Zerbib et al (2017) reported on a double-blind crossover RCT of SNS in 36 women with refractory constipation.<sup>22</sup> Subjects were eligible if they had chronic constipation (>1 year), with 2 or fewer bowel movements per week, straining to evacuate with more than 25% of attempts, or sensation of incomplete evacuation with more than 25% of attempts, with lack of response to standard therapies. Thirty-six subjects meeting inclusion criteria underwent an initial peripheral nerve evaluation (PNE); those who had adequate symptom improvement to a predefined level were offered permanent SNS implant. After a 2-week washout, subjects were randomized to “on” or “off” for 8 weeks, followed by a 2-week washout, when the groups crossed over. Of the 36 patients enrolled, 20 responded and underwent randomization. Four were excluded (2 due to wound infection, 1 each due to the withdrawal of consent and lack of compliance). At 1-year follow-up, a positive response was observed in 12 of 20 and 11 of 20 patients after active and sham stimulation periods, respectively ( $p=0.746$ ).

A larger randomized crossover trial was published by Dinning et al (2015).<sup>23</sup> The trial included patients (age range, 18-75 years) with slow transit constipation. Potentially eligible patients completed a 3-week stool diary and, in order to continue participating, they had to indicate in the diary that they had complete bowel movements less than 3 days per week for at least 2 of the 3 weeks. Patients with metabolic, neurogenic, or endocrine disorders known to cause constipation were excluded. Fifty-seven met eligibility criteria and had temporary PNE, and 55 underwent permanent implantation. In random order, patients received active stimulation (subsensory in phase 1, suprasensory in phase 2) or sham stimulation (device was on, but pulse width and frequency were set to 0). The primary outcome measure, determined by stool diaries, was a bowel movement with feelings of complete evacuation more than 2 days per week for at least 2 of 3 weeks; it was only assessed in phase 2. Compared with sham stimulation, 16 (29.6%) of 54 patients met the primary outcome during suprasensory stimulation, and 11 (20.8%) of 53 patients met it during sham stimulation; the difference was not statistically significant ( $p=0.23$ ). Other outcomes did not differ significantly with suprastimulation vs sham stimulation and outcomes did not differ in the phase 1 comparison of subsensory vs sham stimulation.

### Case Series

One of the larger case series was published by Kamm et al (2010).<sup>24</sup> This prospective study was conducted at multiple sites in Europe. It included 62 patients who had idiopathic chronic constipation lasting at least 1 year and who had failed medical and behavioral treatments. Constipation was defined as at least one of the following: fewer than 2 bowel movements per week, straining to evacuate in at least 25% of attempts, or a sensation of incomplete evacuation on at least 25% of occasions. Forty-five (73%) of the 62 met criteria for permanent implantation during the 3-week trial period. Criteria included an increase in evacuation frequency to at least 3 per week or a 50% reduction in either frequency of straining during evacuation or in episodes with the sensation of incomplete evacuation. After a median follow-up of 28 months (range, 1-55 months) after permanent implantation, 39 (87%) of 45 patients were classified as treatment successes (i.e., met the same improvement criteria as used to evaluate temporary stimulation). There was a significant increase in the frequency of bowel movements from a median of 2.3 per week at baseline to 6.6 per week at latest follow-up ( $p<0.001$ ). The frequency of spontaneous bowel movements (i.e., without laxatives or other stimulation) increased from a median of 1.7 per week at baseline to 4.3 per week at last follow-up ( $p=0.001$ ). A total of 101 adverse events were reported; 40 (40%) of these were attributed to underlying constipation or an unrelated diagnosis. Eleven serious adverse events related to treatment were reported (the authors did not specify whether any patients experienced >1 serious event). The serious adverse events included a deep postoperative infection ( $n=2$ ), superficial erosion of lead through the skin ( $n=1$ ), persistent postoperative pain at the site of implantation ( $n=2$ ), conditions leading to lead revision ( $n=4$ ), and device failure ( $n=2$ ). The study was criticized for including a large number of patients who had more than 2 bowel movements per week at study entry.

Another study, published by Maeda et al (2010), focused on adverse events.<sup>25</sup> This chart review included 38 patients with constipation who received permanent SNS after a successful trial period. When charts were reviewed, a mean of 25.7 months had elapsed since implantation. A total of 58 reportable events were identified in 22 (58%) of the 38 patients. A median of 2 (range, 1-9) events per patient was reported; 26 (45%) of 58 events were reported in the first 6 months after device implantation. The most common reportable events were lack or loss of efficacy (26/58 [45%] events) and pain (16 [28%] events). Twenty-eight (48%) of the events were resolved by reprogramming. Surgical interventions were required for 19 (33%) of the events, most commonly permanent electrode replacement (14 events). Three (8%) of 38 patients discontinued device use due to reportable events.

### Section Summary: Constipation

Four randomized crossover studies are available; two had very small sample sizes, and the others did not find significant differences in outcomes when active SNS was compared with sham stimulation. There are also several, mainly small, case series. Collectively, they represent

insufficient evidence to permit scientific conclusions about the effect of SNM or SNS on health outcomes in patients with constipation.

### **Chronic Pelvic Pain**

A systematic review by Tirlapur et al (2013), evaluating studies on nerve stimulation for chronic pelvic pain, did not identify any RCTs on SNS for treatment of chronic pelvic pain or bladder pain.<sup>26</sup> The published evidence was limited to case series. For example, Martellucci et al (2012) reported on 27 patients with chronic pelvic pain (at least 6 months) who underwent testing for SNM implantation.<sup>27</sup> After a 4-week temporary stimulation phase, 16 (59%) of 27 patients underwent implantation of an InterStim device. In the 16 implanted patients, mean pain on a visual analog scale was 8.1 before implantation and 2.1 at the 6- and 12-month follow-ups. An earlier study by Siegel et al (2001) reported on 10 patients and reported that 9 of them experienced a decrease in pain with SNS stimulation.<sup>28</sup>

### **Section Summary: Chronic Pelvic Pain**

Data from several small case series with heterogeneous patient samples represent insufficient evidence on the effect of SNM and SNS on health outcomes in patients with chronic pelvic pain. RCTs are needed, especially with sham controls, reporting pain as the primary outcome.

### **Trial Stimulation Techniques**

As described in the Background section, there are 2 types of trial stimulation before permanent implantation of a neuromodulation device. They are PNE and stage 1 (lead implantation) of a 2-stage surgical procedure. PNE was the initial method of trial stimulation and has been the standard of care before permanent implantation of the device. In review articles like that by Baxter and Kim (2010), lead migration was described as a potential problem with the PNE technique, but no studies were identified that quantified the rate of lead migration in large numbers of patients.<sup>29</sup> The 2-stage surgical procedure is an alternative trial stimulation modality.

Comparative rates of lead migration and rates of progressing to permanent implantation are useful outcomes in that there may be reduced sensitivity of the PNE test due to lead dislodgement. However, due to the potential placebo effect of testing, it is also important to compare the long-term efficacy of SNM after these 2 trial stimulation techniques. Also, it would be useful to have data on the optimal approach to using the 2-stage surgical procedure. As noted in the Background section, the 2-stage surgical procedure has been used in various ways, including for patients who failed PNE, for patients with an inconclusive PNE, and for patients who had a successful PNE to further refine patient selection.

No RCTs were identified that evaluated long-term health outcomes (e.g., reduction in incontinence symptoms) after trial stimulation with PNE vs stage-1 lead implantation. There are limited data on the rates of failure after SNM in patients selected using the 2-stage test. Leong et al (2011), in a single-center prospective study, evaluated 100 urge incontinence patients with both PNE and the first stage of the 2-stage technique (i.e., patients served as their controls).<sup>30</sup> Patients were first screened with the PNE and, afterward, with lead implantation. Response to testing was based on diary data for 3 consecutive days after receiving each type of lead. In the test phase, 47 (47%) patients had a positive response to PNE, and 69 (69%) had a positive response to the first-stage lead placement test. All patients who responded to PNE also responded to stage-1 testing. The 69 patients who responded to stage-1 testing underwent implantation. They were then followed for a mean of 26 months, and 2 patients (3% of those with a positive test) failed therapy. Although this study showed a low failure rate, only 22 subjects had a successful test with the stage 1 technique but not with PNE. This is a small number of patients on which to base conclusions about the comparative efficacy of the 2 techniques. Also, the order of testing could have biased findings. All patients had PNE testing before the first-stage lead implantation and could have been biased by their first test. Stronger study designs would be to randomize the order of testing or to randomize patients to receive 1 type of testing or the other.

Scheepens et al (2002) analyzed 15 patients with urinary incontinence or retention who had a good initial response to PNE but then failed PNE in the longer term (i.e., days 4-7 of testing).<sup>31</sup> These 15 patients underwent stage 1 of the 2-stage technique. One patient failed the first stage and was explanted. Of the remaining 14 patients, 2 were explanted later due to lack of efficacy of SNM. The other 12 patients were followed for a mean of 4.9 years and voiding diary data showed improvement in nearly all incontinence symptoms. There was a low failure rate after stage 1 testing, but this is a small sample size, and stage-1 testing was not compared with another trial stimulation method (e.g., PNE).

Marcelissen et al (2010) published findings in 92 patients with urinary symptoms who underwent trial evaluation for SNM treatment.<sup>32</sup> Patients initially underwent PNE (n=76) or stage-1 surgery (n=16). Patients who had a negative PNE (n=41) then underwent stage-1 evaluation. Eleven (63%) of 16 patients had a positive initial stage-1 test and were implanted with a SNM device. Thirty-five (46%) of 76 patients had a positive initial PNE test and underwent permanent implantation. Forty-one (54% of those undergoing PNE) patients had a negative test and then had stage 1 surgical evaluation. Eighteen (44%) of 41 had a positive stage-1 test and underwent implantation. Altogether 64 patients underwent implantation of an SNM device. Mean follow-up was 51 months. Thirty-eight (59%) of 64 patients implanted experienced clinical success at last follow-up, defined as more than 50% improvement in symptoms reported in a voiding diary. The clinical success rate was not reported separately by trial stimulation method.

Several studies (e.g., Borawski et al [2007]<sup>33</sup> and Bannowsky et al [2008]<sup>34</sup>) compared response rates during the test phase in patients with urinary incontinence symptoms; both found higher response rates with the stage-1 test than with PNE. In these studies, more people who received the stage-1 test went on to undergo implantation. The Borawski study was an RCT with 30 patients (13 received PNE, 17 received the stage 1-test). The Bannowsky study was not randomized; 42 patients received a PNE, and 11 patients received a stage 1 test. Neither followed patients once devices were implanted, so neither provided data on the relative success rates of SNM after these 2 test procedures. Without follow-up after implantation, it is not possible to determine whether the 2-stage procedure reduced false negatives (i.e., selected more people who might benefit) or increased false negatives (i.e., selected more people who might go on to fail).

No published studies were identified that compared different trial stimulation techniques in patients with nonurinary conditions (e.g., fecal incontinence).

### Summary of Evidence

For individuals with urinary incontinence who have failed conservative treatment who receive SNM, the evidence includes RCTs, systematic reviews, and case series. Relevant outcomes are symptoms, morbid events, and treatment-related morbidity. Results from the RCTs and case series with long-term follow-up have suggested that SNM reduces symptoms of urge incontinence, urgency-frequency syndrome, nonobstructive urinary retention, and overactive bladder in selected patients. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals with fecal incontinence who have failed conservative treatment who receive SNM, the evidence includes RCTs and systematic reviews. Relevant outcomes are symptoms, morbid events, and treatment-related morbidity. Although relatively small, the available trials had a low risk of bias and demonstrated improvements in incontinence relative to alternatives. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals with constipation who have failed conservative treatment who receive SNM, the evidence includes RCTs and systematic reviews. Relevant outcomes are symptoms, morbid events, and treatment-related morbidity. The available trials have not consistently reported improvements in outcomes with SNM. Additional studies are needed to demonstrate the health

benefits of this technology. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals with chronic pelvic pain who receive SNM, the evidence is limited to case series. Relevant outcomes are symptoms, morbid events, and treatment-related morbidity. The evidence is insufficient to determine the effects of the technology on health outcomes.

### **Supplemental Information**

#### **Clinical Input from Physician Specialty Societies and Academic Medical Centers**

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

In response to requests from Blue Cross Blue Shield Association, input was received from 4 physician specialty societies and 2 academic medical centers in 2012. Reviewers from 2 specialty societies and 2 academic medical centers provided opinions on the possible medical necessity of implantable leads for test stimulation, as part of a 2-stage process for device implantation. All 4 respondents supported the use of implantable leads for test stimulation as an alternative to percutaneous test stimulation, for patients who had failed percutaneous test stimulation and/or for patients with inconclusive percutaneous test stimulation. Reasons for support included a longer period of interrupted treatment with stage-1 stimulation due to less lead migration and a higher rate of positive tests compared with percutaneous test stimulation.

### **Practice Guidelines and Position Statements**

#### **Urinary Disorders**

##### ***American Urological Association***

In 2014, the American Urological Association updated its guidelines on the diagnosis and treatment of overactive bladder.<sup>35</sup> The guidelines stated that sacral neuromodulation may be offered as a third-line treatment in carefully selected patients with severe refractory symptoms or into those who are not candidates for second-line therapy (e.g., oral antimuscarinics, oral  $\beta_3$ -adrenoceptor agonists, transdermal oxybutynin) and are willing to undergo surgery.

##### ***American College of Obstetricians and Gynecologists***

A 2005 practice bulletin on urinary incontinence from the American College of Obstetricians and Gynecologists considered sacral nerve neuromodulation to be beneficial for treating chronic voiding dysfunction.<sup>36</sup> An updated 2015 practice bulletin on urinary incontinence from the College did not address sacral nerve stimulation (SNS).<sup>37</sup>

#### **Fecal Disorders**

##### ***National Institute for Health and Care Excellence***

The National Institute for Health and Care Excellence issued guidance on the management of fecal incontinence in 2007. The guidance was reviewed in 2014, and no changes were made. The guidance has recommended:

“a trial of temporary sacral nerve stimulation should be considered for people with faecal incontinence in whom sphincter surgery is deemed inappropriate.... All individuals should be informed of the potential benefits and limitations of this procedure and should undergo a trial stimulation period of at least 2 weeks to determine if they are likely to benefit. People with faecal incontinence should be offered sacral nerve stimulation on the basis of their response to percutaneous nerve evaluation during specialist assessment, which is predictive of therapy success.”<sup>38</sup>

##### ***American College of Gastroenterology***

In its 2004 practice guideline on the diagnosis and management of fecal incontinence, the American College of Gastroenterology found limited evidence in favor of SNS.<sup>39</sup> The College

concluded that the precise indication for SNS, its comorbidity, its long-term outcome, and efficacy remain to be defined.

### **Pelvic Floor Society**

The Pelvic Floor Society conducted a systematic review as the basis for practice recommendations on the use of SNS for the treatment of constipation.<sup>40</sup> The systematic review assessed 7 observational studies, all generally of poor quality due to inadequate description of methods. Due to inconsistent reporting on harms and treatment success, and heterogeneity in the patient populations, the Society could not recommend SNS.

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

Not applicable.

### **Medicare National Coverage**

Effective 2002, the Centers for Medicare & Medicaid Services covers SNS for the "treatment of urinary urge incontinence, urgency-frequency syndrome, and urinary retention."<sup>41</sup> SNS "involves both a temporary test stimulation to determine if an implantable stimulator would be effective and a permanent implantation in appropriate candidates. Both the test and the permanent implantation are covered."

The following limitations for coverage apply to all three indications:

- Patients must be refractory to conventional therapy ... and be appropriate surgical candidates such that implantation with anesthesia can occur.
- Patients with stress incontinence, urinary obstruction, and specific neurologic diseases ... that are associated with secondary manifestations ... are excluded.
- Patients must have had successful test stimulation in order to support subsequent implantation. Before patients are eligible for permanent implantation, they must demonstrate a 50% or greater improvement through test stimulation. Improvement is measured through voiding diaries.

### **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>			
NCT02434874 <sup>a</sup>	Sacral Nerve Stimulation to Treat Urgency Urinary Incontinence with Wireless Neuromodulation	60	Dec 2017 (ongoing)
NCT03261622	Sacral Nerve Stimulation for Fecal Incontinence – Placebo or Clinical Effective (SNS)	75	Nov 2020
NCT03139734	Sacral Neuromodulation for Pelvic Pain Associated with Endometriosis	50	May 2022

<sup>a</sup> denotes an industry-sponsored trial

NCT: national clinical trial.

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42. Blue Cross Blue Shield Association. Medical Policy Reference Manual, No. 7.01.69 (April 2018).

### Documentation for Clinical Review

Please provide the following documentation (if/when requested):

- History and physical and/or consultation notes including:
  - Diagnosis of type of incontinence and frequency
  - Documented trial stimulation period demonstrating at least 50% improvement in symptoms (for permanent implant)
  - Prior trial of conservative therapies and patient response
- Make and model of device being requested (if applicable)
- Multidisciplinary evaluation notes

### Post Service

- Operative report(s)

### Coding

*This Policy relates only to the services or supplies described herein. Benefits may vary according to product design; therefore, contract language should be reviewed before applying the terms of the Policy. Inclusion or exclusion of codes does not constitute or imply member coverage or provider reimbursement.*

### MN/IE

The following services may be considered medically necessary in certain instances and investigational in others. Services may be considered medically necessary when policy criteria are met. Services may be considered investigational when the policy criteria are not met or when the code describes application of a product in the position statement that is investigational.

Type	Code	Description
	64561	Percutaneous implantation of neurostimulator electrode array; sacral nerve (transforaminal placement) including image guidance, if performed
	64581	Incision for implantation of neurostimulator electrode array; sacral nerve (transforaminal placement)
	64585	Revision or removal of peripheral neurostimulator electrode array
	64590	Insertion or replacement of peripheral or gastric neurostimulator pulse generator or receiver, direct or inductive coupling
	64595	Revision or removal of peripheral or gastric neurostimulator pulse generator or receiver
	95970	Electronic analysis of implanted neurostimulator pulse generator system (e.g., rate, pulse amplitude, pulse duration, configuration of wave form, battery status, electrode selectability, output modulation, cycling, impedance and patient compliance measurements); simple or complex brain, spinal cord, or peripheral (i.e., cranial nerve, peripheral nerve, sacral nerve, neuromuscular) neurostimulator pulse generator/transmitter, without reprogramming
	95971	Electronic analysis of implanted neurostimulator pulse generator system (e.g., rate, pulse amplitude, pulse duration, configuration of wave form, battery status, electrode selectability, output

Type	Code	Description
		modulation, cycling, impedance and patient compliance measurements); simple spinal cord, or peripheral (i.e., peripheral nerve, sacral nerve, neuromuscular) neurostimulator pulse generator/transmitter, with intraoperative or subsequent programming
	95972	Electronic analysis of implanted neurostimulator pulse generator system (e.g., rate, pulse amplitude, pulse duration, configuration of wave form, battery status, electrode selectability, output modulation, cycling, impedance and patient compliance measurements); complex spinal cord, or peripheral (i.e., peripheral nerve, sacral nerve, neuromuscular) (except cranial nerve) neurostimulator pulse generator/transmitter, with intraoperative or subsequent programming
HCPCS	A4290	Sacral nerve stimulation test lead, each
	E0745	Neuromuscular stimulator, electronic shock unit
	E1399	Durable medical equipment, miscellaneous
	L8680	Implantable neurostimulator electrode, each
	L8685	Implantable neurostimulator pulse generator, single array, rechargeable, includes extension
	L8686	Implantable neurostimulator pulse generator, single array, nonrechargeable, includes extension
	L8687	Implantable neurostimulator pulse generator, dual array, rechargeable, includes extension
	L8688	Implantable neurostimulator pulse generator, dual array, nonrechargeable, includes extension
ICD-10 Procedure	01HY0MZ	Insertion of Neurostimulator Lead into Peripheral Nerve, Open Approach
	01HY3MZ	Insertion of Neurostimulator Lead into Peripheral Nerve, Percutaneous Approach
	01HY4MZ	Insertion of Neurostimulator Lead into Peripheral Nerve, Percutaneous Endoscopic Approach
	01PY0MZ	Removal of Neurostimulator Lead from Peripheral Nerve, Open Approach
	01PY3MZ	Removal of Neurostimulator Lead from Peripheral Nerve, Percutaneous Approach
	01PY4MZ	Removal of Neurostimulator Lead from Peripheral Nerve, Percutaneous Endoscopic Approach
	01WY0MZ	Revision of Neurostimulator Lead in Peripheral Nerve, Open Approach
	01WY3MZ	Revision of Neurostimulator Lead in Peripheral Nerve, Percutaneous Approach
	01WY4MZ	Revision of Neurostimulator Lead in Peripheral Nerve, Percutaneous Endoscopic Approach
	0JH60BZ	Insertion of Single Array Stimulator Generator into Chest Subcutaneous Tissue and Fascia, Open Approach
	0JH60CZ	Insertion of Single Array Rechargeable Stimulator Generator into Chest Subcutaneous Tissue and Fascia, Open Approach
	0JH60DZ	Insertion of Multiple Array Stimulator Generator into Chest Subcutaneous Tissue and Fascia, Open Approach
	0JH60EZ	Insertion of Multiple Array Rechargeable Stimulator Generator into Chest Subcutaneous Tissue and Fascia, Open Approach
	0JH63BZ	Insertion of Single Array Stimulator Generator into Chest Subcutaneous Tissue and Fascia, Percutaneous Approach

Type	Code	Description
	0JH63CZ	Insertion of Single Array Rechargeable Stimulator Generator into Chest Subcutaneous Tissue and Fascia, Percutaneous Approach
	0JH63DZ	Insertion of Multiple Array Stimulator Generator into Chest Subcutaneous Tissue and Fascia, Percutaneous Approach
	0JH63EZ	Insertion of Multiple Array Rechargeable Stimulator Generator into Chest Subcutaneous Tissue and Fascia, Percutaneous Approach
	0JH80BZ	Insertion of Single Array Stimulator Generator into Abdomen Subcutaneous Tissue and Fascia, Open Approach
	0JH80CZ	Insertion of Single Array Rechargeable Stimulator Generator into Abdomen Subcutaneous Tissue and Fascia, Open Approach
	0JH80DZ	Insertion of Multiple Array Stimulator Generator into Abdomen Subcutaneous Tissue and Fascia, Open Approach
	0JH80EZ	Insertion of Multiple Array Rechargeable Stimulator Generator into Abdomen Subcutaneous Tissue and Fascia, Open Approach
	0JH83BZ	Insertion of Single Array Stimulator Generator into Abdomen Subcutaneous Tissue and Fascia, Percutaneous Approach
	0JH83CZ	Insertion of Single Array Rechargeable Stimulator Generator into Abdomen Subcutaneous Tissue and Fascia, Percutaneous Approach
	0JH83DZ	Insertion of Multiple Array Stimulator Generator into Abdomen Subcutaneous Tissue and Fascia, Percutaneous Approach
	0JH83EZ	Insertion of Multiple Array Rechargeable Stimulator Generator into Abdomen Subcutaneous Tissue and Fascia, Percutaneous Approach
	0JPT0MZ	Removal of Stimulator Generator from Trunk Subcutaneous Tissue and Fascia, Open Approach
	0JPT3MZ	Removal of Stimulator Generator from Trunk Subcutaneous Tissue and Fascia, Percutaneous Approach

## Policy History

This section provides a chronological history of the activities, updates and changes that have occurred with this Medical Policy.

Effective Date	Action	Reason
06/10/1998	New Policy Adoption	Medical Policy Committee
10/20/1999	Policy Review	Medical Policy Committee
01/11/2008	Policy Revision Title change. Prior policy title: Implantable Unilateral Sacral Nerve Stimulation for Urinary Incontinence. Code Revision.	Medical Policy Committee
09/25/2009	Policy Title Revision, criteria revised	Medical Policy Committee
10/29/2010	Coding Update	Administrative Review
04/01/2011	Policy revision with position change	Medical Policy Committee
08/29/2014	Policy revision with position change	Medical Policy Committee
04/30/2015	Sacral Anterior Root Stimulation for Neurogenic Bladder (Policy statement indication) has been merged to this policy from Neuromuscular, Functional, and Threshold Electrical Stimulation Policy revision without position change	Medical Policy Committee
07/31/2015	Coding Update	Administrative Review
02/01/2016	Coding update	Administrative Review

Effective Date	Action	Reason
03/01/2017	Policy revision without position change	Medical Policy Committee
07/01/2018	Policy revision without position change	Medical Policy Committee

### Definitions of Decision Determinations

**Medically Necessary:** A treatment, procedure, or drug is medically necessary only when it has been established as safe and effective for the particular symptoms or diagnosis, is not investigational or experimental, is not being provided primarily for the convenience of the patient or the provider, and is provided at the most appropriate level to treat the condition.

**Investigational/Experimental:** A treatment, procedure, or drug is investigational when it has not been recognized as safe and effective for use in treating the particular condition in accordance with generally accepted professional medical standards. This includes services where approval by the federal or state governmental is required prior to use, but has not yet been granted.

**Split Evaluation:** Blue Shield of California/Blue Shield of California Life & Health Insurance Company (Blue Shield) policy review can result in a split evaluation, where a treatment, procedure, or drug will be considered to be investigational for certain indications or conditions, but will be deemed safe and effective for other indications or conditions, and therefore potentially medically necessary in those instances.

### Prior Authorization Requirements (as applicable to your plan)

Within five days before the actual date of service, the provider must confirm with Blue Shield that the member's health plan coverage is still in effect. Blue Shield reserves the right to revoke an authorization prior to services being rendered based on cancellation of the member's eligibility. Final determination of benefits will be made after review of the claim for limitations or exclusions.

Questions regarding the applicability of this policy should be directed to the Prior Authorization Department. Please call (800) 541-6652 or visit the provider portal at [www.blueshieldca.com/provider](http://www.blueshieldca.com/provider).

*Disclaimer: This medical policy is a guide in evaluating the medical necessity of a particular service or treatment. Blue Shield of California may consider published peer-reviewed scientific literature, national guidelines, and local standards of practice in developing its medical policy. Federal and state law, as well as contract language, including definitions and specific contract provisions/exclusions, take precedence over medical policy and must be considered first in determining covered services. Member contracts may differ in their benefits. Blue Shield reserves the right to review and update policies as appropriate.*