MEDICAL POLICY – 6.01.502
Single Photon Emission Computed Tomography (SPECT) for Non-cardiac Indications

Effective Date: July 1, 2018
Last Revised: June 12, 2018
Replaces: N/A

RELATED MEDICAL POLICIES:
6.01.54 Dopamine Transporter Imaging with Single-photon Emission Computed Tomography

Select a hyperlink below to be directed to that section.

POLICY CRITERIA | DOCUMENTATION REQUIREMENTS | CODING
RELATED INFORMATION | EVIDENCE REVIEW | REFERENCES | HISTORY

∞ Clicking this icon returns you to the hyperlinks menu above.

Introduction

SPECT is a type of nuclear imaging test that uses a radioactive dye, also called a tracer, and a special camera to create a three-dimensional (3-D) image of the organs in the body. The images created by tracking the dye in the blood stream can show areas of increased/decreased blood flow and progressive changes in the body. SPECT is proposed to help diagnose or monitor certain tumors, bone disorders, and heart problems.

SPECT imaging of the brain for mental health disorders is used as a research tool in clinical trials. Research has not shown the utility of SPECT brain imaging for differential diagnosis or for assessing or predicting an individual’s risk of getting a mental health disorder.

Dopamine transporter imaging with single-photon emission computed tomography (DAT-SPECT) is addressed in another policy (see Related Medical Policies).

Note: The Introduction section is for your general knowledge and is not to be taken as policy coverage criteria. The rest of the policy uses specific words and concepts familiar to medical professionals. It is intended for providers. A provider can be a person, such as a doctor, nurse, psychologist, or dentist. A provider also can be a place where medical care is given, like a hospital, clinic, or lab. This policy informs them about when a service may be covered.
### Policy Coverage Criteria

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Medical Necessity</th>
</tr>
</thead>
</table>
| **SPECT scan**  | **SPECT scans may be considered medically necessary for any of the following conditions or symptoms:**  
|                 | - Brain tumor recurrence versus radiation necrosis                                |
|                 | - Liver hemangioma versus tumor identification                                    |
|                 | - Localization of abscess, infection or inflammation                              |
|                 | - Assessment of osteomyelitis (bone vs. soft tissue infection)                     |
|                 | - Lymphoma evaluation (tumor vs. necrosis)                                        |
|                 | - Neuroendocrine tumors (carcinoid, pheochromocytoma, thyroid carcinoma, adrenal gland tumors) [OctreoScan™ or MIBG] |
|                 | - Parathyroid disease                                                             |
|                 | - Renal function and renal scarring evaluation (Dimercaptosuccinic acid [DMSA] scan) |
|                 | - Seizure foci localization for patients with intractable epilepsy                 |
|                 | - Vertebral abnormalities evaluation (such as spondylosis, spondylolisthesis, or stress fractures) |
| **SPECT scan**  | **SPECT scans are considered not medically necessary for any of the following conditions or symptoms:**  
|                 | - Cerebrovascular accident (also called CVA, stroke, or brain attack)             |
|                 | - Subarachnoid hemorrhage                                                          |
|                 | - Transient ischemic attack (TIA)                                                  |

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Investigational</th>
</tr>
</thead>
</table>
| **SPECT scan**  | **SPECT scans are considered investigational for any of the following conditions or symptoms:**  
|                 | - Attention deficit hyperactivity disorder (ADHD)                                |
|                 | - Colorectal cancer (eg, with CEA-Scan, IMMU-4)                                   |
|                 | - Head trauma – evaluation of brain morphology                                   |
|                 | - Mental health disorders (diagnosis, prediction, response to medication)         |
|                 | - Movement disorder evaluation                                                    |
|                 | - Pervasive development disorders (PDD)                                           |
### Procedure

<table>
<thead>
<tr>
<th>Investigational</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Prostate cancer (e.g., with ProstaScint®)</td>
</tr>
<tr>
<td>- Unclassified dementia evaluation (e.g., Alzheimer disease)</td>
</tr>
</tbody>
</table>

### Documentation Requirements

The medical records submitted for review should document that medical necessity criteria are met. Include history and physical supporting that patient has ANY of the following symptoms or conditions:

- Brain tumors, to differentiate between recurrent tumor versus radiation changes, infection
- Liver hemangioma, to further define the mass
- Localization of abscess, infection, or inflammation
- Lymphoma evaluation
- Neuroendocrine tumors
- Parathyroid disease
- Renal function and renal scarring evaluation (dimercaptosuccinic acid [DMSA] scan)
- Patients with intractable epilepsy, when seizure focus cannot be localized
- Evaluation of vertebral abnormalities (such as spondylosis, spondylolysis, spondylolisthesis, degenerative joint disease/arthritis of the facet joints, stress fractures)

### Coding

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT</td>
<td></td>
</tr>
<tr>
<td>78607</td>
<td>Radiopharmaceutical localization of inflammatory process; tomographic (SPECT)</td>
</tr>
</tbody>
</table>

Note: CPT codes, descriptions and materials are copyrighted by the American Medical Association (AMA). HCPCS codes, descriptions and materials are copyrighted by Centers for Medicare Services (CMS).
Definition of Terms

Abscess: A mass filled with pus (made up of dead white blood cells and dead tissue, bacteria, and blood serum) that collects anywhere in the body as a result of the body’s response to an infection.

Adenoma: A noncancerous (benign) epithelial tumor that may affect various organs in the body. The adenoma often comes from or resembles glandular tissue, though some grow in nonglandular areas.

Carcinoid tumors: Carcinoid tumors are slow growing and usually start in the gastrointestinal tract (anywhere between the stomach and the rectum) or the lung. These tumors make and release (secrete) large amounts of hormones, including cortisol, histamine, insulin and serotonin. Carcinoid tumors are a type of neuroendocrine tumor.

Liver hemangioma: A noncancerous tumor (mass) that forms in or on the liver. It is made up of small blood vessels. Liver hemangiomas are more common in women than men.

Lymphoma: A cancer of the white blood cells (lymphocytes) of the body’s immune system. It develops in the lymph nodes and lymphatic system.

Movement disorders: A group of diseases that includes abnormally slow movement (bradykinesia), rigidity, tremor at rest, and postural instability.

Neuroendocrine tumors: A diverse group of tumors that form from cells of the hormone and nervous systems. They may be found in the intestine and also occur in the thyroid, lung and other parts of the body.

Pervasive developmental disorders (PDD): Refers to a group of disorders defined as delays in the development of socialization and communication skills often accompanied by cognitive and language delays.

Transient ischemic attack (TIA): A temporary lack of adequate blood and oxygen (ischemia) to the brain. The neurological signs and symptoms are similar to a brain attack (stroke), but go away within a short period of time. This may also be referred to as a mini-stroke.
Background

SPECT is an imaging modality that provides information about the functional level of a particular body part. It requires the injection of a low-level radioactive isotope (chemical tracer) into the bloodstream. Images then reflect how the tracer is processed by the body. This is in contrast to structural information provided by CT, MRI or ultrasound. Scans are made with a device that detects radioactivity in the body. A SPECT tomograph generates detailed information as the radiotracers used with a SPECT attach to elements appropriate for obtaining specific information. An example of this is how antibodies attach to specific types of tumors. A radiotracer can be attached to an antibody that will then bind to a tumor, which is then identified and located by a SPECT scan.

SPECT provides information about the cellular or level of chemical activity within an organ or system, including structural information about that system. This process can show areas of increased activity, such as inflammation seen in an abscess. Patterns of distribution can then be correlated with particular diseases. The selection of a radiotracer and imaging protocol is specific to the disease process being investigated. SPECT cameras can image large areas of the body as the emitted radiation from the radiotracers travel through the body.

Information obtained by SPECT complements or confirms data obtained by other forms of testing and may provide additional information in some situations. For many conditions, SPECT has been found to be as useful as PET, even though PET images tend to be of higher quality than those of SPECT, SPECT tends to be more available. Both PET and SPECT can diagnose disease prior to the onset of clinical symptoms or structural manifestations of disease as they provide information regarding the functional level of a body system.

Abscess/Infection

Labeled white blood cells are infused prior to SPECT imaging of the suspected clinical site of infection. This infusion helps with localization of tissue inflammation.
Surgical Repair

SPECT can be useful in distinguishing between tumor regrowth and radiation necrosis in patients with cerebral metastases.²

Cerebrovascular Disease (CVA, stroke, brain attack, TIA)

The use of SPECT has become outdated for the evaluation and management of cerebrovascular disease, including cerebrovascular accidents (CVA or stroke), subarachnoid hemorrhages, and transient ischemic attacks (TIA). Newer imaging techniques are more common such as computed tomography angiography (CTA) and magnetic resonance angiography (MRA).³⁻⁵

Epilepsy Seizure Foci

Ictal SPECT may be applicable for patients being considered for surgery to treat intractable epilepsy, when seizure focus cannot be localized by EEG, video-EEG, or MRI. Effective surgical treatment of patients with intractable epilepsy is dependent on accurate localization of the epileptic focus and precise delineation of the epileptogenic region. Ictal SPECT uses the physiologic increase in regional cerebral blood flow during seizures to localize the epileptogenic region. This testing aids in identifying the source or sources of the seizures as well as assess brain function. SPECT may offer a safe and accurate alternative to quantitative MRI or PET for the pre-surgical ictal detection of seizure focus. It should be performed in a hospital setting.⁶⁻⁷

Kidney (renal)

Using Technetium-99m labeled dimercaptosuccinic acid (DSMA) for diagnostic imaging may be useful to evaluate kidney function and identify scarring that may be the result of frequent infections.⁸⁻⁹ The National Institute for Health and Clinical Excellence 2007 guideline recommends DMSA scanning when the diagnosis cannot be confirmed by Doppler ultrasound.¹⁰ The American Urological Association 2010 Clinical Practice Guideline recommends DMSA scan when a renal ultrasound is abnormal in children with vesicoureteral reflux to detect the presence of any renal scarring.¹¹
Liver Hemangioma versus Primary Hepatoma or Metastases

Technetium-labeled red blood cells are infused prior to SPECT imaging of the liver. There is risk of hemorrhage in a percutaneous biopsy of liver hemangiomas, so non-invasive methods of testing are useful for differentiating between the blood pool of an hepatic hemangioma from other solid hepatic masses. Review articles and published studies support SPECT as an appropriate diagnostic tool to differentiate between hepatic lesions versus hemangiomas. 12

Lymphoma

SPECT scans may be useful to distinguish tumor from radiation necrosis in the chest and abdomen. An initial study can be compared with a follow-up study after the completion of treatment. SPECT is not appropriate for initial staging of lymphoma. 13

Mental Health Disorders

SPECT imaging of the brain for mental health disorders is used as a research tool in clinical trials. The National Institute of Mental Health (NIMH) made the following statement in their brochure titled “Neuroimaging and Mental Illness: A window into the brain”:

No scientific studies to date have shown that a brain scan by itself can be used for diagnosing a mental illness or to learn about a person’s risk for disease. Brain scans alone cannot be used to diagnose a mental disorder, such as autism, anxiety, depression, schizophrenia, or bipolar disorder. Other types of tests are needed for a mental illness to be properly diagnosed. 14,15

Mild Cognitive Impairment (MCI) Conversion to Alzheimer’s Disease (AD)

The utility of SPECT to predict conversion from mild cognitive impairment (MCI) to Alzheimer’s disease (AD) is limited. 16,17 A technology assessment of SPECT for dementia and AD by the Institute for Clinical Effectiveness and Health Policy concluded: “SPECT has not clearly demonstrated its usefulness in assessing patients with dementia, and it has no precise indications for diagnosis, evaluation of prognosis or monitoring response to treatment.” 18 Controlled studies of SPECT in AD show the sensitivity of this testing varies from 50 to 95%. The
American Academy of Neurology does not recommend SPECT for routine use in the differential diagnosis of dementia.\textsuperscript{19}

**Neuroendocrine Tumors**

SPECT for the diagnosis and staging of neuroendocrine tumors may be done using a monoclonal antibody (OctreoScan™) or I-131 meta-iodobenzyl-guanidine (MIBG) because carcinoids and other neuroendocrine tumors have somatostatin receptors and can be imaged with somatostain analogs tagged with an appropriate radioisotope.\textsuperscript{20, 21}

**Parathyroid Disease**

Guidelines on parathyroid scintigraphy from the Society of Nuclear Medicine\textsuperscript{22} state that there is a developing consensus that SPECT and SPECT/CT are most useful for improving the precision of anatomic localization. The Parathyroid Task Group of the EANM\textsuperscript{21} state that the use of SPECT/CT has a major role for obtaining anatomical details on ectopic foci. However, its use as a routine procedure before target surgery is still investigational. Preliminary data suggest that SPECT/CT has lower sensitivity in the neck area compared to pinhole imaging.\textsuperscript{22-24}

**Pervasive Development Disorders (PDD)**

Pervasive developmental disorder (PDD) can be difficult to diagnose due to the variety and severity of the presentation of symptoms. The American Academy of Neurology Practice Guideline states the following: "There is no evidence to support a role for functional neuroimaging studies in the clinical diagnosis of autism at the present time."\textsuperscript{25}

**Prostate Cancer**

ProstaScint, a monoclonal antibody combined with radioactive indium-111, is used to detect prostate cancer. It is injected into the body and then a gamma camera is used to locate prostate cancer cells. There is little evidence demonstrating improvements in health outcomes following ProstaScint scans. One study showed 60% progression-free survival (PFS) of 60% for those study participants with a negative scan and 74% for those with a positive scan. The researchers of the study concluded that the individuals with positive scans did not have a statistically significant
difference in PFS than those with a negative scan result. Pucar concluded that “ProstaScint has not added benefit over other imaging modalities in evaluating post-radical prostatectomy recurrence, due to its low sensitivity for detecting local recurrences and bone metastases.”

The American College of Radiology (ACR) states: “The reliability and usefulness of indium-111 radiolabeled capromab pendetide (a first-generation monoclonal antibody against prostate-specific membrane antigen [PSMA]) scan as a method to stage prostate cancer remains unproven.” They also note that the optimal use of the scan remains to be determined as the scans are difficult to interpret and are costly to perform.

**Vertebral Abnormalities**

SPECT scans may be useful in evaluating chronic back or neck pain that is atypical, that may be caused by spondylolysis or stress fractures that are undiagnosed by conventional imaging studies.

**References**


**History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/01/16</td>
<td>New policy, approved August 9, 2016. Add to Medicine section. SPECT may be considered medically necessary when criteria are met for select non-cardiac indications. SPECT is not medically necessary for cerebrovascular indications. SPECT is investigational when criteria are not met.</td>
</tr>
<tr>
<td>06/01/17</td>
<td>Annual review, approved May 23, 2017. Policy reorganized for clarity; no change in policy statements.</td>
</tr>
<tr>
<td>07/01/18</td>
<td>Annual Review, approved June 12, 2018. Policy updated with literature search through April 2018, References 10, 11,18, 19, 26-29 added. Added assessment of osteomyelitis to medical necessity criteria. Deleted degenerative joint disease/arthritis of the facet joints from the vertebral abnormalities medical necessity criteria.</td>
</tr>
</tbody>
</table>

**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). ©2018 Premera All Rights Reserved.

**Scope:** 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.
Discrimination is Against the Law

Premera Blue Cross complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability, or sex. Premera does not exclude people or treat them differently because of race, color, national origin, age, disability or sex.

Premera:
- Provides free aids and services to people with disabilities to communicate effectively with us, such as:
  - Qualified sign language interpreters
  - Written information in other formats (large print, audio, accessible electronic formats, other formats)
- Provides free language services to people whose primary language is not English, such as:
  - Qualified interpreters
  - Information written in other languages

If you need these services, contact the Civil Rights Coordinator.

If you believe that Premera has failed to provide these services or discriminated in another way on the basis of race, color, national origin, age, disability, or sex, you can file a grievance with:

Civil Rights Coordinator - Complaints and Appeals
PO Box 91102, Seattle, WA 98111
Toll free 855-332-4535, Fax 425-918-5592. TTY 800-842-5357
Email: AppealsDepartmentInquiries@Premera.com

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

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).

Arabic (Arabic):

لا يمكن للبهجة أن يكون هذا الإشعار عضوًا في مجموعة مفهومية تقوم بها هيئة.Premera Blue Cross، والتي تضم كل المعلومات التي ت🔍 إلى المستفيدين، سواء كان ذلك بسبب الخصائص المتعلقة بالعمر والجنس، والتوجه الجنسي، ورتبة المجردة أو المجردة، أو أي عامل آخر. يمكن للبهجة أن تكون مكونة من مجموعة مفهومية تشمل مجموعة مفهومية تتعلق بالمعلومات الشخصيّة، وذلك من خلال مراجعة المعلومات الشخصية الخاصة بالمستفيدين. على سبيل المثال، فهيئة Premera Blue Cross، يمكن أنها تكون مكونة من مجموعة مفهومية تتعلق بالمعلومات الشخصية الخاصة بالمستفيدين.

أو:

800-722-1471 (TTY: 800-842-5357) 453577

中文 (Chinese):

本通知有重要的訊息。本通知可能有關於您透過 Premera Blue Cross 提交的申請或保險的重要訊息。本通知可能有重要日期。您可能需要在截止日期之前採取行動，以保留您的健康保險或費用補貼。您有權利免費以您的母語得到本訊息和幫助。請撥電話 800-722-1471 (TTY: 800-842-5357).

Italiano (Italian):

Japanese (Japanese):
この通知には重要な情報を含んでいます。この通知により、Premera Blue Crossの申請または補償範囲に関する重要な情報が含まれていますが、この通知には記載されている可能性がある重要な日付をご確認ください。健康保険や保険サポートを維持するには、特定の期限までに行動を取りなければならない場合があります。貴重の言語による情報をサポーターが無料で提供します。800-722-1471 (TTY: 800-842-5357)までお電話ください。

한국어 (Korean):
본 통지서에는 중요한 정보가 들어 있습니다. 즉 이 통지서는 귀하의 신청에 관하여 그리고 Premera Blue Cross를 통해 커버래지에 관한 정보를 포함하고 있을 수 있습니다. 귀하는 귀하의 건강 커버레이지를 계속 유지하거나 비용을 절감하기 위해서 일정한 마감일까지 조치를 취해야 할 필요가 있을 수 있습니다. 귀하의 이러한 정보와 권리를 귀하의 안내로 비용 부담없이 얻을 수 있는 권리가 있습니다.800-722-1471 (TTY: 800-842-5357)로 전화하실시오.

Polski (Polish):

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 dados 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).

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 определённым 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).

Español (Spanish):
Este Aviso contiene información importante. Es posible que este aviso contenga información importante acerca de su solicitud de 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 a 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):

ไทย (Thai):
ประกาศนี้มีข้อมูลที่สำคัญ ประกาศนี้มีข้อมูลที่สำคัญเกี่ยวกับการขอการช่วยเหลือนะคร สำหรับการขอ Premera Blue Cross และมีข้อมูลที่สำคัญในกรณี อุบัติเหตุหรือสุขภาพodie การขอ Premera Blue Cross ศูนย์ช่วยเหลือทางการแพทย์การช่วยเหลือนะครต้องให้จัดให้มีความชัดเจน ต่อไปนี้จะมีการติดต่อที่ต้องการของคุณที่ต้องการจะไม่ได้รับการช่วยเหลือนะครที่ต้องการข้อมูลที่ต้องการจะไม่ได้รับการช่วยเหลือนะคร โปรดติดต่อที่ต้องการจะไม่ได้รับการช่วยเหลือนะคร 800-722-1471 (TTY: 800-842-5357).

Űnгар (Hungarian):
A hozzáféréshez a fontos információt támasztja meg. Az információ a Premera Blue Cross alapján készült, és fontos információkat tartalmaz egy eddig nem ismert időszakban. Kérjük, nézze meg az összes információt, mielőtt végighagyne. Az 800-722-1471 (TTY: 800-842-5357) számot is felhívja, ha segítséget szüksége van.

Română (Romanian):

Український (Ukrainian):
Це повідомлення містить важливу інформацію. Це повідомлення може містити важливу інформацію про Ваше звернення щодо страхувального 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 власні 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):