# Cardiac PET (CT)

## Technology In Brief

**What Is It:**
- Cardiac PET (or PET/CT) is an exam utilized to assess myocardial perfusion and viability. Alone, positron emission tomography (PET) provides functional imaging of metabolic activity of myocardial tissue; PET/CT simultaneously permits structural evaluation and provides attenuation correction.

**How Does it Work:**
- PET provides functional imaging based on an injected molecular marker, commonly rubidium-82 for myocardial studies, which requires a rubidium generator. Ammonia-based radiotracers may be used if an institution operates an on-site cyclotron. During the exam, areas of enhanced radiotracer uptake are detected to identify damaged tissue.

**Adoption Status:**
- Early adopters; most institutions purchase PET/CT, though PET-only system offered by vendor Positron

**FDA Status:**
- All models approved

**Major Vendors:**
- GE, Philips, Siemens, Positron

**Competing Products:**
- SPECT and SPECT/CT; cardiac MR; premium CT scanners

## Consideration

### Clinical
- PET is most commonly used for myocardial rest/stress perfusion for the detection of coronary artery disease (CAD) in a niche patient population
- Select patients include obese patients or female patients with significant soft tissue and patients with equivocal SPECT studies
- Additionally, PET may be used for the detection of viability, using FDG, to predict potential benefit of revascularization following CAD diagnosis

### Reimbursement
- In 2012, CMS combined reimbursement of non-myocardial PET and myocardial PET to reduce variability in annual myocardial reimbursement; thus, reimbursement for all PET studies is equivalent

### Cost
- A PET/CT may be purchased for $1.5M to $2.3M depending upon level of CT technology software
- A PET-only system may be purchased for $800K, and a rubidium generator may add variable costs of approximately $384K per year, depending on leasing arrangement

### Payer Coverage
- Myocardial PET reimbursement by private payers varies by geography, as select payers have a higher BMI threshold for reimbursement

### Market Potential
- There is a low market potential due to the small subset of patients that would qualify for cardiac PET studies
- With the rubidium generator recall over, the market for cardiac PET is now unfrozen, though still limited

### Operational Needs
- For cardiac PET, a rubidium generator or cyclotron (for ammonia) must be available on site
- Technologists must be trained in nuclear medicine
- Physicians must be trained and comfortable reading these studies

### Impact in Accountable Care
- Cardiac PET offers higher quality imaging than SPECT or SPECT/CT and serves a chronically ill patient population, particularly the obese

### Competitive Take
- For AMCs: Cardiac PET offers market differentiation through advanced imaging to support advanced cardiac centers and treat niche patient populations
- For community hospitals: Low volumes and high costs for cardiac PET make it difficult to justify an investment in PET/CT technology for cardiology without support from a strong oncology program

## Technology Insights’ Take

Source: Technology Insights interviews and analysis.
Cardiac PET Supports Advanced Cardiac Care, Serves Obese, But Expensive

**Market & Financial Overview**

**Cardiac PET National Market Estimates**

<table>
<thead>
<tr>
<th>2012</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>30,124</td>
<td>44,799</td>
</tr>
</tbody>
</table>

**49%**

Overall Market Growth

**Reimbursement Rates**

<table>
<thead>
<tr>
<th>APC</th>
<th>Group Title</th>
<th>2012 Final Rate</th>
<th>2013 Final Rate</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>0308</td>
<td>Positron Emission Tomography (PET) Imaging</td>
<td>$1,038</td>
<td>$1,056</td>
<td>2%</td>
</tr>
</tbody>
</table>

**Clinical Considerations**

**Diagnostic Combination of Cardiac PET and CTA**

- Severe stenosis
- 3-vessel disease
- Low ejection fraction or ischemia
- Degrees of ischemia
- Myocardial scar

The clinical benefits of PET over SPECT are well established, as PET provides superior degrees of spatial resolution and contrast. Future development of PET will be marked by improvements in targeted radiotracers and CT-detector technology. With the advent of 64-slice PET/CT, clinical research suggests that combined PET and CTA can compensate for the weakness of each modality, such as identifying patients with multi-vessel disease on CTA better than PET alone. Larger clinical studies will be required for greater validation of such advantages.

**Keys for Investment Success**

- Cardiac PET programs often lack the requisite volumes to break even on technology investments—due to the high monthly cost of rubidium generator operations—but may be justified by clinical utility and further development of cardiac services
- Cardiologist referrals are paramount to developing a successful cardiac PET program, as PET is not a requisite exam for many patients
- Technologists may aid in proactively alert referring physician to appropriateness of PET
- Developing competency in cardiac PET is relatively attainable, but requires certification, training and continued proof of competency

Source: Society of Cardiovascular Computed Tomography.