**COMPETENCY AND IMPLEMENTATION**
Peripheral (PIV) Insertion

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MC-PP-597
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**FINANCIAL DISCLOSURE**

Employment - CR Bard / Bard Access Systems

**PUBLISHED DATA:**

PIV Insertion Success Rate
CONTRIBUTING TO VENOUS DEPLETION

- Some chronic diseases
- Diabetes
- Cancer
- Cardiovascular conditions
- End stage renal disease
- COPD
- Aging population
- Pediatric population
- Mastectomy
- Stroke
- Contractures
- Smoking
- Inactivity
- Major surgery
- Extremes of age
- Due to limited use of specific limbs
- Obesity increasing
- Hemophilia
- Rheumatoid arthritis
- Drug abuse
- Crohns, ulcerative colitis, irritable bowel syndrome
- Dark pigmentation difficult to visualize vasculature
- Hypotensive
- Multiple injuries
- History of multiple venous cannulations
- Immunodeficiency
- Long periods of bedrest and inactivity
- Peripheral venous disease

*Hadaway, L (2005) Page 1
**Dychter, SS (2012) : Page 86

DURING THE PAST 20 YEARS INCREASE IN OBESITY

More than 1/3 of U.S. adults (35.7%) are obese

Potentially Challenging IV access
- non-palpable
- Non-visible

www.cdc.gov/obesity/datatrends.html 4/12/2012

TATTOO

Difficult visualization of veins
**IV CONSULTS**

- Vancouver General Hospital (1,000 beds)
  - 7 day per week consult service for inpatients with difficult sticks or IV device complications
  - Consults received from 33 of 37 wards
  - Majority of consults
    - Surgical services (45%)
    - Medical services (41%)
    - Critical care (9%)
    - Other (5%)
  - General surgery wards highest (21%)

Bosma, TL (2002) Page 311

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**STATUS OF VEIN AT TIME OF CONSULT**

Vancouver General Hospital: IV Consults

<table>
<thead>
<tr>
<th>Status of Vein</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visible and good</td>
<td>20%</td>
</tr>
<tr>
<td>Visible and fair</td>
<td>24%</td>
</tr>
<tr>
<td>Visible and poor</td>
<td>9%</td>
</tr>
<tr>
<td>Non visible but palpable</td>
<td>10%</td>
</tr>
<tr>
<td>Non visible non palpable</td>
<td>4%</td>
</tr>
<tr>
<td>Unknown</td>
<td>3%</td>
</tr>
</tbody>
</table>

Bosma, TL (2002) Page 311

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**PIV INSERTION SUCCESS**

Shands at the University of Florida

- N=371 patients
- Mean number of IV attempts 2.18
- Range 1 - 14 attempts
- 27% required 3 or more attempts
- 25% treatment delay for patients requiring IV therapy
- No visualization technologies utilized

**PERIPHERAL IV: SUCCESS RATE**

DOCTORS HOSPITAL, SARASOTA FLORIDA

Successful IV Insertion

- Adult and Peds
- No visualization technology noted
- N = 753 total patient IV starts


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**PERIPHERAL IV: SUCCESS RATE**

<table>
<thead>
<tr>
<th># Insertion attempts</th>
<th>Generalist Nurse 437 starts</th>
<th>Infusion Nurse 639 starts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 attempt</td>
<td>76.9% success</td>
<td>81.9% success</td>
</tr>
<tr>
<td>2 attempts</td>
<td>17.3% success</td>
<td>16.1% success</td>
</tr>
<tr>
<td>3 attempts</td>
<td>5.8% success</td>
<td>2.0% success</td>
</tr>
</tbody>
</table>

- Hospitals
- 300-500 beds
- Home infusion agency
- No visualization technology noted


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**VISUALIZATION TECHNOLOGIES**

Placement:
Peripheral Intravenous Catheter (PIV)
<table>
<thead>
<tr>
<th>Ultrasound Group</th>
<th>Tradiona (Landmark) Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>97% success rate</td>
<td>38%</td>
</tr>
<tr>
<td>13 minutes*</td>
<td>30 minutes*</td>
</tr>
<tr>
<td>1.7 punctures</td>
<td>3.7 punctures</td>
</tr>
<tr>
<td>8.7 patient satisfaction</td>
<td>5.7 patient satisfaction</td>
</tr>
</tbody>
</table>

*Time from notification by a nurse until successful cannulation

Physicians (2) Department of Emergency Medicine
Inclusion Criteria: inability of RN to obtain access after (3) attempts
Candidates: Obesity, IV Drug abuse, chronic medical conditions
Exclusions: Need for central venous access
Greater patient satisfaction with ultrasound group

Costantino, TG (2005) Pages 4,5,6

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**VISUALIZATION TECHNOLOGIES: PIV INSERTION**
**GEORGE WASHINGTON UNIVERSITY MEDICAL CENTER**

- N=219 attempts
- ED Technicians (N=19)
- Insertion success rate of 78.5%
- Training program:
  - 2 hour training session
  - 1 hour didactic
  - 1 hour hands on
  - Measure depth to make sure catheters were of adequate length
  - Quiz (10) questions
  - Transverse method of ultrasound encouraged initially

Schoenfeld, E (2011): Page 496

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**VISUALIZATION TECHNOLOGIES: PIV INSERTION**
**R ADAMS COWLEY SHOCK TRAUMA CENTER**

- N=148 PIV requests
- 147 successfully placed (99%)
- 105 successfully placed 1st attempt (71%)
- Intensive Care Unit
- Ultrasound-guided placements

Gregg, SC (2010) Page 1
COST AND REIMBURSEMENT

COSTS: PIV INSERTION

- Santolucito (OHSU): 2001
  - $32 operational cost successful insertion
- Multiple attempts:
  - Additional nursing time
  - Multiple catheters
  - Additional supplies for procedure
- $96 for (3) attempts

Hadaway, L (2005) Page 1

NURSING SALARY

<table>
<thead>
<tr>
<th>Experience</th>
<th>Hourly rate</th>
<th>Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 years</td>
<td>$27.05</td>
<td>$52,967</td>
</tr>
<tr>
<td>6-15 years</td>
<td>$32.30</td>
<td>$59,732</td>
</tr>
<tr>
<td>16-25 years</td>
<td>$33.28</td>
<td>$66,699</td>
</tr>
<tr>
<td>≥26 years</td>
<td>$37.96</td>
<td>$74,070</td>
</tr>
</tbody>
</table>

- PIV start/restart
  - 15 minutes (2010)
  - 20 minutes (1995)
- Difficult (2) attempts
  - 45 minutes (1995)

2010: Illinois, Wisconsin, Indiana
Bard Access Systems MM-713
Keefe, S (2010) Pages 6-7
LIABILITY RELATED TO PIV CATHETERIZATION
4,194 CLAIMS related PERIPHERAL VASCULAR CATHETERIZATION AND PIV V CATHETERS

<table>
<thead>
<tr>
<th>Complication</th>
<th>No. of cases</th>
<th>Cases resulting in payment</th>
<th>2007 median payment</th>
<th>2007 payment range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin slough or necrosis</td>
<td>26</td>
<td>25% (7)</td>
<td>566,370</td>
<td>22,184–515,476</td>
</tr>
<tr>
<td>Swelling</td>
<td>22</td>
<td>38% (8)</td>
<td>511,580</td>
<td>5342–545,532</td>
</tr>
<tr>
<td>Nerve damage</td>
<td>22</td>
<td>51% (12)</td>
<td>54,575</td>
<td>1,360–52,215,500</td>
</tr>
<tr>
<td>Fasciitis, fasciitis, fasciitis or</td>
<td>20</td>
<td>67% (13)</td>
<td>542,750</td>
<td>54,000–51,600,000</td>
</tr>
<tr>
<td>Neutropenia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin slough or necrosis</td>
<td>4</td>
<td>75% (3)</td>
<td>575,600</td>
<td>120,000–52,000,000</td>
</tr>
</tbody>
</table>


REIMBURSEMENT

Hospital Inpatient
DRG Based for Medicare and Medicaid
CPT 36000 - (Professional only)

COMPETENCY
PRESS GANEY: SATISFACTION REPORT  
N=1,759,472 PATIENTS SURVEYED  
N=11,137 HOSPITALS SURVEYED

<table>
<thead>
<tr>
<th>How well the staff worked together to care for you (highest)</th>
<th>Skill of nurses in general</th>
<th>Courtesy of the person who started your IV</th>
<th>Skill of the person who started your IV</th>
<th>Room Temperature Lowest score</th>
</tr>
</thead>
<tbody>
<tr>
<td>.79 mean</td>
<td>.63 mean</td>
<td>.42 mean</td>
<td>.42 mean</td>
<td>.25 mean</td>
</tr>
</tbody>
</table>

Correlations of items with “likelihood of recommending from lowest to highest

Wolosin, RJ (2003) Pages 1,4

COMPETENCY VALIDATION

* Variety of different methods should be used for competency validation including but not limited to:
  * Written tests for evaluating knowledge
  * Use of clinical scenarios
  * Assessment of critical thinking skills
  * Observation in a skills laboratory
  * Observation of skill in work environment
  * Preferred method for an invasive procedure

Infusion Nurses Standards of Practice (2011) Page 511

IMPLEMENTATION
IMPLEMENTATION STEPS

- Hospital needs to develop policy and procedure
- Equipment IFU
- Competency checklist
- Didactic training
- Simulation training
- Patient proctoring
- Outcome monitoring and evaluation

REFERENCES

- MM-713 Bard Access Systems 2011
- Appendix IV: Professional-Organizational Procedure/Labor Requirements
- Santolucito JB; (2001) "A Retrospective Evaluation of the Timeliness of Physician Initiated PICC Referrals; JVAD Fall 2001 pp 20-26
- Brown F; (1998) "An I.V. Specialty Team Can mean Savings for Hospital and Patient" JITA (7) September-October 1998 p58
- Lininger RA; (2003) "Pediatric Peripheral IV Insertion Success Rates" Pediatric Nursing 29(5) September/October 351-354
- Infusion Nursing Standards of Practice JJN 2011; 34(1S)