

# SCOPE OF PRACTICE: THE ADVANCED PRACTICE NURSING ROLE IN CENTRAL VENOUS CANNULATION AND VASCULAR ACCESS

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# Program

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Scope of Practice

Nurse Led Central Venous  
Catheter Insertion

Key Points

# Background

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- It is commonly accepted that the more often a procedure is performed by an individual the greater their expertise
- BUT why is there demarcation still between what is “Doctors” work and what is “Nurses” work?
- It has been about culture, history and marking ones professional turf!
- Nurses are no different!

# What is already known about this topic?

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- Expanding opportunities for postgraduate specialist education, health service restructuring, and technological advances have all had a significant impact on the nature of the nurse's role and scope of practice and their influence on the health care system.
- Nurses have embraced these changes and the opportunity they bring for 'extending the frontiers of practice'
- Nurse practitioners offer a beneficial service and fill a gap in health care provision.
- The nurse practitioner scope of practice varies from country to country.
- Australian nurse practitioners are well positioned to bridge the divide of inequitable distribution of health services not only between metropolitan and rural/remote areas, but also within metropolitan areas.

# Scope of Practice defined..

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The scope of nursing practice, as defined by various state nursing practice acts and state boards of nursing, addresses the obligation of registered nurses to use specialised judgment and skill in providing safe and competent patient care .

Ultimately, the scope of nursing practice encompasses standards of professional nursing practice that identify the roles and responsibilities of the nurse in any health care setting.

Blair (2003)

# SOP defined...

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Position Statement on Scope of Practice (ANA), the standards of professional nursing practice require that RNs only carry out those activities for which they have the required knowledge, skills, and abilities.

In many countries worldwide, practice is guided by legislative conditions and these practice changes require filtration through bodies of organisations before it get to the advanced practice nurse (ANP) & nurse practitioners (NP).

Today an evolving body of international evidence supports the effectiveness of the APN role in hospital settings, in primary health care, as well as in long-term care facilities

The introduction of APN roles requires a collaborative, systematic and evidence-based process designed to provide data to support the need and goals for a clearly defined APN role

# SOP defined...

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The introduction of APN roles requires a collaborative, systematic and evidence-based process designed to provide data to support the need and goals for a clearly defined APN role

A holistic nursing orientation is needed, together with the promotion of full utilization of all the role domains and creation of an environment that supports the role.

Organizational factors influence the ability of APNs to work effectively to their full scope of practice

Fagerström (2009)

# Advanced Nursing Practices

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- Advanced practice nursing is emerging as an important strategy in improving patient safety and improving patient health outcomes.
- The insertion of a CVC by a trained specialist nurse clinician may promote efficiencies and potentially minimise adverse events.
- The training methods for nurse clinicians emphasise that appropriate training and supervision along with standard operating protocols can decrease rates of adverse outcomes including risks of insertion and the reduction of CVC-associated infection rates

# Advanced Nursing Practices

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- Close cooperation and support from medical colleagues is essential and the accessibility to mentorship and clinical supervision is critical for developing these advanced practice clinical roles
- Provides standardised clinical care – best practice, best policy, best outcomes
- Nurses good at developing and working to protocol-driven practice
- Assist in better time management, cost efficiency and greater patient satisfaction

# Advanced Nursing Practices

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- More involved in practice development, quality/review processes, research, collaboration
- Opened avenues for nurses to specialise - i.e. vascular access – 40yrs in the USA, 30yrs in the UK, 20yrs in Aust
- Better public perception of skills and knowledge of nurses – e.g. rural NPs managing communities health requirements

# Nurse Led Central Venous Catheter Insertion

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## *Background:*

- Due to complication risks, CVCs traditionally inserted by medical practitioners.
- It is *Experience, Training and Procedural Volume* that guide success!
- An experienced clinician who has inserted more than 50 CVCs will have half the estimated complications of one who has inserted less than 50

Taylor & Palagiri (2007)

# Nurse Led Central Venous Catheter Insertion

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*Why Nurse Led Advanced Practice? ORGANISATIONAL NEED!*

- Advanced practice nursing challenging traditional boundaries between medicine and nursing
- Increasing specialisation and technology is changing mode of health care delivery (Dowling et al. 1995)
- Specialist nurses provide a crucial link for continuity and coordinated care
- Specialist nurses can provide high quality, efficient care

# Nurse Led Central Venous Catheter Insertion

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## *In My Own Institution:*

- Mid-Late 1990s Liverpool Hospital doubled in size : we formalised the Trauma Team and implemented the MET System
- Huge impact on workload for the ICU: CVC placement for ward population became less reliable but more frequently requested
- Perception by senior ICU medical staff that there was limited time to supervise junior medical staff which was leading to increased complications/infections
- Initially medical directors applied for funding for an extra medical training position – this was denied.....

# Central Venous Access Service

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- CNC-led Vascular Access service last 15yrs in 650-bed university affiliated institution – est. 1996
- 5550+ CVC, PICC & Vascaths insertions (dialysis/apheresis/Stem Cell Collections/BMT)
- Single operator service initially 3 day/week for 2yrs – 5days/week for 13 years
- Minimal complications
- Addition of CNS 0.3FTE (2003) - proactive service = more consulting, greater access choices, annual leave relief, more education
- Infection rates vastly improved – SSSL (2006) <0.5% and CLABicu (2008/9) - 0% (over 18months)

# Central Venous Access Service

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- Use of portable ultrasound-guided access outside Radiology Dept for ALL PICCs, CVC (IJ, Fem, AxV) – purchased in 2005.
- Proceduralist accreditation through Australian Institute of Ultrasound in 2007
- Specific training and accreditation for vascular access – hospital-based program – incl. doctors orientation and ongoing education program
- Dedicated procedure room and equipment trolley fully stocked with consumables for vascular access incl. full monitoring – ECG/SpO<sup>2</sup>/ART/CVP/NIBP

# Nurse Led Central Venous Catheter Insertion

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## *Why Nurse Led Advanced CVC Insertion?*

- Integrative Literature Review undertaken in 2008

Alexandrou E, Spencer T, Frost S, Parr M, Davidson P, Hillman K.

The nursing role in central venous cannulation: implications for practice, policy and research. 2009. Journal of Clinical Nursing. January 2009.

- 525 papers identified but only 10 met inclusion criteria.
- Papers mainly Narrative in Nature.
- Papers described service development, outcomes and credentialling.

# Three major themes emerged...

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1. Development of dedicated nurse led CVC insertion services were a response to lack of training for JMOs, unacceptable rates of complications on insertion, high infection rates, increased costs with repeated attempts, and no dedicated follow up service
2. Insertion and infectious outcomes for nurses were similar to wider published medical literature
3. Nurse services had dedicated / documented training and credentialing processes

# Currently, we are at.....

Double Lumen CVC	367
Double Lumen PICC 5Fr	266
Midline	139
Single Lumen CVC	1244
Single Lumen PICC 3Fr	18
Single Lumen PICC 4Fr	2170
Triple Lumen CVC	835
Triple Lumen CVC Arrowgard	177
Vascath	207
Double Lumen Midline 5Fr	1
Arterial Catheter	4
Single Lumen CVC Arrowgard	101
Triple Lumen CVC Arrowgard 30cm	4
Single Lumen CVC 30cm	1
Triple Lumen CVC Arrowgard+	10
Single Lumen CVC Arrowgard+	2
<b>Grand Total</b>	<b>5546</b>

Double Lumen CVC	6.62%
Double Lumen PICC 5Fr	4.80%
Midline	2.51%
Single Lumen CVC	22.43%
Single Lumen PICC 3Fr	0.32%
Single Lumen PICC 4Fr	39.13%
Triple Lumen CVC	15.06%
Triple Lumen CVC Arrowgard	3.19%
Vascath	3.73%
Double Lumen Midline 5Fr	0.02%
Arterial Catheter	0.07%
Single Lumen CVC Arrowgard	1.82%
Triple Lumen CVC Arrowgard 30cm	0.07%
Single Lumen CVC 30cm	0.02%
Triple Lumen CVC Arrowgard+	0.18%
Single Lumen CVC Arrowgard+	0.04%
<b>Grand Total</b>	<b>100.00%</b>

# Ultrasound guided devices placed

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Double Lumen CVC	3
Double Lumen Midline 5Fr	0
Double Lumen PICC 5Fr	163
Midline	55
Single Lumen CVC	3
Single Lumen CVC 30cm	1
Single Lumen CVC Arrowgard	3
Single Lumen PICC 3Fr	1
Single Lumen PICC 4Fr	737
Triple Lumen CVC	11
Triple Lumen CVC Arrowgard	5
Triple Lumen CVC Arrowgard 30cm	3
Vascath	46
Triple Lumen CVC Arrowgard+	1
Single Lumen CVC Arrowgard+	0
Grand Total	1032

# Nurse Led Central Venous Catheter Insertion

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## *Development of Nurse Led CVC Services:*

- Delay in CVC placement = delay in treatment, possible extension of hospital stay
- Waterhouse (2002) reported waiting time of up to 48 days for permanent dialysis catheter insertion (this reduced to 2-5 days).
- Fitzsimmons et al. (1997) reported that delay in CVC placement was reason for service implementation

# Nurse Led Central Venous Catheter Insertion

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## *Development of Nurse Led CVC Services:*

- Hamilton (2005) reported junior medical practitioner insertion without adequate supervision and training can lead to:

Increased insertion risk

Multiple insertion attempts

Increased rates of infection

Increased costs

Attempts by other clinicians

# Nurse Led Central Venous Catheter Insertion

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## *What About the Outcomes?*

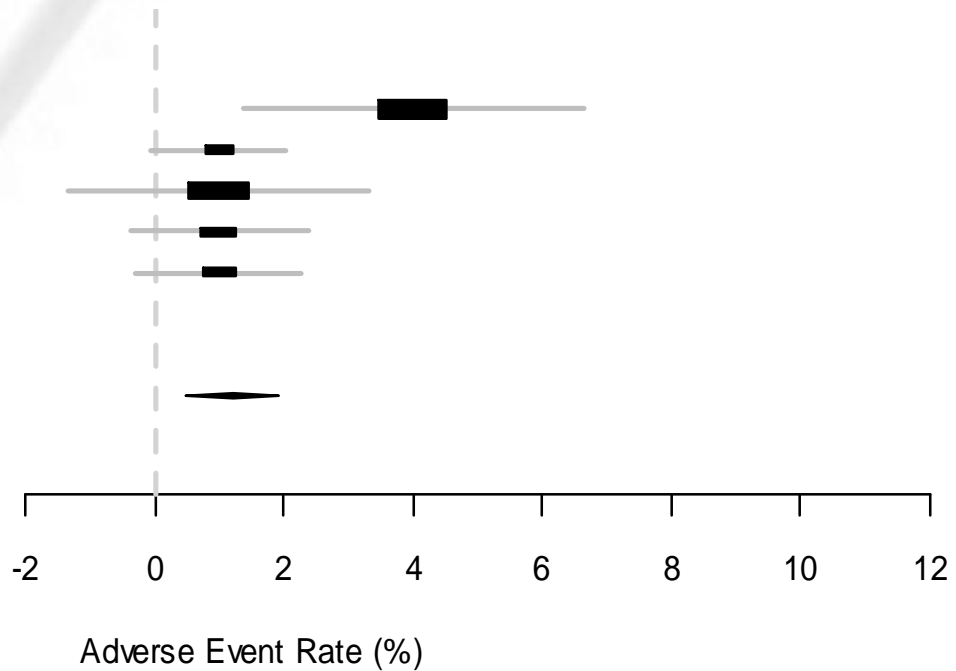
- Kelly et al. (2003) reported 89% of catheter placements to be uneventful.
- Casey and Davies (2003) reported no difference on insertion outcomes between advanced practice nurses and medical officers.
- Waterhouse (2002) reduced waiting times from 48 days to an average of 2-3 days.
- Bolande et al (2005) showed nurses can be trained to insert tunnelled lines successfully.

# Nurse Led Central Venous Catheter Insertion

## (A) Pneumothorax

Hamilton (2005)  
Gopal (2006)  
Waterhouse (2002)  
Fitzsimmons (1997)  
Boland (2003)

Summary



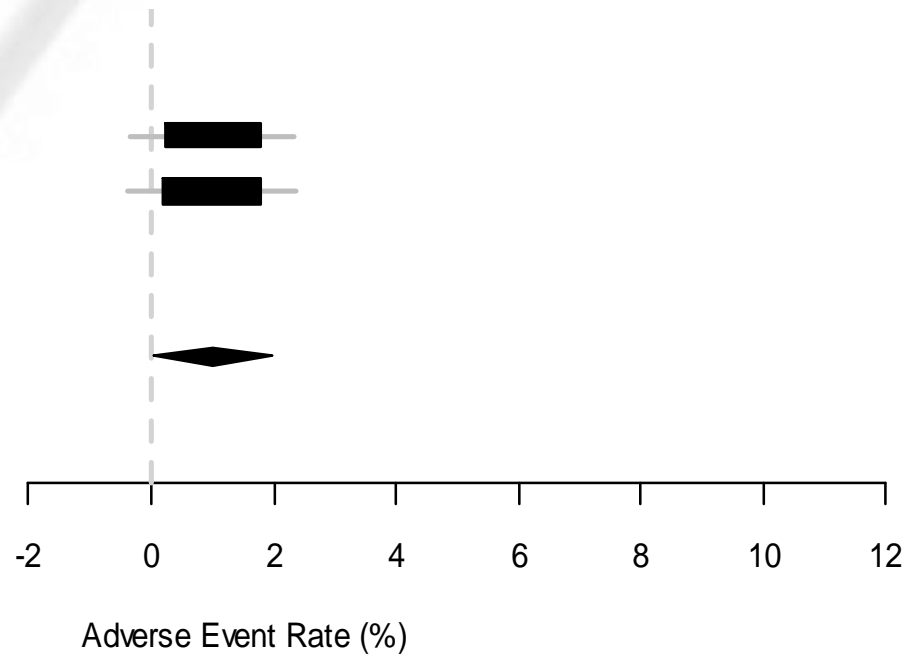
# Nurse Led Central Venous Catheter Insertion

## (B) Sepsis

Hamilton (2005)

Boland (2003)

Summary



# Nurse Led Central Venous Catheter Insertion

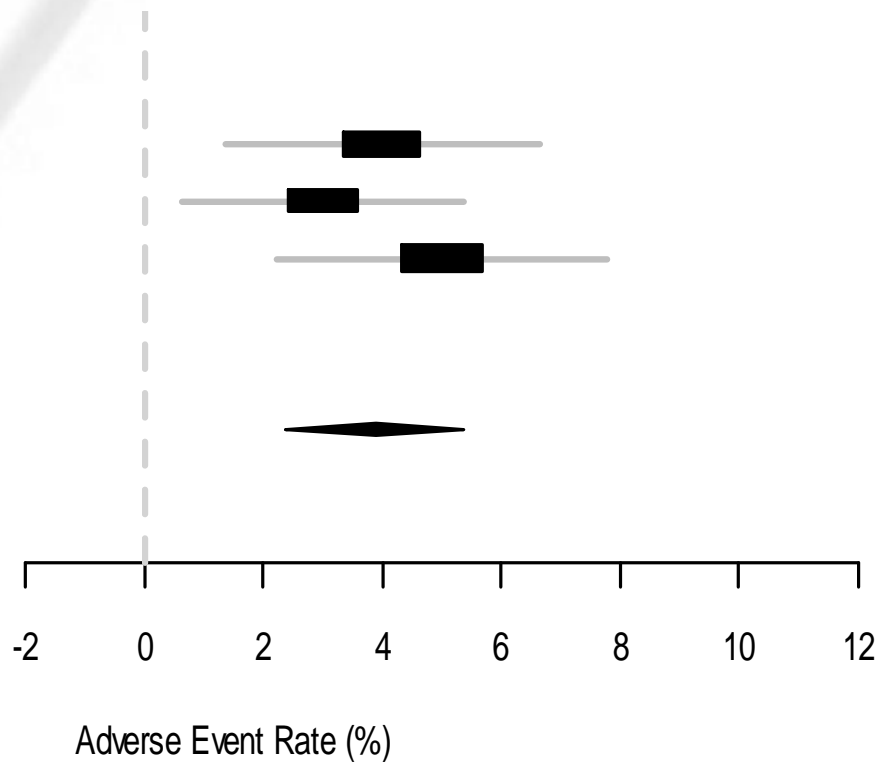
## (C) Arterial Puncture

Gopal (2006)

Fitzsimmons (1997)

Boland (2003)

Summary

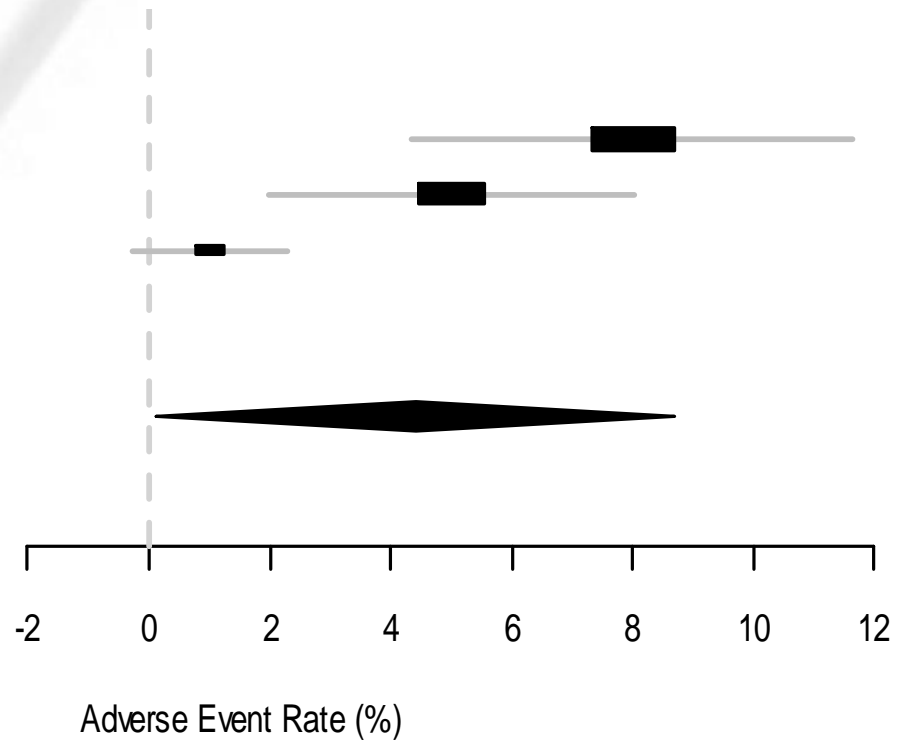


# Nurse Led Central Venous Catheter Insertion

## (D) Misplaced Tip

Gopal (2006)  
Fitzsimmons (1997)  
Boland (2003)

Summary



# Nurse Led Central Venous Catheter Insertion

## *What About the Outcomes?*

- Yacopetti et al (2010) – CVC outcomes between nurse consultant and anaesthetic medical staff.
- Data collected over 18 months

	Clinician type		<i>P</i> *
	Anaesthetic medical staff	Clinical Nurse Consultant	
Catheters inserted, <i>n</i>	245	123	
Patients, <i>n</i>	148	84	
Mean age in years (SD)	50 (15)	49 (18)	0.59
Male sex, <i>n</i> (%)	130 (53%)	75 (61%)	0.12

# Nurse Led Central Venous Catheter Insertion

Complications on insertion, <i>n</i> (%)	Clinician type		<i>P</i>
	Anaesthetic medical staff	Clinical Nurse Consultant	
Uneventful	194 (79%)	96 (78%)	0.91
Multiple passes	18 (7%)	5 (4%)	0.32
Arterial puncture	1 (< 1%)	0	1.00
Failed venous access	12 (5%)	8 (7%)	0.69
Misplaced CVC tip	1 (< 1%)	0	1.00
Difficult feed / access	5 (6%)	13 (10%)	0.33
Pneumothorax	2 (1%)	0	0.55
Haematoma	2 (1%)	(1%)	0.56

# Nurse Led Central Venous Catheter Insertion

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COMPLICATION	I. JUGULAR (%)	S/CLAVIAN (%)	FEMORAL (%)
Arterial Puncture	6.3 – 9.4	3.1 – 4.9	9.0 – 15
Haematoma	0 – 9.4	1.2 – 2.1	3.8 – 4.4
Pneumothorax	0 – 0.7	1.2 – 3.1	NA
Venous Perforation	0.2	1.2	0
TOTAL	6.3 – 12.1	6.2 – 10.7	12.8 – 19.4

(Comfere & Brown 2007)

# Nurse Led Central Venous Catheter Insertion

## What About the Infectious Outcomes?

	Clinician type		<i>P</i> <sup>†</sup>
	Anaesthetic medical staff*	Clinical Nurse Consultant*	
Routine CVC tip surveillance <sup>‡</sup> (N = 159)	103 (42%)	56 (58%)	
No tip growth	79 (77%)	51 (91%)	0.01
Tip growth	24 (23%)	5 (9%)	< 0.01
Clinically indicated CVC tip surveillance, <sup>§</sup> (N = 56)	46 (19%)	10 (8%)	< 0.01
No tip growth	20 (44%)	9 (90%)	0.04
Tip growth only	7 (15%)	0	0.33
BC growth only	3 (6%)	0	1.00
CRBSI	16 (35%)	1 (10%)	0.24
CRBSIs/1000 catheters	2.5	0.4	0.04
Catheter-related thrombosis	1 (< 1%)	0	1.00

# Nurse Led Central Venous Catheter Insertion

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*Outcomes of our central line service (2008):*

## Patient Characteristics

Number of Catheters	4,212	
Number of Patients	3,055	
Age mean (SD)	56	(19)
Males %	58%	

## Indication % (N)

Antibiotics	61.7	(2598)
Oncology / Autoimmune	18	(759)
Other	7.9	(332)
Poor Vascular Access	7.2	(305)
Parenteral Nutrition	5.2	(218)

# Nurse Led Central Venous Catheter Insertion

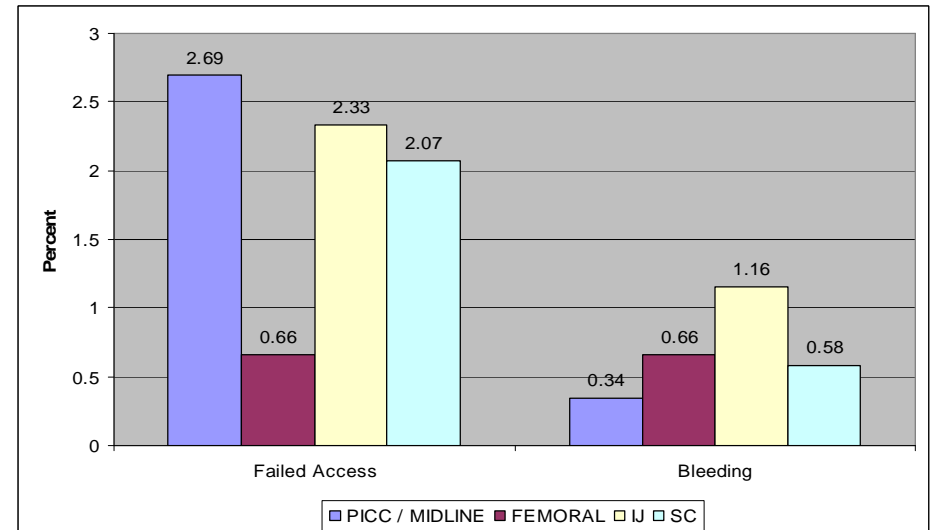
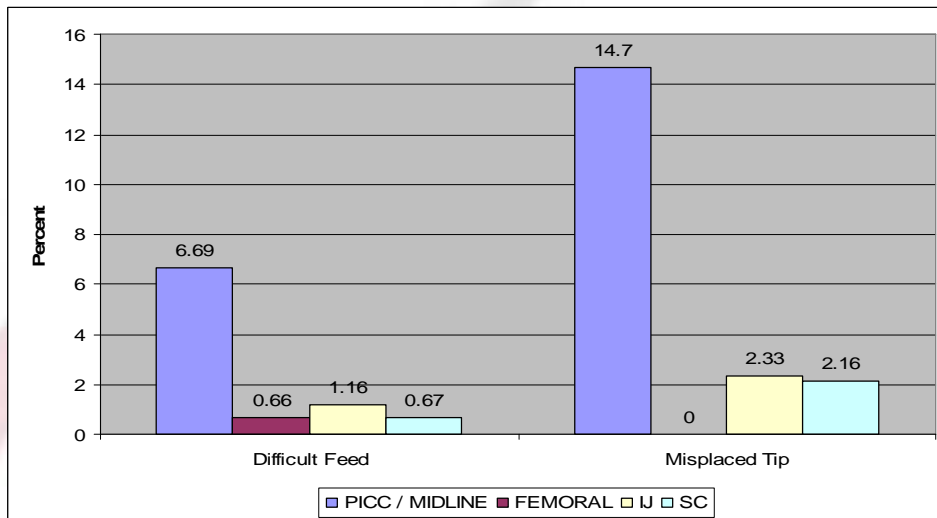
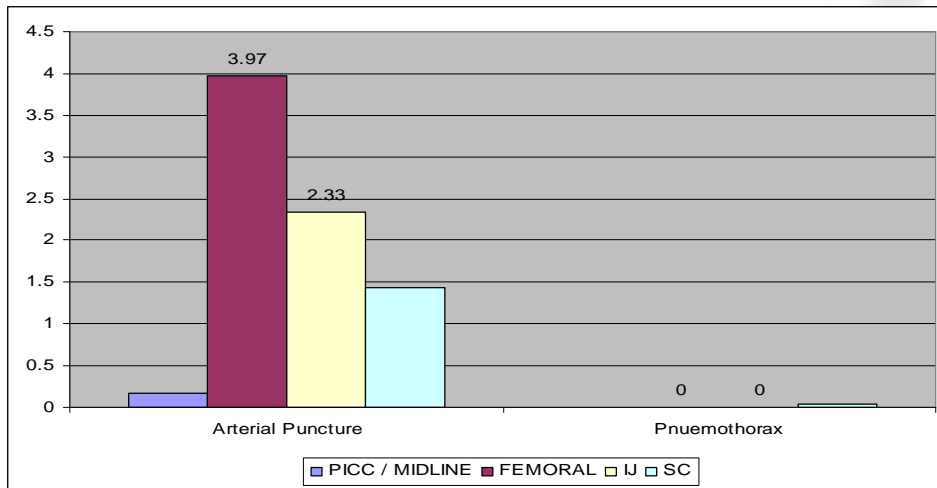
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*Outcomes of our central line service (2008):*

Insertion Site	%	(N)
Subclavian	52.8	(2225)
Upper Peripheral Veins	41.5	(1748)
Femoral	3.6	(151)
Internal Jugular	2.0	(86)
Catheter Type	%	(N)
CVC	55.3	(2330)
PICC	38.9	(1635)
High Flow / Dialysis Catheter	3.5	(149)
Midline	2.2	(92)
Clinical Category of Patients	%	(N)
Medical	55.2	(2325)
Surgical	43.5	(1831)
Women & Child Health	1.0	(42)
Critical Care	0.3	(14)

# Nurse Led Central Venous Catheter Insertion

*Outcomes of our central line service (2008):*



# Nurse Led Central Venous Catheter Insertion

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## *Implications for Clinical Practice:*

- Nurse led CVC insertion - fills the void where there is a shortage of trained medical staff
- Nurse led CVC insertion - improves catheter longevity and reduced catheter infection rates by routine follow up and monitoring - *medical staff have competing demands that do not allow this*
- Nurse led CVC insertion - improves outcomes through procedural volume - a critical success factor in vascular access

# Nurse Led Central Venous Catheter Insertion

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## *Implications for Policy and Research:*

- Workforce shortages with medical staff and increased specialisation will increasingly challenge practice boundaries between medicine and nursing
- There is a need for better regulatory frameworks to get rid of the “grey area”
- Local medical specialist roles in championing advanced practice nursing is a critical factor.
- Further outcomes based research required.

# Key points to take home..

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## *In Conclusion:*

- Workforce innovation with advanced practice nursing can have positive effects on patient outcomes
- Implementing an advanced practice role can be confronting to some medical officers. Need to have key clinician input and support
- Hospital efficiencies can be improved along with cost savings and decreased length of stay

# Key points to take home...

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- As health care develops and greater emphasis is placed upon cost effectiveness and quality of care, advanced practice nurses will be integral in the development and shaping of future health policy, particularly within the realm of health outcomes and health outcomes research.
- CVC insertion is just an example of the changing roles of health care professionals and how the general public and policy makers accept these changes

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Take away thought for the day....

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*'Some outside the profession  
wish to define who we are,  
and what we do,  
but we should not let this  
happen'*