



Bugs and Scrubs! Maintaining Surgical Asepsis in the Field

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Who is doing surgery?



Outline

What is a field clinic?

Is asepsis required?

Requirements & Challenges

Medical & Surgical Supplies



What is a field clinic?

- MASH-style operation (Mobile Army Surgical Hospital)
 - Temporary
 - Equipment, supplies, personnel brought to site
 - Often held in a public location



Why set up a field clinic?

- Target specific patient populations
- Overcome geographic and demographic challenges
- Most cost-effective model of spay-neuter clinic



Is asepsis really required?

- Definition
 - State of being free from disease-causing microorganisms
 - Practices used to promote or induce that state



Is asepsis really required?

- Goals

- Minimize or prevent contamination of the surgical environment
- Prevent contaminants from entering the surgical wound
- Prevent surgical morbidity



Is asepsis really required?

3%

Overall SSI rate among surgical procedures

22%

All healthcare-associated infections

66%

Incisional infections

9,000-20,000

Deaths per year

Is asepsis really required?



Is asepsis really required?

- Veterinary Medicine
 - 82% hospitals reported nosocomial infection outbreak
 - 24.5% of all surgical procedures had SSI

Reference	Species	Procedure Type	SSI Rate (%)
Vasseur 1988	Dogs & cats	Clean	2.5
		Clean-contaminated	4.5
		Contaminated	5.8
		Dirty	18.1
Brown 1997	Dogs & cats	Clean	4.7
		Clean-contaminated	5.0
		Contaminated	12.0
		Dirty	10.1
Nicholson 2002	Dogs & cats	Clean-contaminated	5.9
Eugster 2004	Dogs & cats	Clean	6.9
		Clean-contaminated	8.0
		Contaminated	13.7
		Dirty	24.5
Burrow 2005	Dogs	Clean-contaminated	8.5

Is asepsis really required?

- Standard of care
- Directly impacts patient outcome

“We’ve **cheaped the entire profession** with bargain-basement spays...[and]... **wasted a lot of time and money** sending people to school ...to perform **a simple procedure** that takes three months to master.”

– Dr. Craig Woloshyn

“Spay and neuter clinics are cheap. They work on the principle of low cost and high volume— **kind of like McDonald's**. And what pet owners receive there is similar: **just the basic burger**, no tasty or satisfying extras. Sure, **your medical care may be of a much higher quality**, but clients probably don't understand the technical nuances well enough to base their decisions on these differences.”

– Tumblin & Hoekstra

“Doing a spay as a **“no-frills” procedure**...may make sense as **“herd” medicine** — but depending on how it's done it can be **riskier and more painful**.”

– Dr. Marty Becker



Is asepsis really required?

- Field clinics...
 - Lack of access to veterinary care
 - Logistical difficulty in providing patient follow-up



Strict adherence to aseptic technique and best surgical practices are even more critical!

Primum non nocere



Primum non nocere



Primum non nocere

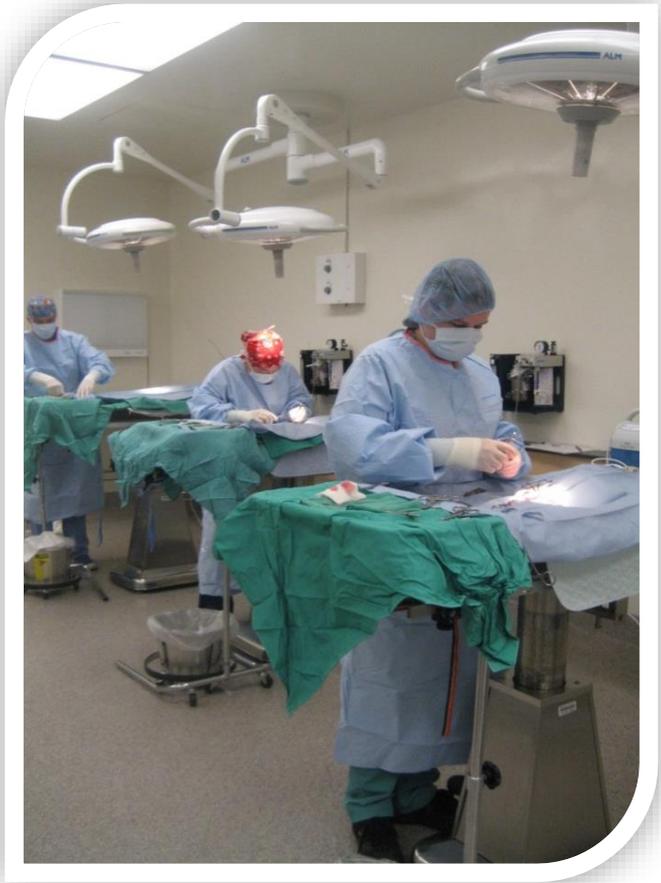
*“...there exists a minimally acceptable level which all clinics should mandate. This ensures **safety and well-being** of the animals.... The standards applied to the patient...will affect the **immediate outcome** of the patient as well as have effects **long after the patient has recovered**....”*



“If a program cannot maintain minimal requirements for each patient and individual welfare is compromised, then one must reevaluate their approach to a field clinic.”

~HSVMA RAVS

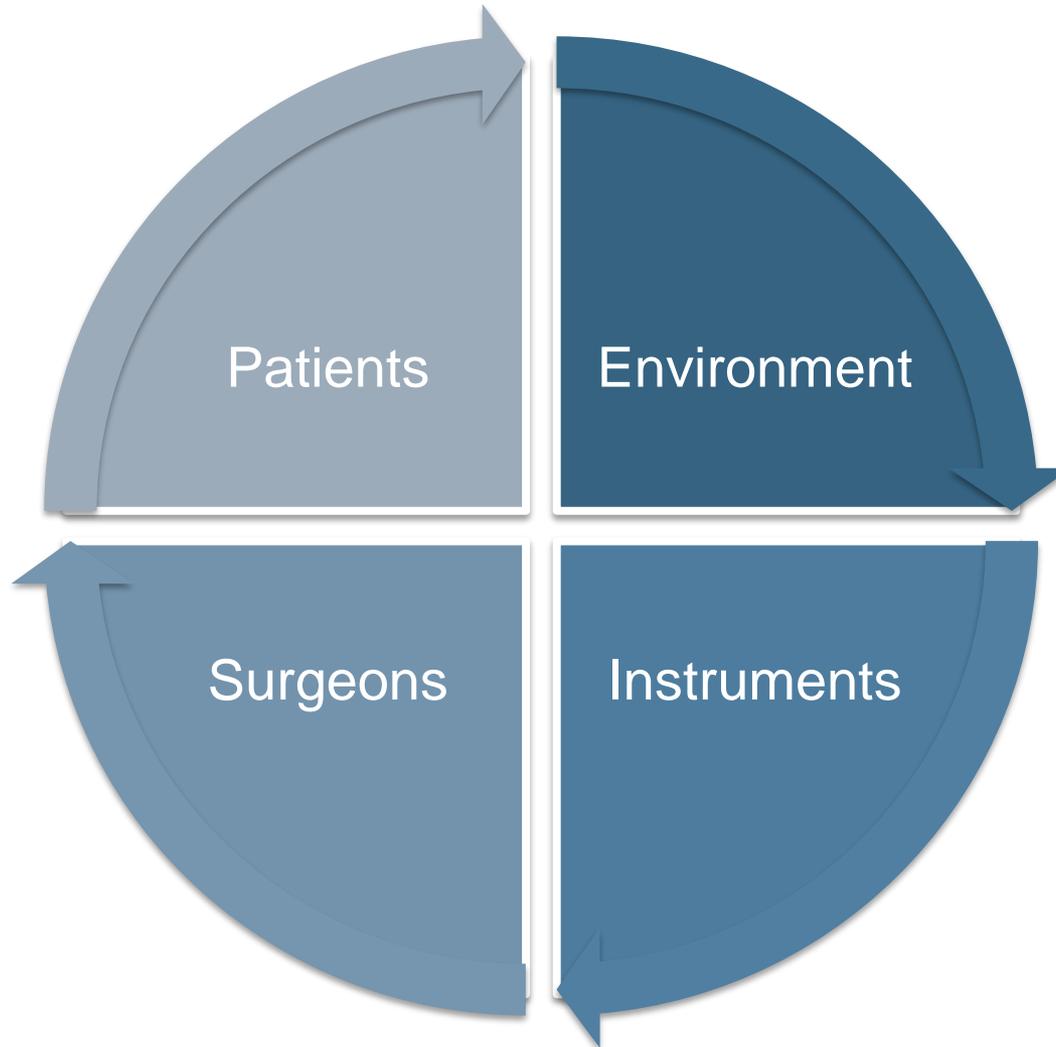
The Greatest Challenge



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The Greatest Challenge



Clinic Environment

Basics

- Animal housing
- Anesthesia & patient preparation
- Surgeon scrub sink
- Operating room
- Recovery



Clinic Environment



Extras

- Dressing rooms
- Supply rooms
- Instrument preparation
- Gowning and gloving

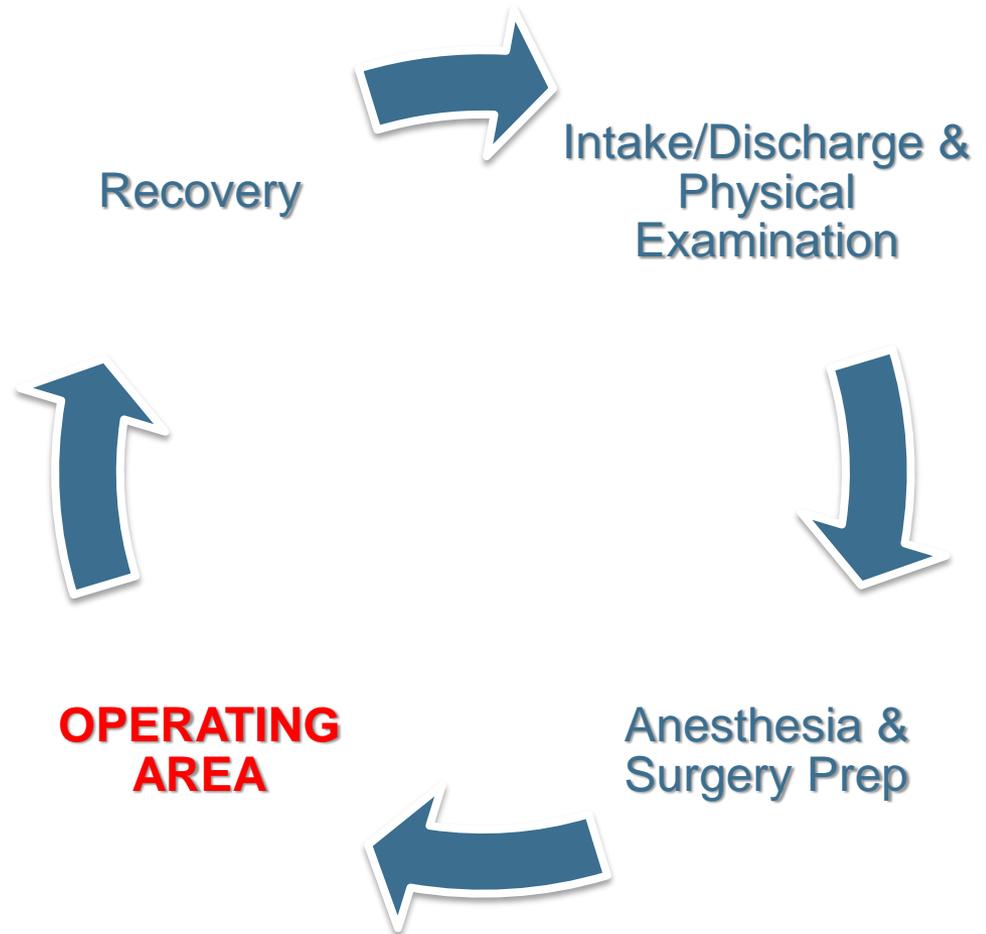
Clinic Environment

Size	<ul style="list-style-type: none">• Personnel• Equipment
Barriers	<ul style="list-style-type: none">• Physical• Visual
Furnishings	<ul style="list-style-type: none">• Remove wall coverings• Clean ceiling fans• Discard perishables
HVAC	<ul style="list-style-type: none">• Humidity• Temperature• Air flow
Work surfaces	<ul style="list-style-type: none">• Smooth, non-porous



Clinic Environment

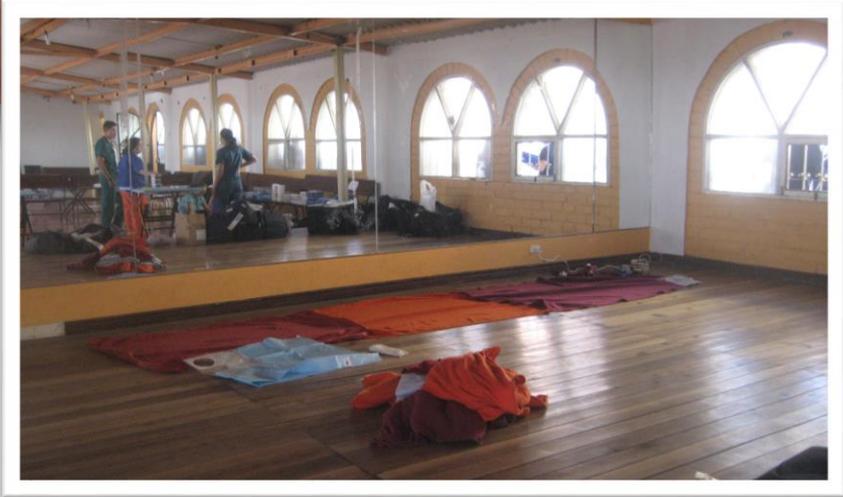
- Traffic Flow
 - Unidirectional
 - Protected areas



Clinic Environment



Clinic Environment



Clinic Environment



Operating Room

Ideal

- Separate working unit isolated from general facility traffic



Operating Room



Minimum

- Designated area within multi-purpose room
- Physical and visual barriers

Surgical Instruments

Cleaning &
decontamination

Packaging

Sterilization



Cleaning and Decontamination

- Removal of organic contamination (e.g., blood and mucous)
 - Contamination inactivates chemical germicides
 - Dried blood, body fluids and saline can result in corrosion, rusting and pitting



- Clean with detergent and water
 - pH neutral, low-foaming

Packaging

Woven

- Cotton/polyester blend
- Minimum thread count 140
- Launder to rehydrate, prevent superheating



Non-woven

- SMS (spunlace-meltblown-spunbounded)

Paper-plastic peel pouches



Sterilization

Liquid chemical

Dry heat

Steam



Liquid Chemical Sterilization

Cold sterile

- Items must be clean & dry
- Disassemble complex items
- Observe proper immersion time (6-12 hours)
- Rinsed & dried aseptically
- Change sterilant after each use



Dry Heat Sterilization

Pros

Portable
Low cost (<\$100 USD)
Will not corrode delicate or sharp instruments
Use for materials damaged or impenetrable by steam

Require electricity
Limited load size
Prolonged run cycles (60-150 mins.)
Uneven heat distribution
Sterilization of all contents unreliable

Cons



Steam Sterilization

Pressure Cookers

- Require heat source
- Low pressure thresholds; longer run cycle
- Limited capacity



Tips

- Instruments must not contact water
- Begin when chamber filled with steam
- Proper packaging & loose loading

Steam Sterilization

Autoclave (Gravity displacement)

- Inexpensive stovetop sterilizers (\$300-600)
- Limited capacity
- Settings vary based on contents



Tips

- Allow to dry & cool thoroughly
- Do not stack or place on cool surface
- Proper packaging & loose loading

Steam Sterilization

Item	Temperature	Time (Min.)	Pressure (PSI) ^a
Instruments	250°F	15-30	15-17
	270°F	12-15	27-30
	275°F	12-25	27-30
Textiles	250°F	30	27-30
	270°F	12-25	27-30
	275°F	12-25	27-30
Flash sterilization ^b	270-275°F	3-10	27-29

^aFor every 1,000 feet of altitude, add an additional 0.5 psi above 15 psi (normal atmospheric pressure at sea level)

^bItem should be unwrapped and placed in a perforated metal tray

Surgical Instruments

Ideal

- Separately wrapped instrument packs for each procedure
- Steam sterilization



Surgical Instruments



Minimum

- Dry heat sterilization
- Individual instruments used on a single patient and reprocessed

Suture Materials

Ideal

- Individually packaged suture for each patient



Suture Materials



Minimum →

- Reeled suture
- Sterile, unused portions shared between patients

Surgeon Preparation

- Surgical attire
 - Caps, masks, gloves +/- gowns
- Surgical hand scrub



Surgical Attire

Ideal

- Dedicated surgical attire worn by all personnel
- Attire not worn outside OR
- Attire laundered daily
- Caps and masks worn at all times within OR
- Single-use, sterile, surgical gowns and gloves worn by surgeons for all OR procedures



Surgical Attire



Minimum

- Dedicated surgical attire worn throughout the day
- Caps and masks for all procedures except castration of cats and puppies
- Single-use sterile gloves for all procedures except cat castrations

Surgeon Preparation



Surgical hand scrub

- Remove debris & transient micro-organisms
- Reduce resident microbial count
- Inhibit rebound growth

Surgeon Preparation

Surgical hand scrub

- Alcohol
- Chlorhexidine
- Iodine/iodophors
- Phenolic compounds

Methods

- Disposable plastic brushes
- Soap-impregnated sponges
- Brushless scrub solution
- Waterless scrubs & rubs



Surgeon Preparation

Rubs & Gels



- All brushless, waterless, antiseptic rubs or gels are not equivalent
- Contact time for surgical antiseptics is greater than for hygiene
- Application technique different than traditional anatomic or timed scrub



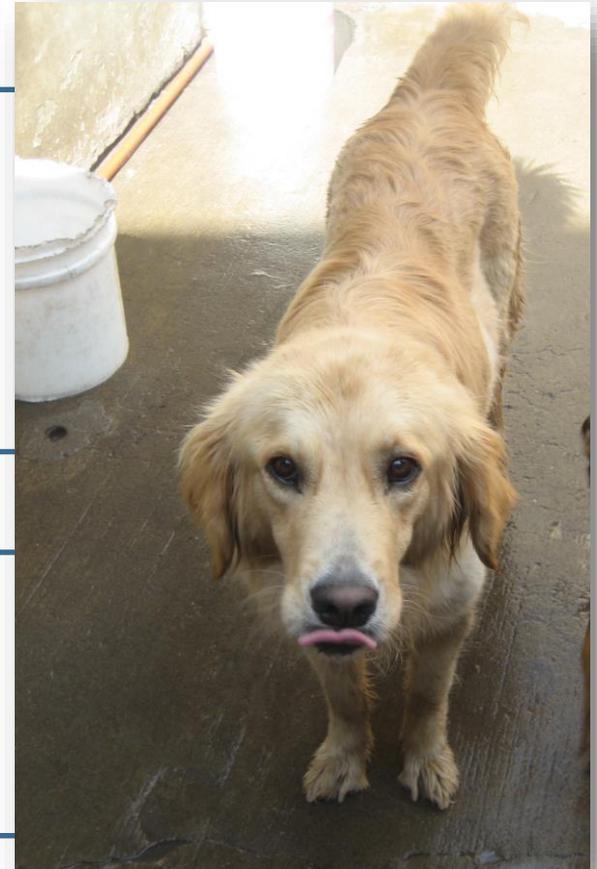
Surgeon Preparation

When do I scrub?

- Beginning of surgical period
- After breaks in asepsis
- After procedures >60 minutes

How long do I scrub?

- Initial scrub 5 minutes
- Subsequent scrubs 2 minutes



Surgeon Preparation

- Sterile surgical gloves are not intended for re-use and cannot maintain their integrity with re-sterilization
- Non-sterile examination gloves cannot be sterilized



Surgeon Preparation

Ideal

- Surgical scrub performed prior to each procedure and prior to entering OR



Surgeon Preparation



Minimum

- Surgical scrub performed prior to a series of procedures except for castration of cats and puppies

Patient Preparation

Hair removal

- Electric clippers
- Depilatory creams
- Straight blades

Scrubbing of surgical site

- Scrub, rinse, spray, paint
- Dry thoroughly

Barrier drapes

- High risk of fecal or hair contamination



Patient Preparation

Ideal

- Hair removal and operative site prepared after anesthetic induction and prior to entering the OR



Patient Preparation



Minimum

- Hair removal and operative site prepared within OR

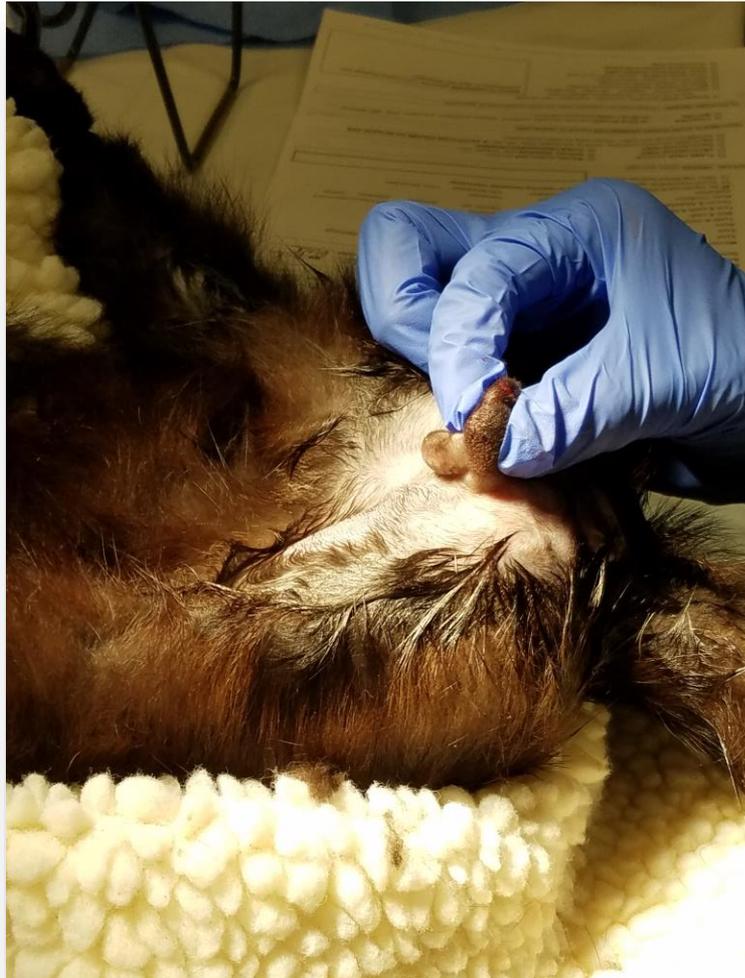
Draping

Ideal

- Complete sterile draping performed for all OR procedures



Draping



Minimum

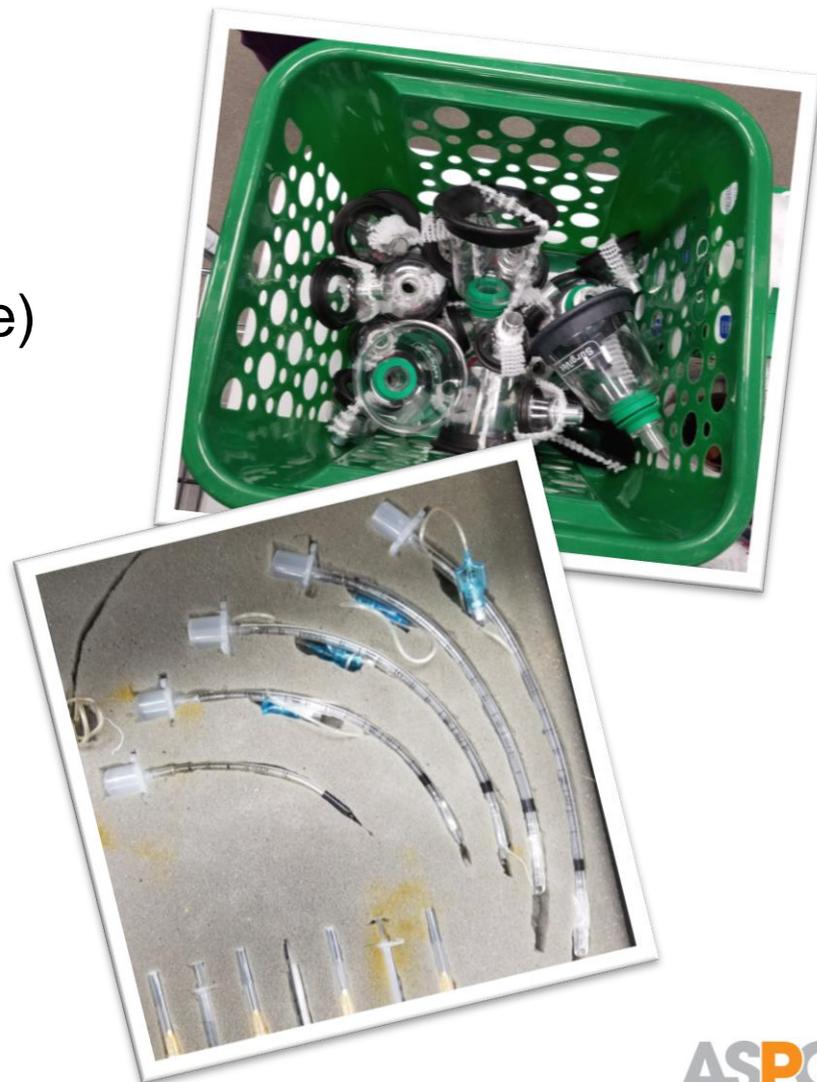
- Complete sterile draping performed for all abdominal procedures

Medical and Surgical Supplies

Sterilization	<ul style="list-style-type: none">• Contact with vascular system or sterile tissue• IV catheters, IV tubing
Disinfection	<ul style="list-style-type: none">• Contact with mucous membranes• Laryngoscope blades, masks
Cleaning	<ul style="list-style-type: none">• Contact with intact skin• EKG leads, blood pressure cuffs
Dispose	<ul style="list-style-type: none">• Single-use items• ET tubes, breathing circuits, syringes

Medical and Surgical Supplies

- Sterilization (vascular)
 - Needles
 - Syringes
- Disinfection (mucous membrane)
 - Endotracheal tubes
 - Masks
 - Breathing circuits*
- Cleaning – (intact skin)
 - Monitoring devices



Asepsis is not optional...even (and especially) in the field!



Good practices show you care!



Who is doing surgery?



What would we see in your clinic?



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