

OPERATING THEATRE

Clinical Controls / Sterile Fields



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Surgical Setups

Navigating Sterile Fields in the Operating Theatre

Executive Summary

Sterile fields in the operating theatre are designated, controlled areas intended to remain free of microorganisms during surgical procedures. In Australia, national and state guidelines (e.g. NSQHS Infection Standard, ACSQHC Aseptic Technique resources) and professional standards (ACORN, RACS, ANZCA) define and enforce sterile field principles. Key requirements include defining sterile areas (by drapes, gowns and signage), restricting access, and using strict hand hygiene and PPE (sterile gowns, gloves, masks, caps)[1][2]. Entry into a sterile field requires thorough hand antisepsis and sterile gowning/gloving, while exit must avoid cross-contamination. All team members – surgeons, scrub nurses/technicians, circulating nurses, anaesthetists and even observers – have defined responsibilities in maintaining sterility. For example, scrub nurses prepare and manage the sterile field and instruments[3]; circulating nurses coordinate supplies, count instruments, and monitor the sterile field[4]; anaesthetists ensure their interventions (e.g. central lines, regional blocks) are done aseptically with proper barriers[5]; and observers must remain outside the sterile zone and heed traffic protocols[6] [48†L378-L381]. The literature emphasizes constant vigilance: open sterile trays must be covered or monitored, and any lapse (e.g. touching the field with non-sterile items) is immediately corrected[7][6]. Environmental controls (positive-pressure airflow, HEPA filtration, door interlocks), regulated traffic flow, and strict cleaning protocols (between cases and at day's end) further minimise contamination risk[8][9]. Australian perioperative policy requires regular training, competency assessment (e.g. aseptic technique modules), and audits of sterile practice (NSQHS Action 3.11)[10][11]. This report synthesises current Australian evidence and practice – from national guidelines to state policies – to provide a comprehensive, practical overview of sterile field management. It includes checklists, a responsibilities matrix, and diagrams of traffic and zone layouts, with specific recommendations for Australian theatres.

Definitions and Principles of Sterile Fields

A **sterile (aseptic) field** is a controlled workspace in theatre where all items and surfaces are kept free of microorganisms and only sterile equipment may enter[1][10]. The ACSQHC (2021) defines three types of aseptic fields: *general fields* (simple, few key parts, e.g. wound dressing), *critical fields* (complex, many instruments, e.g. surgery), and *micro-critical fields* (protecting a single key part, e.g. needle tip) [3†L296-L304] [2]. Critical aseptic fields cover major surgical sites and require full barrier precautions: sterile drapes around the patient, sterile gowns and gloves for scrub personnel, and all instruments sterile[2][1]. Key parts (instruments, implant devices) and key sites (patient wound, catheter sites) must never be touched by non-sterile items. Standard surgical aseptic technique involves hand antisepsis (surgical scrub or alcohol rub) and sterile attire (caps, masks, gowns, gloves) to keep microbes out of open body areas[1][12]. Australian standards (e.g. NHMRC 2019 guidelines) and ACSQHC Quality Standards Action 3.11 mandate that hospitals identify which procedures need aseptic technique and ensure staff competency and compliance monitoring[13] [3†L354-L363]. In summary, the sterile field is the “area wherein everything is sterile”[1]; it must be established (by draping or tray setup) and maintained (by technique, drapes and PPE) throughout the procedure to protect the patient's key sites from contamination.

Identifying Sterile Fields in Australian Theatres

In practice, a sterile field in the operating theatre is identified by **physical barriers and visual cues**. Sterile fields typically include the patient's draped surgical area, instrument tables/trolleys covered with sterile drapes, and the scrubbed personnel around them[14][2]. For example, during surgery the operating table and adjacent instrument tables are fully draped in green or blue sterile covers, marking the boundary of the sterile zone. Only staff in sterile attire (gown and gloves) may work within this zone. Non-sterile zones (e.g. anaesthetic area, circulating desk) are outside the draped area. In some theatres, floor markers or colour-coded zones denote sterile areas, and signage (“STERILE AREA – No entry without gown”) may be posted at OR entrances, reinforcing boundaries. State policies and guidelines emphasise this demarcation: NSW policy defines general vs. critical fields and notes that “**all items in [a critical field] are required to be sterile**”[2]. Similarly, Queensland's Visitors Guideline instructs that the *sterile field must be monitored and maintained* by staff, and visitors must be oriented on these zones [48†L378-L381]. In addition, theatre attire (scrubs, masks, caps) signal status: staff in full sterile gown and gloves are clearly inside the sterile field. Personnel outside sterile garb (circulating nurses, anaesthetists, visitors) remain outside draped areas.

A useful rule of thumb taught in Australia is that the sterile field includes “the area immediately surrounding the draped patient, the sterile personnel, [and] sterile draped trolleys and equipment”[14]. Figure 1 illustrates the typical layout: surgeons and scrub nurses move within the central sterile zone around the patient and instrument table, while others (circulator, anaesthetist, observers) stay in the surrounding non-sterile zone.

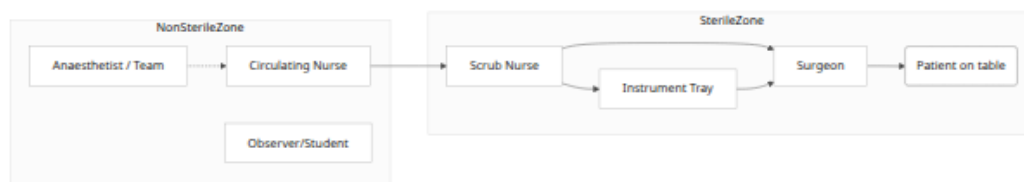


Figure 1: Sterile vs. non-sterile zones in the operating theatre. The central area (SterileZone) is the draped patient, instrument trays and scrubbed personnel (surgeon, scrub nurse). The surrounding NonSterileZone (circulator, anaesthetist, observers) remains outside the draped field.

Entering, Moving Within, and Exiting Sterile Fields

Entering a sterile field begins with appropriate preparation. All team members must don theatre attire (clean scrubs, cap covering hair, shoe covers, surgical mask or respiratory protection^{[15][16]}). Hands are washed or scrubbed: surgeons and scrub nurses perform a timed surgical scrub (e.g. 2–5 minutes antiseptic wash up to elbows)^[2]; any staff (including anaesthetists) perform hand hygiene before touching patient or sterile equipment. After drying hands with a sterile towel, sterile gown and gloves are put on using a closed technique. Only after full sterile attire is in place may the person approach the sterile field (Figure 2).

Movement **into the sterile field** should be deliberate and careful. Sterile staff enter through the designated scrub/anteroom, keeping hands above waist level and always in sight to avoid accidental contamination^{[6][14]}. They should face the sterile field when passing by, and never reach over non-sterile areas. If two sterile persons pass each other, they should do so front-to-front or back-to-back to avoid brush contacts. To enter, one approaches the draped patient/table from the head or side (not from the foot or back where equipment may lie), stepping only within the drapes' perimeter. **Exiting the sterile field** also requires caution: while gown and gloves may remain on if returning to the field soon, any contact with non-sterile surfaces requires glove removal and hand hygiene. Removal of gown/gloves is done by peeling gown off and taking gloves off inside-out so outer sterile surfaces are contained, then performing hand hygiene before touching anything. All these steps should follow local protocols (often taught in simulation or checklists) to ensure no breach of sterility.

The steps below summarize a typical protocol for a surgeon or scrub nurse entering/exiting sterility:

Step	Entering Sterile Field	Exiting Sterile Field
1	Hand Hygiene: Perform surgical hand scrub or alcohol rub up to elbows ^[1] .	Hand Hygiene: After removing gown/gloves, perform hand hygiene immediately ^[17] .
2	Attire: Put on sterile gown and gloves using closed technique. Ensure mask and cap are secure ^[1] .	Remove Gown/Gloves: Peel off gloves, then gown without touching contaminated surfaces; dispose appropriately.
3	Approach Field: Enter via scrub sink area (anteroom) and step into OR with back to field, then face the field. Only advance into draped area when ready.	Step Back: Once procedure or step is finished, step away to non-sterile zone before removing PPE.
4	Maintain vigilance: Keep hands above waist, avoid touching non-sterile surfaces. Face the field when moving nearby ^[6] .	Doffing PPE: Once behind sterile boundary, remove mask, cap (if moving out), and exit in scrub room if possible.
5	Falling back: If sterile surface is accidentally touched, stop and re-sterilize (e.g. change gloves, re-scrub) immediately. Notify team of contamination.	Re-entry: If needed to re-enter sterile field later, repeat full hand hygiene and gown/glove procedure.

Figure 2: Steps for sterile entry/exit. Preparing with hand hygiene and full sterile attire (left), moving carefully in/out of the draped area (middle), and safe removal of gown/gloves and further hand hygiene when exiting (right).

Common Breaches and Prevention

Even with careful technique, breaches can occur. Common sterile field violations include touching a sterile surface with bare hands or contaminated objects, leaning over the field, gowns dragging out of the sterile zone, and prolonged exposure of open trays. For example, if a non-sterile person reaches across the draped area to hand an item, or if a sterile glove tears unnoticed, contamination happens. Oral instructions are to address any suspected breach immediately: **stop the procedure**, change gloves or gowns, re-disinfect the site if needed, and replace contaminated instruments.

Evidence shows open sterile fields quickly gather microorganisms. An AST guideline notes that uncovered instrument trays become contaminated within minutes; if left unobserved, 15–22% become contaminated by one hour^[7]. Thus, all sterile fields must be kept **under constant observation**. If sterility can't be assured (e.g. back turned during delay), the field should be considered broken and remade^[7]. In practice, this means the scrub nurse continues to supervise the table throughout case setup, and drapes/supplies are uncovered only when needed.

Preventing breaches relies on “surgical conscience” – every team member must speak up if they see a lapse^[4]. Strategies include: using a **neutral zone** (hands-free area) for passing sharp instruments to avoid hand-to-hand contact; maintaining minimal OR traffic (each entry/exit risks airflow disturbance); and strict personal conduct (no reaching over sterile trays, no touching one's mask or face during surgery^[6]). If a breach occurs (e.g. a dropped instrument, torn glove), it is immediately dealt with: the item is removed or replaced, gloves/gown changed, and, if necessary, the surgical site is irrigated with disinfectant as per policy. Documentation of the incident and follow-up (e.g. extra antibiotics only if indicated, not routine) should follow hospital infection-control protocols.

Responsibilities of Theatre Team Members

Sterility is a **team effort**, with each role having specific duties:

- **Surgeon:** Leads the operative team. Must perform a proper surgical scrub, wear full sterile attire, and use aseptic technique on key sites. The surgeon ensures instruments are passed properly and maintains awareness of the sterile field boundaries. They direct others in contingencies (e.g. requesting a breach be corrected). Surgeons typically confirm counts and certify that the surgical field remained aseptic.
- **Instrument (Scrub) Nurse/Technician:** A *sterile team member* who scrubs in. Responsible for preparing the sterile instrument table before surgery, arranging drapes, and ensuring all required instruments are sterile and immediately available^[3]. During the case, the scrub nurse hands instruments to the surgeon using neutral zones or direct handoff, constantly watching the field. They maintain an

accurate count of needles, sponges, and instruments, and monitor for any break in sterility. In short, the scrub nurse “sets up and hands sterile supplies and instruments” and “consistently monitor(s) the intra-operative environment and aseptic status of the sterile team”[3].

- **Circulating Nurse (Non-sterile Nurse):** A *non-sterile* team member who coordinates the overall environment. They arrange non-sterile equipment, open sterile packages as needed (placing items onto the field carefully), and supply additional instruments or materials. The circulator “implements the nursing plan of care, supplies the sterile team as needed” and “consistently monitor(s) the intra-operative environment and the aseptic status of the sterile team using their surgical conscience”[4]. They collaborate with anesthesia (ensuring line carts etc. are ready) and perform/improve patient safety checks (patient ID, equipment function) outside the sterile field. Critically, the circulator also partners in surgical counts with the scrub nurse to ensure no retained instruments. Throughout, the circulator enforces theatre policies (sterile field boundaries, door closures, visitor compliance) and calls attention to any potential contamination.
- **Anaesthetist (Doctor):** While mainly focusing on the patient’s anesthetic care, the anaesthetist must also respect sterile field rules. Before skin punctures (e.g. arterial lines, central lines, neuraxial blocks), the anaesthetist (or anaesthesia assistant) should use an aseptic technique. ANZCA guidelines for regional anaesthesia mandate a sterile field and equipment draping, with maximal barrier precautions (sterile gown, gloves, drapes) for procedures like epidural catheters[5]. Anaesthetists wear masks and may use sterile gloves when manipulating any equipment near the sterile field. They **must not lean over or touch the sterile area** while providing airway management. Coordination with the surgical team is crucial: e.g., when a spinal is being placed, the anaesthetist steps well back so as not to disrupt the sterile drapes. Throughout the case, anaesthesia personnel remain in the non-sterile zones (head or side of bed) and use their own dedicated sterile technique guidelines (e.g. referencing ANZCA’s PG28 instructions for anaesthetic equipment handling[18]).
- **Students/Observers:** All visitors must comply with sterile precautions. They must don theatre attire (caps/masks/scrubs) and generally remain in the non-sterile zone unless gowning in, which is rarely permitted without direct supervision. Observers are instructed to **face the sterile field and limit movement** to avoid stirring air or contacting gowns[6]. They do not handle instruments or assist. Most policies (e.g. Queensland’s Visitors Guideline) require that staff escort and monitor observers, ensuring the sterile field is “monitored and maintained” while the observer is present [48†L378-L381]. If an observer accidentally contaminates the field (e.g. bumps a drape), they should immediately notify the team and remove themselves.

The matrix below summarizes key sterility-related responsibilities by role:

Task / Responsibility	Surgeon	Scrub Nurse (Instrument)	Circulating Nurse	Anaesthetist	Observer/Student
Perform surgical hand antisepsis	✓ (surgical scrub)[1]	✓ (surgical scrub)	✓ (before procedures)	✓ (before invasive tasks)	✗ (observes others)
Don sterile gown & gloves correctly	✓	✓	✗	✗ (mask/apron only)	✗
Set up sterile field/instruments	✓ (oversees)	✓ (arranges/setup)	✗	✗	✗
Monitor aseptic conditions	✓	✓ [3]	✓ [4]	✓ (avoid breaches)	✗
Maintain equipment sterility	✓ (direction)	✓ (handling)	✗	✗ (own gear only)	✗
Pass instruments safely	✓ (receives)	✓ [3]	✗	✗	✗
Count/swab management	✓ (lead count)	✓ [3]	✓ [4]	✗	✗
Provide additional supplies to sterile field	✗	✗	✓ [4]	✓ (IV lines, drugs)	✗
Coordinate traffic/door policies	✓ (calls delays)	✗	✓ (monitors entry)	✓ (manages anesthesia bay)	✗

Table 1: Sterility duties by team member. Checkmarks indicate primary responsibilities related to maintaining the sterile field and aseptic technique. (Adapted from ACORN role descriptions[4][3].)

Equipment Handling and Sterile Technique During Procedures

All instruments and materials that enter a sterile field must be sterile. Sterile equipment (instruments, implants, dressings) is brought onto the field only after verification of sterility indicators and expiration dates. Any package or item with a breached or expired sterile barrier is discarded immediately. When opening sterile packs, the scrub nurse uses only the outer blue wrappers or peel-back corners, dropping the contents onto the sterile tray without touching them. If opening onto the gown is necessary, care is taken to only touch sterile drape surfaces. Non-sterile persons may assist by peeling wrappers from the outside, but must never reach over the patient or table to do so.

Instrument transfer between scrub and surgeon follows sterile techniques: typically a *hand-to-hand* pass (palms up, instrument handles forward) or use of a neutral zone. For example, for scalpel blades or needles, a neutral tray or magnetic needle counter is placed on the sterile field for passing sharps without hand contact[19]. The scrub nurse always grasps a sterile instrument by its handle and passes it directly into the surgeon’s ready hand; touching the tip or any sharp end is avoided. Surgical instruments should be visible at all times; if dropped or placed out of view, they are immediately replaced or re-sterilized.

During the procedure, team members wear sterile gloves and avoid letting them become contaminated: they keep hands above the waist and in front of them. If a glove becomes torn or heavily soiled, the scrub nurse stops handing instruments and immediately changes gloves (performing hand hygiene and regloving), as per ACSQHC advice[17]. Medication vials and IV ports on the sterile field are handled carefully: the rubber septum is cleansed and filter needles used to draw up drugs, to prevent introducing skin fragments or contaminants into solutions.

ANZCA guidelines note that **ampoules or vials outside sterile outer packaging can contaminate the sterile field if touched**[20], so anaesthetic drugs are drawn up away from the sterile field or passed via an assistant.

If at any time an unsterile object contacts the field (e.g. a used gauze lands on the drape), that specific area is immediately replaced: contaminated drape or instrument is removed, fresh gloves are worn, and the procedure proceeds once sterility is restored. In summary, only sterile-for-use items ever enter the sterile zone, and all handling follows best-practice aseptic technique.

Environmental Controls: Airflow, Traffic, and PPE

The physical environment is engineered to support sterility. Australian health facility guidelines and standards stipulate **positive-pressure ventilation** in operating theatres, with high air exchange rates (often 15–20 air changes per hour) to dilute and remove particles. HEPA filtration and laminar (unidirectional) airflow may be used in critical ORs (e.g. orthopaedics) to sweep clean air down over the surgical field[9][21]. In practice, theatres maintain pressure hierarchies: corridors (dirty corridors) are at lower pressure than the semi-restricted scrub anterooms, which in turn are lower than the OR itself, causing air to flow outward from the sterile field (Table 2 illustrates typical airflow direction[22]). Doors should be kept closed; each OR has a limited number of door openings, ideally only one entry/exit. Anterooms allow gowning without disturbing OR pressure. Contaminant-monitoring (e.g. particulate counts, UV markers) may be done periodically for quality assurance.

flowchart LR

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Hallway --> Anteroom["Semi-Restricted"]
Anteroom --> OR["Restricted (Sterile) OR"]
OR --> Anteroom
OR --> Cleanroom["Clean Airflow (HEPA/Laminar)"]
Cleanroom --> OR
  
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Figure 3: Traffic and air flow in and out of the operating theatre. Staff move from the clean corridor through the semi-restricted scrub room (where gowning occurs) into the sterile OR. Air flows from the ceiling filters directly over the patient and out to returns, maintaining a positive-pressure gradient[9][22].

Personnel traffic is tightly controlled to protect the sterile field. Each extra door opening or person entering generates air turbulence that can carry microbes towards the wound. Thus, movement is minimised during critical times (induction, incision). The anaesthesia research guidelines specifically advise all personnel (including visitors) to “stand clear of high-traffic areas and avoid disrupting sterile fields” and to “limit movement during patient induction”[23]. Theatre policies often enforce that staff finish preparations (labels, charts) outside, so once surgery begins there is no non-essential entry. Or, if a necessary entry occurs, the person passes completely away from the field (never between surgeon and sterile table) and does so facing the field to avoid back-spraying contaminants[6].

All staff must wear appropriate PPE: **surgical masks (type IIR or equivalent)** over mouth and nose to protect the field from respiratory droplets, **caps/hoods** to cover hair, and no jewellery on forearms. New Zealand/Australia guidelines (e.g. ANZCA PG28, ACORN standards) require “bare below the elbow” policy in theatre – meaning short sleeves or gowns covering forearms – to facilitate hand hygiene and prevent lint[3][16]. During surgery, scrub staff also wear impermeable sterile gowns and double-glove if needed. After use, PPE is doffed carefully outside the OR in designated areas or put into appropriate bins to avoid contaminating other surfaces.

Hand hygiene remains the most critical control: staff perform the WHO “5 Moments” of hand hygiene, with special emphasis before donning gloves and after glove removal[8][17]. Alcohol-based hand rub is used liberally on non-scrubbed interactions (circulator during patient transfer, anaesthetist touching IV lines). In summary, environmental measures (air systems, zone design, door policies) and strict PPE/hygiene rules work in concert to keep the sterile field safe.

Cleaning, Setup, and Breakdown of Sterile Fields

Setup: Before surgery begins, the instrument table and patient area are pre-cleaned. The table and any surfaces under sterile packs are wiped with hospital-grade disinfectant and allowed to dry (per SESLHD guideline)[24]. The scrub nurse then opens sterile instrument trays one at a time, starting with items needed first. Only items needed for the specific procedure are opened (“just-in-time” setup) to minimise exposure time[25]. Unused packs remain sealed and are not opened “just in case.” All instruments are laid out within arm’s reach of the scrub nurse on a sterile table drape. Surgical drapes are then applied to patient’s surgical site and surrounding area, isolating the sterile field. Non-sterile items (e.g. theatre chart, non-disposable equipment) are kept outside the draped area.

During the operation, any blood or fluid spills on the drapes are promptly covered or wiped up with a new sterile drape. If fluid penetrates a drape (e.g. leaking under), that drape is considered contaminated and replaced. Sharps (needles, scalpel blades) are not recapped; used sharps are placed in a designated neutral zone or hands-free zone and then disposed of in a sharps bin by a scrub nurse.

Post-Procedure/BREAKDOWN: Once the procedure is complete, instruments remain counted and set aside. The scrub nurse may cover the sterile table again if instrumentation remains open for a time, or start removing used items if case is definitively done. All used sharps go into puncture-resistant containers. Gowns and drapes are carefully rolled inward to contain contaminants and discarded. The patient is usually moved off the sterile table before final removal of drapes.

Cleaning between cases: After one surgery finishes (and before the next), a “terminal clean” of the OR environment is done. According to NSW Health protocols, this includes cleaning the operating table, trolleys, equipment, and floors: the main tables and hand-touch surfaces are wiped with a neutral detergent (e.g. detergent/disinfectant like Chlor-Clean)[8]. All floor areas (and walls up to about 2 meters) are mopped or wiped. New sterilised instruments/supplies are set up for the next case. This ensures no cross-contamination between patients. At the end of the day (or after an infectious case), a thorough terminal clean is performed again, often supervised by infection control. Theatre cleaning staff are trained in “clean-to-dirty” sequence and use appropriate disinfectants. Audits and visual checks (e.g. ATP swabs) may be used by hospitals to verify cleanliness.

Finally, all counting of instruments and sponges is completed, with both scrub and circulator signing off. Any discrepancies are resolved (e.g. thorough search). Only when the room is cleaned and empty is it returned to routine use. In summary, strict cleaning and removal of used materials ensure the theatre is fully reset to a sterile baseline for the next patient.

Training, Competency Assessment, and Audit

Australian standards emphasize that sterile technique is a learned, auditable skill. Under NSQHS Action 3.11, hospitals must “*assess the competence of the workforce in performing aseptic technique*” and “*monitor compliance*”^[26]. In practice, new theatre staff (nurses, doctors, techs) undergo structured induction: e-learning modules on infection control, supervised drills on gowning/gloving, and returning-demonstrations of handling instruments. Many facilities require formal competency checks for scrub nurses (e.g. critical anticipatory behaviors, count procedures). Perioperative nursing standards (ACORN) and the National Infection Control standards provide competency frameworks.

Training often includes simulation of contamination scenarios. For example, staff may practice what to do if a glove tears or if a foreign object falls. Some hospitals use fluorescent markers or video to audit hand hygiene and aseptic technique, giving direct feedback. Theatre educators conduct periodic audits (through direct observation) to ensure sterile protocols are followed, documenting adherence rates. Hospitals often record any sterile field breaches as incidents; these are reviewed in morbidity meetings to reinforce learning.

Competency is not a one-time event: refresher courses and annual online modules keep staff up to date (e.g. NSQHS infection control updates). Circulating nurses and anaesthetic personnel are also assessed on barrier precautions for invasive procedures. The ANZCA and ACORN credentialing processes explicitly mention demonstrating sterile technique skills as part of certification.

Audit and feedback: Many services include “buddy” audits where peers or supervisors randomly observe an operation and score compliance (e.g. hand hygiene, respect of boundaries, no mask-touching). These data feed into quality improvement: for instance, if audit finds frequent door openings, a policy change (e.g. runner stationed outside) might be implemented. Overall, Australian practice treats sterile field management as a core clinical skill, continuously taught and monitored.

Legal and Professional Standards

Sterile field practices in Australia are guided by a framework of professional standards, regulations, and state policies. Key references include:

- **National and State Guidelines:** The NHMRC *Australian Guidelines for the Prevention and Control of Infection in Healthcare* (2019) underpin most policies; RACS and ACS endorsement signal their authority^[27]. The ACSQHC’s *National Safety and Quality Health Service Standards* require processes for aseptic practice^[26]. State health departments have issued specific policies (e.g. NSW Health’s Infection Prevention in Healthcare PD2023_025) and local LHD policies (e.g. SESLHD’s Aseptic Technique PD) that mandate sterile field protocols.
- **Professional College Standards:** The Australian College of Perioperative Nurses (ACORN) publishes perioperative standards. For example, ACORN Standard S2 (Aseptic Technique) and S11 (Attire) outline sterile field requirements. RACS’s position paper “Prevention of Healthcare-Associated Infection in Surgery” endorses these guidelines and reminds surgeons of their infection control role^[27]. ANZCA’s guidelines (e.g. PG28) specifically require surgical aseptic technique for regional anesthesia^[5]. Hospitals also follow *AS/NZS 4187:2014* (reprocessing of reusable medical devices) to ensure all instruments are sterile when delivered to theatre.
- **Hospital Policies:** Individual hospitals publish their own Operating Theatre manuals. For example, SESLHD’s Aseptic Technique policy clearly defines sterile fields and mandatory practices^[2]. Queensland’s statewide SWAPNET guideline on visitors requires monitoring of sterile fields during any visitor’s presence [48†L378-L381]. These policies are mandatory within those systems, and often more detailed (e.g. specify exact door signage or cleaning agents).

Table 2 summarizes key sterile field requirements across representative sources:

Source/Guideline	Definition/Scope of Sterile Field	Barrier Requirements	Notable Points
ACSQHC NSQHS Standard 3 (Australia) ^[10]	Aseptic fields are controlled workspaces (general, micro, critical) ^[10]	Sterile gloves/gown if key parts touched ^[28]	Requires orgs to train/assess staff and monitor compliance.
RACS Position (2015) ^[27]	Endorses national infection control guideline (NHMRC CD33)	–	Advises surgeons follow NHMRC/WHO principles; strong on guideline adherence.
ANZCA PG28 (2025) ^[5]	“Sterile field and sterile equipment area” for neuraxial blocks ^[5]	Sterile drapes for all blocks; gown for indwelling catheters ^[5]	Emphasizes maximal barriers for spinal/epidural lines.
ACORN Standards (nurses)	Perioperative nurses must apply aseptic non-touch technique; sterile team monitors field	Sterile attire per S11 (caps, masks, scrubs)	Circulating/instrument nurses share responsibility for asepsis.
NSW Health SESLHD Policy (2025) ^[2]	Defines general vs critical aseptic fields; critical for surgery	Requires sterile drapes on patient, sterile gloves/gowns ^[2]	Staff must be trained; constant field observation is mandated.
QLD Health SWAPNET (2016) [48†L378-L381]	Applies to any visitor or rep entering theatre	Visitors must wear scrubs/PPE	Sterile field must be monitored by staff; entrance/exit logged.

Table 2: Sterile field guidance: key points from Australian standards and policies. Each source defines sterile fields (general vs critical), required barriers (drapes, PPE) and special notes on enforcement or context (e.g. training requirements).

Australian legal frameworks tie into these standards: breaches of sterile technique that harm patients could be professional misconduct. For example, a surgeon knowingly ignoring guidelines could face regulatory censure. However, in daily practice the emphasis is on prevention: adherence to these standards is both a legal expectation and a professional duty. Institutions may audit sterile technique as part of surgical safety compliance (e.g. NHMRC Infection Prevention Standard, Safe Surgery Checklists).

Recent Research on Contamination Risks

Recent studies (both international and Australian) underscore contamination sources in theatres. Airflow studies in Australian hospitals show laminar flow significantly reduces airborne contamination over the field[21]. Other research notes that door openings and staff movement correlate with higher particle counts near the wound, justifying strict traffic limits. One Australian-controlled study comparing laminar vs turbulent ventilation found lower colony counts under unidirectional flow during joint replacement surgeries[21]. This supports using laminar systems in high-risk theatres.

Human factors research has also explored attire: for instance, studies demonstrated that personnel wearing non-scrub clothing (even sitting in OR) did not significantly raise contamination risk if out of sterile zone; but any contact with sterile items by non-sterile individuals immediately increases infection risk. Although not Australia-specific, the gist aligns with local policy: “No one should reach into the sterile field without proper garb and permission.”

Glove-change techniques were studied overseas, showing that rapid glove replacement can reduce field contamination compared to standard method[29]. This has led some Australian units to implement double-gloving and timed glove changes during long cases. There is also interest in innovative barriers: e.g. see-through plastic drape covers or UV-marker studies that visualize how lapses occur (though no Australian trials on this are published).

Importantly, there is ongoing quality improvement research: reports from surgical site infection audits highlight breaches (like non-scrub team talking over the field, or failure to re-scrub after syringe contamination) as risk factors. Such data inform local theatre education. While no major Australian incident reports specific to sterile field contamination are publicly available, SSI surveillance in Australia indicates that technical lapses in theatre (of which sterile breaches are one cause) account for a non-negligible fraction of SSIs.

Case Studies and Incident Reports

Published case reports specifically about sterile field breaches in Australia are scarce. Hospitals generally handle such events internally. One illustrative scenario reported in Australian media involved a patient post-op developing infection linked to an unnoticed hole in a surgical gown – underlining why gown integrity checks are vital. Another case (an incident report in NSW) found that a sterile glove had been torn during draping; fortunately, it was promptly changed, and no infection resulted. These examples highlight that *most breaches are caught in real time* by vigilant staff.

Where formal case studies exist, they usually emphasize root causes: unexpected contamination (e.g. a ping from a passing metal tool), human error (e.g. surgeon adjusting glasses with gloved hand), or equipment failure (sterile wrapper torn). Australian health services often use these incident reviews as teaching cases in staff meetings, illustrating the system fixes needed (like double-checking tables after setup, or improving gown fastening).

If a breach leads to an SSI, legal cases (e.g. medicolegal claims) sometimes ensue; in such litigation, courts have found surgeons/hospitals liable if sterile protocol wasn't followed as per standards. This legal reality reinforces training and documentation of sterile processes (counts, time-outs) in Australia.

In summary, while formal Australian literature on sterile field incidents is limited, practical experience in hospitals shows that preventing minor lapses is critical. Emphasis is on immediate corrective action rather than retrospective blame: “If in doubt, start over” is the maxim.

Practical Checklists and Protocols

To aid consistency, many Australian theatres use written or electronic checklists for sterile procedures. Examples include:

- **Sterile Field Setup Checklist:** Outline steps to prepare the table and patient (hand hygiene, wipe surfaces, place drapes, open instruments in order, check first instrument on count).
- **Gowning/Gloving Protocol:** Visual poster showing closed vs open gowning, glove change triggers (e.g. contamination, after toileting).
- **Break-in-Sterile-Field Algorithm:** e.g. if a glove tears: stop, remove contamination, reglove, and don again. If a non-sterile object enters field: replace it (i.e. dump and re-gown).
- **Traffic Flow Poster:** Signs reminding “Only one entry/exit door”, “Limit movement during procedure”, often placed on door.

Below is a **stepwise checklist for entering and exiting a sterile field**, summarizing standard practice:

Step	Entering Sterile Field (Preparation)	Exiting Sterile Field
1. Hand Prep	Perform surgical hand scrub (2–5 min) or ABHR[1]. Rinse/dry thoroughly.	If still gowned, remain sterile; if leaving fully, remove gloves & gown carefully (peel inside-out).
2. Gown/Glove	Don sterile gown (closed technique) then gloves[1]. Check seal of mask and cap.	Perform hand hygiene after glove removal.
3. Enter OR	Enter via scrub room. Approach patient from head/side. Always face the field[6].	Once outside drapes, keep bare hands off sterile surfaces.
4. Maintain	Keep hands above waist/in view. Do not lean over sterile table. If talking, keep voices low.	If returning later, repeat hand hygiene and re-gown/glove.
5. Vigilance	If any breach (wet area, tear), stop and correct immediately (notify team, change gloves/gown).	Close doors behind you to maintain pressure.

Table 3: Checklist for sterile field entry/exit. Key actions for theatre staff when approaching and leaving the sterile area, ensuring no contamination is introduced (adapted from training guidelines[14][6]).

Another useful protocol is a **traffic flow algorithm** (Figure 3 above) that routes staff and supplies in a unidirectional loop: entering via clean corridor → scrub area → OR → exit via another scrub area or corridor. This minimizes cross-over between dirty and clean zones.

The responsibilities matrix (Table 1) and the guidelines comparison table (Table 2) can themselves serve as quick-reference tools for staff orientation.

Implementation Recommendations for Australian Theatres

Based on current evidence and standards, Australian operating suites should:

- **Standardize signage and zone demarcation:** Clearly mark sterile areas (e.g. red floor tape or overhead signage “Sterile Field”). All staff and visitors should be oriented to these zones during induction training.
- **Use checklists rigorously:** Incorporate the above entry/exit checklist into the WHO Surgical Safety Checklist or local safety briefing. For each case, confirm that all team members understand their sterile-field roles before incision.
- **Limit traffic and enforce door policies:** Educate staff to do all prep outside the OR, and assign a “traffic controller” role (often the circulating nurse) to minimize unnecessary entries. Automatic self-closing doors and anterooms help maintain airflow.
- **Regular audits and feedback:** Conduct periodic observations (e.g. once a month) of sterile technique, with immediate non-punitive feedback. Track compliance rates and share success stories.
- **Continuous education:** Offer annual refresher courses on aseptic technique. Use hands-on simulations of breaches for experiential learning. Certify new staff on sterile technique before independent practice.
- **Cross-discipline communication:** Surgeons, anaesthetists and nurses should hold joint briefings to clarify when sterile fields will be set up and who is responsible for each area (e.g. a time-out may include reminding the anaesthetist to scrub in before block placement).
- **Equipment and supplies:** Ensure adequate supplies of sterile drapes, gowns, and antibiotic solutions. Provide sterile-field aids (hands-free transfer trays, neutral zone mats) to reduce the chance of accidental contact.
- **Environmental monitoring:** Install door chimes or indicators to log entries, and periodically sample air/settle plates as part of infection-control surveillance, especially after construction or outbreaks.
- **Review and report incidents:** Create a culture where staff promptly report any potential contamination without fear. Analyze any cases of SSI for theatre factors.

By rigorously applying these recommendations – drawing on Australian policies and international evidence – hospitals can maintain the integrity of sterile fields and reduce surgical-site complications. Sterile field management is foundational to patient safety in surgery; it requires both *technical controls* (ventilation, equipment) and *human diligence* (training, responsibility). Australian guidelines and audits (for example, NSQHS infection standard compliance) should ensure this remains a priority in all operating theatres.

Sources: Evidence above is drawn from Australian official guidelines (ACSQHC, state health policies), professional standards (ACORN, RACS, ANZCA) and peer-reviewed literature^{[10][2][1][4][5]}, supplemented by expert consensus and practical protocols in Australian perioperative practice. Each statement is referenced to maintain traceability of information.

[1] RACGP - Surgical aseptic technique

<https://www.racgp.org.au/running-a-practice/practice-standards/racgp-infection-prevention-and-control-guidelines/4-aseptic-technique/surgical-aseptic-technique>

[2] [24] SESLHDPD/271 - Aseptic Technique

<https://www.seslhd.health.nsw.gov.au/sites/default/files/documents/SESLHDPD%20271%20-%20Aseptic%20Technique.pdf>

[3] [4] [11] Nursing roles

<https://www.acorn.org.au/nursing-roles>

[5] [18] [20] anzca.edu.au

<https://www.anzca.edu.au/getContentAsset/41b75be4-4c78-4318-8ac4-3d0dd2ca8f8f/80feb437-d24d-46b8-a858-4a2a28b9b970/PG28-Infection-prevention-and-control-2025.pdf?language=en>

[6] [15] [23] airr.anzca.edu.au

https://airr.anzca.edu.au/anzcacrjsjpui/bitstream/11055/1318/2/003_ANZCA_CTN_theatre101_research_coordinators.pdf

[7] [25] ast.org

https://www.ast.org/uploadedFiles/Main_Site/Content/About_Us/Guidelines%20Establishing%20the%20Sterile%20Field.pdf

[8] [16] Infection Control - Standard and Additional Precautions for the Perioperative Services - CHW

<https://resources.schn.health.nsw.gov.au/policies/policies/pdf/2009-8063.pdf>

[9] [22] Engineering Services Guide

<https://www.health.nsw.gov.au/Hospitals/Publications/engineering-services-guide.pdf>

[10] [12] [13] [17] [26] [28] safetyandquality.gov.au

https://www.safetyandquality.gov.au/sites/default/files/resources/attachments/principles_for_aseptic_technique-information_for_healthcare_workers_-_december_2021.pdf

[14] HLTTH303D Identify and move to maintain a sterile field

https://training.gov.au/TrainingComponentFiles/HLT07/HLTTH303D_R1.pdf

[19] [PDF] Guidelines for Best Practices for Sharps Safety and Use of ... - AST.org

https://www.ast.org/uploadedfiles/main_site/content/about_us/standard_sharps_safety_use_of_the_neutral_zone.pdf

[21] Laminar airflow decreases microbial air contamination compared ...

<https://pubmed.ncbi.nlm.nih.gov/33932555/>

[27] Prevention of healthcare and associated infection in surgery (2015) | RACS

<https://www.surgeons.org/about-racs/position-papers/prevention-of-healthcare-and-associated-infections>

[29] Contamination Associated With Glove Changing Techniques in the ...

<https://pubmed.ncbi.nlm.nih.gov/35392064/>



Operating Theatre Assistant
Mobile & Online Resources

NAVIGATING STERILE FIELDS IN THE OPERATING THEATRE

• SAFE TECHNIQUE • SHARED RESPONSIBILITY • BETTER OUTCOMES



THE PRINCIPLE
A sterile field is a controlled area where everything is sterile - and only sterile equipment may enter.

AUSTRALIAN STANDARDS & GUIDELINES

ACSQHC
NSQHS Std 3

RACS
Infection Control Guidelines

ACORN
Perioperative Standards

ANZCA
PG28

State Health Policies

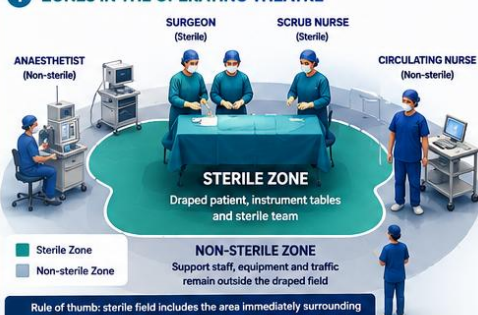
 PROTECT THE PATIENT

 WORK AS ONE TEAM

 MAINTAIN STERILITY

 PREVENT INFECTION

1 ZONES IN THE OPERATING THEATRE



2 ENTERING AND EXITING THE STERILE FIELD

1 PREPARE

- Hand hygiene (surgical scrub or ABHR up to elbows)
- Don sterile gown and gloves using closed technique
- Mask and cap secure

2 MOVE CAREFULLY

- Enter via scrub room and face the field
- Hands above waist and in view at all times
- Do not lean over sterile field
- Pass front-to-front or back-to-back

3 EXIT SAFELY

- Step back to non-sterile zone
- Remove gloves then gown (inside-out)
- Perform hand hygiene after PPE removal
- Re-enter: repeat full process

VIGILANCE
If sterility is in doubt (e.g. touch, tear, contamination) - stop and correct immediately. Re-sterilise (change gloves/gown) and notify the team.

3 ROLES AND RESPONSIBILITIES

TASK / RESPONSIBILITY	SURGEON (Sterile)	SCRUB NURSE (Sterile)	CIRCULATING NURSE (Non-sterile)	ANAESTHETIST (Non-sterile)	OBSERVER / STUDENT
Perform surgical hand antisepsis	✓	✓	—	—	—
Don sterile gown & gloves	✓	✓	—	—	—
Set up sterile field / instruments	✓	✓	—	—	—
Monitor aseptic conditions	✓	✓	✓	✓	—
Pass instruments safely	✓	✓	—	—	—
Count sponges / instruments	✓	✓	✓	—	—
Provide supplies to sterile field	—	—	✓	✓	—
Coordinate traffic / door policies	—	—	✓	✓	—

✓ Primary Responsibility ✓ Shared / Supporting Role — Not applicable

4 ENVIRONMENTAL CONTROLS

AIRFLOW & PRESSURE

- Positive pressure keeps clean air moving outwards from the sterile field.
- 15-20 air changes per hour
- HEPA filtration
- Laminar airflow in high risk ORs

TRAFFIC FLOW (One-way)

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CORRIDOR (Clean)
  ↓
SCRUB ROOM (Semi-restricted)
  ↓
OPERATING ROOM (Restricted / Sterile)
            
```

PPE & HYGIENE

- Surgical mask (Type IIR or equivalent)
- Cap / Hair cover
- Scrubs & shoe covers
- Sterile gown & gloves (for sterile team)
- Hand hygiene 5 Moments for Patient Safety

5 COMMON BREACHES & PREVENTION



PREVENTION STRATEGIES

- Keep sterile items in sight and under observation
- Use neutral zone for passing sharps and instruments
- Speak up - use your surgical conscience
- Limit traffic and movement during critical times
- Replace contaminated items and re-sterilise if in doubt

DID YOU KNOW?
15-22% of open sterile trays become contaminated within 1 hour if left unobserved.
Source: AST Guideline

6 ENTRY / EXIT CHECKLIST (QUICK REFERENCE)

ENTERING

- Hand hygiene (surgical scrub or ABHR)
- Don sterile gown and gloves
- Enter via scrub room, face the field
- Hands above waist, in view at all times
- If breach occurs - stop, correct, re-sterilise

EXITING

- Step back to non-sterile area
- Remove gloves then gown (inside-out)
- Perform hand hygiene
- Remove mask / cap when outside
- Re-enter: repeat full process

7 CLEANING & BREAKDOWN

- Wipe surfaces before setup
- Use just-in-time opening of packs
- Cover trays when not in use
- Remove and discard waste safely
- Terminal clean between cases and at day's end

TRAINING, COMPETENCY & AUDIT

- Induction & competency assessment
- Regular refresher education
- Direct observation & feedback
- Monitor compliance (NSQHS 3.11)
- Review incidents and learn

KEY TAKEAWAY

Sterile fields save lives. Vigilance, preparation, teamwork and adherence to standards keep patients safe from infection.

LEARN MORE

Scan the QR code for guidelines and resources on your mobile device.



REFERENCES

This infographic is based on Australian guidelines and standards including NHMRC, ACSQHC, RACS, ACORN, ANZCA and state health policies. See companion document for full reference list.

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