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Queensland Government

Adult First Dose Sepsis and Septic Shock Administration Guidelines

Sepsis is a medical emergency. This guideline has been developed to facilitate the rapid administration of antibiotics for sepsis and septic shock.

Antibiotics and fluids:
Where possible use separate dedicated lines for resuscitation fluid and for medications. When injecting antibiotics directly into an IV injection port which has resuscitation fluid running:
- clamp the infusion fluid line and flush with 10mL sterile sodium chloride 0.9% solution
- administer antibiotic over the required time
- flush the line with 10mL sterile sodium chloride 0.9% solution and recommence resuscitation fluid.

Multiple antibiotic orders:
Medications should be administered in an order that ensures the highest number of antibiotics is given to the patient as quickly as clinically appropriate (i.e. antibiotics with short administration times are given first and long infusions are given last).

Antibiotic	Presentation	Reconstitution **fluid** / volume (for mixing powdered medications)	Final volume	Minimum administration time	Notes
Ampicillin	Vial 1g	10mL WFI	20mL	Inject or infuse doses 2g: 10–15min[1]	Rapid IV administration may cause seizures
Amoxicillin-Clavulanate	Vial 2/0.2g	20mL WFI	20mL	Inject: 3–5min	
Azithromycin	Vial 500mg	4.8mL WFI Then add to infusion bag	250mL or 500mL (0.9% NaCl)	Infuse: 60min[1]	Local infusion-site reactions may occur
Benzylpenicillin	Vial 600mg	10mL WFI	10mL	Inject: 5–10min[4]	Inject at maximum rate of 300mg/min[4]: 1.2g in 20mL WFI given over 5min 1.8g in 30mL WFI given over 6min 2.4g in 40mL WFI given over 8min Rapid IV administration may cause seizures
	Vial 1.2g	20mL WFI	20mL		
Ceftriaxone	Vial 1g	10mL WFI	10mL (1g dose)	Inject 1g: 2–4min	Incompatible with calcium containing solutions, flush thoroughly
			100mL (0.9% NaCl) (2g dose)	Infuse 2g: 30min	
Cefazolin	Vial 2g	10mL WFI	20mL	Inject: 5min	
Ceftazidime	Vial 1g or 2g	10mL WFI	10mL	Inject 2g: 3–5min	
Ciprofloxacin	Infusion bag or infusion vial 200mg/100mL	No reconstitution required	N/A	Infuse: 60min	Local infusion reactions may occur if given over less than 60mins[1]
Clindamycin	Ampoule 300mg/2mL, 600mg/4mL	No reconstitution required	100mL (0.9% NaCl) (900mg)	Infuse 900mg: 30–40min	Maximum rate is 30mg/min
Dexamethasone	Vial 4mg/mL or 8mg/2mL	No reconstitution required	10mL (0.9% NaCl)	Inject: 3–5min	For meningitis give prior to antibiotics
Flucloxacillin	Vial 1g	20mL WFI	100mL (2g dose)	Infuse 2g: 30min	The 2g dose can be given by injection over 6–8min, however infusion is preferred as phlebitis is common and can be severe Rapid IV administration may cause seizures
Gentamicin	Ampoule 80mg/2mL	No reconstitution required	20mL (0.9% NaCl)	Inject: 3–5min (max dose = 700mg)	Gentamicin is inactivated by penicillin and cephalosporin antibiotics. Do not mix in the same injection or infusion solution. Administer at separate sites if possible. Where it is not practical or possible to administer separately, flush the line well before and after giving each drug[1] DO NOT delay administration of these antibiotics
Lincomycin	Vial 600mg/2mL	No reconstitution required	100mL (0.9% NaCl) (900mg)	Infuse 900mg: 60min	Severe cardiopulmonary reactions have occurred when given faster than 1g/hour or in concentrations of more than 1g/100mL[1]
Meropenem	Vial 1g	20mL WFI	20mL	Inject: 5min	
Metronidazole	Infusion bag 500mg/100mL	No reconstitution required	N/A	Infuse: 20min	
Moxifloxacin	Infusion bag 400mg/250mL	No reconstitution required	N/A	Infuse: 60min	
Piperacillin - Tazobactam	Vial 4/0.5g	20mL WFI	50mL	Infuse: 20min	Rapid IV administration may cause seizures
Trimethoprim - Sulfamethoxazole	Vial 80/400mg in 5ml	No reconstitution required	Dilute each amp in 125mL of 0.9% NaCl (e.g. 2 amps in 250mL)	Infuse: 60min	For other doses see AIDH
Vancomycin	Vial 500mg	10mL WFI	1g in 250mL Final concentration: 2.5–5mg/mL (strict fluid restriction: max of 10mg/mL)	Sepsis infusion times 1g or less: 60min 1.5g dose: 90min 2g dose: 120min 2.5g dose: 150min 3g dose: 180min	Infusion related effects are common (red man syndrome); decrease infusion rate and monitor May cause pain at the injection site and thrombophlebitis; dilute further and rotate the infusion site
	Vial 1g	20mL WFI			

References: 1. AIDH 7th Edition, accessed March 2019. 2. QH Aminoglycoside Dosing in Adults, May 2018. 3. Micromedex, accessed March 2019. 4. electronic Medicines Compendium (eMC) https://www.medicines.org.uk/emc, accessed March 2019.

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Queensland Government

Emergency Department Non-pregnant Adult Sepsis Pathway

For tertiary and secondary facilities
Low MRSA Non-Tropical

Facility: .....

(Affix identification label here)

URN:

Family name:

Given name(s):

Address:

Date of birth: Sex: ☐ M ☐ F ☐ I

Clinical pathways never replace clinical judgement.
Care outlined in this pathway **must** be altered if it is not clinically appropriate for the individual patient.

Septic Shock = shock + infection (mortality 20–23%) **Sepsis = organ dysfunction + infection (mortality 10–12%)**

Screen ALL non-pregnant adult emergency department patients who meet ANY of the following criteria *(tick all that apply)*
- ☐ Looks sick
- ☐ You suspect they may have sepsis
- ☐ Has a suspected infection
- ☐ Fever symptoms (or recent fever symptoms)
- ☐ Hypothermia <35.5°C
- ☐ Signs of clinical deterioration (e.g. altered level of consciousness or total Q-ADDS score of ≥4)
- ☐ If you suspect **neutropaenic sepsis**, refer to local guidelines if available, otherwise continue screening on this pathway

RECOGNISE

Screening initiated: DD / MM / YY HH : MM (24hr)

Are ANY of the following risk factors present? *(tick all that apply)*
Absence of risk factors does not exclude sepsis as a cause of deterioration
- ☐ Re-presentation within 48 hours
- ☐ Malnourished or frail
- ☐ Immunocompromised / Asplenia / Neutropaenia
- ☐ Indwelling medical device
- ☐ Recent trauma or surgery / Invasive procedure
- ☐ Postpartum / Miscarriage
- ☐ IV drug use or alcoholism
- ☐ Aboriginal and / or Torres Strait Islander

AND / OR

Is there ANY reason to suspect an infection? *(tick all possible sources that apply)*
- ☐ Yes, but source is unclear at present
- ☐ Respiratory tract
- ☐ Urinary tract
- ☐ Abdomen / GIT
- ☐ Skin / Joint / Prosthesis / Device
- ☐ CNS / Meningitis
- ☐ New onset confusion
- ☐ Family members / carers are concerned there is an infection
- ☐ Other (specify): .....

YES

Does the patient have ANY high risk criteria? *(tick all that apply)*
- ☐ Respiratory rate ≥25 breaths/min
- ☐ New oxygen requirement to keep oxygen saturation ≥92%
- ☐ Heart rate ≥130 beats/min
- ☐ Systolic BP <90mmHg (or drop >40 from normal)
- ☐ Not passed urine in last 18 hours *OR* urinary output (UO) <0.5 mL/kg/hr (if known)
- ☐ Evidence of new or altered mental state
- ☐ Lactate ≥2mmol/L if known
- ☐ Non-blanching rash / Mottled / Ashen / Cyanotic
- ☐ Recent chemotherapy

YES → **Patient has SEPSIS or SEPTIC SHOCK until proven otherwise**
- Obtain immediate senior medical review
- Consider transfer to resuscitation area
- Commence resuscitation

NO

Does the patient have ANY moderate risk criteria? *(tick all that apply)*
- ☐ Respiratory rate 21–24 breaths/min
- ☐ Heart rate 90–129 beats/min *OR* new dysrhythmia
- ☐ Systolic BP 90–99mmHg
- ☐ Not passed urine in last 12–18 hours
- ☐ Temperature <35.5°C or ≥38.5°C
- ☐ Family members / carers concerned about mental state
- ☐ Acute deterioration in functional ability

YES → **Patient may have SEPSIS**
- Ensure lactate taken
- Obtain senior medical review

NO → **Low risk for SEPSIS**
- Look for other common causes of deterioration
- In the event of deterioration reassess sepsis risk using a new copy of this form
- If to be discharged home, give patient sepsis discharge instructions

ESCALATE / DE-ESCALATE

Senior medical review attended: DD / MM / YY HH : MM (24hr)

Does the senior medical reviewer think sepsis or septic shock is likely?
☐ Sepsis / septic shock likely ☐ Sepsis / septic shock unlikely

YES → **Commence resuscitation and treatment for sepsis NOW** *(See page 2)*

NO

Signature Log Every person documenting in this clinical pathway must supply a sample of their initials and signature below

Initials	Signature	Print name	Role	Initials	Signature	Print name	Role

DO NOT WRITE IN THIS BINDING MARGIN

DO NOT WRITE IN THIS BINDING MARGIN

v1.00 - 11/2020
WINC Code: 1NY37705

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ED NON-PREGNANT ADULT SEPSIS PATHWAY TERTIARY AND SECONDARY

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Queensland Government

Emergency Department Non-pregnant Adult Sepsis Pathway

For tertiary and secondary facilities

Low MRSA Non-Tropical

(Affix identification label here)

URN:

Family name:

Given name(s):

Address:

Date of birth: Sex: ☐ M ☐ F ☐ I

DO NOT WRITE IN THIS BINDING MARGIN

RESUSCITATE

Notify nursing team leader ☐ and SMO ☐ the patient has potential sepsis or septic shock *(tick when notified)*

ACTIONS 1–4 to be commenced for:

- Neutropaenic or meningococcal sepsis within 30 minutes of recognition
- Septic Shock within 1 hour of recognition of shock (mortality 20–23%)
- Sepsis within 3 hours of triage (mortality 10–12%)

(Document variance in comments section if key tasks not commenced)

Action	Tick
1. Measure (or remeasure) lactate	☐ **Lactate collected**
2. Take blood cultures x 2 sets • Collect prior to antibiotics unless this would delay treatment for >1 hour • If patient has a central line collect an additional (third) set of blood cultures via the line • Collect FBC, UEC, BGL, LFT, lipase and VBG • For septic shock add coagulation studies • Collect other relevant cultures but do not delay antibiotics	☐ **2 sets blood cultures collected**
3. Commence appropriate IV antibiotics • Identify likely source of infection (including relevant imaging findings) • Prescribe antibiotics according to guidelines. Modify for allergies or prior microbiological sensitivities • Notify nursing staff of urgent need to administer antibiotics and ensure completed • Recommend consulting microbiologist or infectious diseases physician (particularly if: septic shock, recent overseas travel, risk factors for multi-resistant organisms, IV drug use, morbid obesity or dialysis patient)	☐ **Antibiotics commenced**
4. Commence IV or intraosseous fluids if clinically indicated • Consider volume of fluid based on patient's weight, cardiac function, comorbidities, current volume status and haemodynamics • If bolus indicated, rapidly infuse 250mL–500mL IV or intraosseous 0.9% NaCl or Hartmann's over 5 minutes • Assess response to fluid and consider repeating bolus if clinically indicated - do NOT exceed 30mL/kg without SMO input	☐ **IV fluids commenced** (or not indicated)
5. Consider vasopressors/inotropes for hypotension during or after fluid resuscitation (e.g. Noradrenaline: usual commencing dose 5mcg/min)	☐ **Vasopressors/ inotropes considered** (or not indicated)
6. Facilitate rapid source control - if this requires operative intervention ensure early notification of appropriate surgical or interventional team	☐ **Source control facilitated** (or not required)

REVIEW

7. Reassess and monitor response to resuscitation - aim for:

- Oxygen saturation >94% (88–92% if COPD)
- Systolic BP >100mm Hg
- Urine output >0.5 to 1.0mL/kg/hr – consider IDC with hourly monitoring
- Lactate <2mmol/L

If haemodynamic status not improving or if vasopressors/inotropes commenced refer to ICU

Action	Tick
8. Early referral to relevant inpatient team with clinical hand-over, and document: • Appropriate criteria to ensure escalation of signs of deterioration • Requirement to review antibiotics as soon as possible • Need for infectious diseases, microbiologist or AMS team review, particularly in septic shock	☐ **Referral completed and documented**

Handover risk of deterioration to receiving nurse when patient transferred out of ED

An emergency call can be initiated at any time if you are clinically concerned.

Date and time complete: DD / MM HH : MM (24hr) Initials

ED staff name: Ward staff name:

Comments / Variance from Actions

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DO NOT WRITE IN THIS BINDING MARGIN

Queensland Government

ED Adult Community Acquired Sepsis Prescribing Guidelines

Low MRSA Non-Tropical

Discuss antibiotic choices with an Infectious Diseases Specialist (ID) or Microbiologist if there are any concerns with antibiotic choice, *OR* if the patient:

- may require treatment for a combination of suspected sources
- is at risk of hospital acquired infection, or multidrug-resistant infection[Note 1]
- has contraindications to specific antibiotic therapy recommended in this guideline, or is at extremes of weight
- has suspected encephalitis, necrotising fasciitis, water-related skin and soft tissue infection or tropical infection[Note 2]
- is immunocompromised (N.B. if **febrile neutropenia** is suspected refer to local guidelines/call Infectious Diseases Specialist).

Septic shock (all antibiotics to be commenced within one hour)

For adult emergency department (non-pregnant) patients only

Source of infection	Empirical antibiotic regimen	Penicillin allergy (all)
***Meningococcus* or meningitis**	Dexamethasone 10mg IV, 6 hourly (before or with the first dose of antibiotic)	Dexamethasone 10mg IV, 6 hourly (before or with the first dose of antibiotic)
	Ceftriaxone 2g IV, 12 hourly (or 4g IV, daily) **If at risk of *Listeria*[Note 3]** ADD Benzylpenicillin 2.4g IV, 4 hourly **If gram-positive cocci seen on CSF Gram stain, recent penicillin use, or sinusitis/chronic otitis media** ADD Vancomycin[Note 4] 30mg/kg ABW IV loading dose	Ciprofloxacin 400mg IV, 8 hourly PLUS Vancomycin[Note 4] 30mg/kg ABW IV loading dose
Necrotising fasciitis	Give antibiotics as per the 'All other infection sources causing septic shock' PLUS Lincomycin[Note 5] 900mg IV, 8 hourly Arrange immediate surgical consultation regarding debridement	
Community acquired pneumonia	Give antibiotics as per the 'All other infection sources causing septic shock' PLUS Azithromycin 500mg IV, daily	
At risk of tropical infection[Note 2]	Meropenem 1g IV, 8 hourly PLUS Vancomycin[Note 4] 30mg/kg ABW IV loading dose	
All other infection sources causing septic shock	Gentamicin[Note 6] 7mg/kg IBW/AdjBW IV, max 700mg PLUS Amoxicillin-Clavulanate 2/0.2g IV, 8 hourly **If has pre-existing intravascular device or at risk of MRSA[Note 7]** ADD Vancomycin[Note 4] 30mg/kg ABW IV loading dose	Gentamicin[Note 6] 7mg/kg IBW/AdjBW IV, max 700mg PLUS Metronidazole 500mg IV, 12 hourly PLUS Vancomycin[Note 4] 30mg/kg ABW IV loading dose

§ IRVS Intensive respiratory or vasopressor support.

Note 1 **Multidrug-resistant infection risks:**
- recent admission (within 12 months) to an overseas hospital with a high prevalence of multidrug-resistant gram-negative organisms
- previous colonisation or infection with a resistant gram-negative organism, such as Carbapenemase Producing Enterobacterales (CPE), meropenem and/or gentamicin resistant organism, Multidrug-Resistant Gram-Negative organism (MRGN) OR Vancomycin Resistant *Enterococcus* (VRE).

Note 2 **Tropical infection (*Burkholderia pseudomallei* or *Acinetobacter baumannii*) risks:** travel to tropical countries or north of Mackay AND diabetes, hazardous alcohol consumption, chronic kidney disease, chronic lung disease, immunosuppressive therapy.

Note 3 ***Listeria* risks:** Immunosuppression, >50yrs, history of hazardous alcohol consumption, pregnancy, debilitation.

Note 4 **Vancomycin dosing:** Vancomycin is dosed according to Actual Body Weight (ABW). See *Therapeutic Guidelines (eTG)* for subsequent dosing or dosing in obesity.

Note 5 **Clindamycin** can be used instead of IV Lincomycin. The recommended dose of IV Clindamycin is 900 mg IV, 8 hourly.

Note 6 **Gentamicin dosing:** Gentamicin is dosed according to Ideal Body Weight (IBW) or actual body weight, whichever is less. Where actual body weight is >20% of IBW, use Adjusted Body Weight (AdjBW). For adjusted dosing calculations or patients with known or likely pre-existing renal impairment please see *Therapeutic Guidelines (eTG)* or *QH Aminoglycoside Dosing in Adults Guidelines, April 2018*. Gentamicin can be given as a single dose in adults with sepsis, regardless of age.

Note 7 **MRSA infection risks:** Chronic underlying disease (e.g. renal failure, diabetes), immunosuppression, chronic wounds or dermatitis, injection drug use, living in close quarters or communities with high MRSA prevalence, known colonisation with MRSA.

Note 8 *Pseudomonas* risks include frequent exposure to water or moist environment,or previous *Pseudomonas* colonisation.

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Sepsis (NOT septic shock)

For adult emergency department (non-pregnant) patients only. Refer to notes on page 3.

Source of infection		Empirical antibiotic regimen	Penicillin allergy - NOT immediate hypersensitivity	Penicillin allergy - immediate hypersensitivity (anaphylaxis)
SINGLE SOURCE				
Meningitis		Dexamethasone 10mg IV, 6 hourly (before or with the first dose of antibiotic)	Dexamethasone 10mg IV, 6 hourly (before or with the first dose of antibiotic)	Dexamethasone 10mg IV, 6 hourly (before or with the first dose of antibiotic)
		Ceftriaxone 2g IV, 12 hourly (or 4g IV, daily) **If at risk of *Listeria*[Note 3]** ADD Benzylpenicillin IV 2.4g, 4 hourly	Ceftriaxone 2g IV, 12 hourly (or 4g IV, daily) **If at risk of *Listeria*[Note 3]** ADD Trimethoprim-Sulfamethoxazole 160/800mg IV, 6 hourly	Ciprofloxacin 400mg IV, 8 hourly PLUS Vancomycin[Note 4] 30mg/kg ABW IV loading dose
		If gram-positive cocci seen on CSF Gram stain, recent penicillin use, or sinusitis/chronic otitis media ADD Vancomycin[Note 4] 30mg/kg ABW IV loading dose		
Skin and soft tissue	**Cellulitis**	Flucloxacillin 2g IV, 6 hourly	Cefazolin 2g IV, 8 hourly	Vancomycin[Note 4] 30mg/kg ABW IV loading dose
	Water-related	Give cellulitis regimen then seek ID advice		
	Diabetic foot infections	Amoxicillin-Clavulanate 2/0.2g IV, 8 hourly **If *Pseudomonas* risk present[Note 8]** replace with Piperacillin-Tazobactam 4/0.5g IV, 6 hourly	Cefazolin 2g IV, 8 hourly PLUS Metronidazole 500mg IV, 12 hourly	Ciprofloxacin 400mg IV, 12 hourly PLUS Lincomycin[Note 5] 900mg IV, 8 hourly
	Necrotising fasciitis	Treat necrotising fasciitis with the septic shock regimen on page 3		
Community acquired pneumonia (SMART-COP <5, or at low risk of requiring IRVS§)		Benzylpenicillin 1.2g IV, 6 hourly PLUS Doxycycline 200mg PO loading dose, followed by 100mg PO, 12 hourly **If IRVS§ required or SMART-COP ≥5** replace Benzylpenicillin with Ceftriaxone 1g IV, 12 hourly	Ceftriaxone 1g IV, daily PLUS Doxycycline 200mg PO loading dose, followed by 100mg PO, 12 hourly	Moxifloxacin 400mg PO/IV, daily
Urinary		Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Ampicillin 2g IV, 6 hourly	Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS seek ID advice	Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS seek ID advice
Abdominal		Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Ampicillin 2g IV, 6 hourly PLUS Metronidazole 500mg IV, 12 hourly	Ceftriaxone 1g IV, daily PLUS Metronidazole 500mg IV, 12 hourly	Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Lincomycin[Note 5] 900mg IV, 8 hourly
Intravascular device (discuss early removal of device with treating team)		Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Vancomycin[Note 4] 30mg/kg ABW IV loading dose		
Febrile neutropenia (refer to local guidelines where available)		Piperacillin-Tazobactam 4/0.5g IV, 6 hourly **If at risk of MRSA[Note 7]** ADD Vancomycin[Note 4] 30mg/kg ABW IV loading dose	Ceftazidime 2g IV, 8 hourly **If at risk of MRSA[Note 7]** ADD Vancomycin[Note 4] 30mg/kg ABW IV loading dose	Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 700mg PLUS Vancomycin[Note 4] 30mg/kg ABW IV loading dose PLUS seek ID advice
MULTIPLE POSSIBLE SOURCES				
Community acquired pneumonia/urinary		Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Ampicillin 2g IV, 6 hourly PLUS Doxycycline 200mg PO loading dose, followed by 100mg PO, 12 hourly	Ceftriaxone 1g IV, daily PLUS Doxycycline 200mg PO loading dose, followed by 100mg PO, 12 hourly	Seek ID advice
Community acquired pneumonia/cellulitis		Cefazolin 2g IV, 8 hourly PLUS Doxycycline 200mg PO loading dose, followed by 100mg PO, 12 hourly		Seek ID advice
Urinary/abdominal		Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Ampicillin 2g IV, 6 hourly PLUS Metronidazole 500mg IV, 12 hourly	Ceftriaxone 1g IV, daily PLUS Metronidazole 500mg IV, 12 hourly	Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Lincomycin[Note 5] 900mg IV, 8 hourly
SOURCE UNKNOWN				
No obvious source of infection		Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Flucloxacillin 2g IV, 4 hourly **If at risk of MRSA[Note 7]** ADD Vancomycin[Note 4] 30mg/kg ABW IV loading dose	Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Cefazolin 2g IV, 6 hourly **If at risk of MRSA[Note 7]** ADD Vancomycin[Note 4] 30mg/kg ABW IV loading dose	Gentamicin[Note 6] 4–5mg/kg IBW/AdjBW IV, max 500mg PLUS Vancomycin[Note 4] 30mg/kg ABW IV loading dose

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