



**Queensland  
Government**

## Peritoneal Dialysis Peritonitis Clinical Pathway

(Affix identification label here)

URN:

Family name:

Given name(s):

Address:

Date of birth:

Sex:  M  F  I

Facility: .....

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

**This form is to be used to assess patients on peritoneal dialysis who present with any of the following symptoms (tick as appropriate)**

<input type="checkbox"/> Cloudy effluent	<input type="checkbox"/> Abdominal pain
<input type="checkbox"/> Febrile	<input type="checkbox"/> Systemically unwell

Assessment	Completed	Initial	Time	Date
• Clinically assess the patient				
• Collect sterile sample of PD fluid of 150ml into 3 sterile yellow top containers and 5ml into EDTA collection tube (purple top) » Send specimens to Microbiology with pathology request: <i>Peritoneal dialysis effluent for M/C/S, WCC and Differential</i>	<input type="checkbox"/>			
• Commence immediate Empiric Treatment using below table				
• Inspect exit site » Swab site if signs of infection	<input type="checkbox"/>			
• If temperature above 38°C collect blood cultures	<input type="checkbox"/>			
• Admit / transfer patient if any of the following (tick as appropriate below): <input type="checkbox"/> Fever <b>or</b> <input type="checkbox"/> Significant Pain <b>or</b> <input type="checkbox"/> Unable to perform own dialysis				
• Contact the Nephrologist or Peritoneal Dialysis Unit covering the patient as soon as possible at the time of presentation	<input type="checkbox"/>			

**Immediate Empiric Treatment**

- Doses must be added to the patient's medication chart to be a valid order
- Dwell time for bags containing antibiotics must be at least 6 hours
- Continue APD if clinically appropriate and dosing as per appendix 1 (page 11)

	Drug	Dose	Route	Frequency	Comments
	Nystatin	500,000 international units	O	QID	Until last antibiotic dose (or 2 days after last aminoglycoside dose and 7 days after last Vancomycin dose).
<b>Optional</b>	Heparin	500 units/litre	IP	Each exchange	To bags containing fibrin or clots. If drained bags contain fibrin or clots, instil Heparin into new dialysis bag.
<b>Known MRSA or Cephalosporin hypersensitivity</b>	Vancomycin*	30mg/kg up to 2 grams	IP	In one bag stat†	Check serum trough levels on day 3 and thereafter every 3–5 days; re-dose Vancomycin when level below 15mg/L.
	Gentamicin*	0.6mg/kg up to 50mg	IP	In one bag each 24 hours†	Check serum trough levels on day 3 and daily thereafter; the precise levels to re-dose are unknown although it is recommended to avoid trough levels > 2mg/L. In rare situations where measuring levels is not possible (e.g. remote location), administer 2 consecutive daily IP doses of gentamicin then wait for culture guidance on day 3–4 to decide subsequent antibiotic dosing. Consult with Nephrology or ID if treatment with Gentamicin for more than 7 days.
<b>No MRSA</b>	Cefazolin**	15mg/kg	IP	In one bag each 24 hours†	
	Gentamicin**	0.6mg/kg up to 50mg	IP	In one bag each 24 hours†	As per Gentamicin comments above

\* Vancomycin and Gentamicin may be administered in the same bag without loss of bioactivity.  
 \*\* Cefazolin and Gentamicin may be administered in the same bag without loss of bioactivity. Concerns are acknowledged however there have been no issues identified at Qld Health facilities undertaking this practice.  
 † Adjust dose to reflect fill volume in last bag.

Signature Log To be completed by all staff who initial this pathway			
Name (print)	Designation	Signature	Date

DO NOT WRITE IN THIS BINDING MARGIN

v2.00 - 02/2016



SW203

PERITONEAL DIALYSIS PERITONITIS CLINICAL PATHWAY



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## Immediate Treatment

### 0–6 hours

- Start intraperitoneal antibiotics as soon as possible
- Allow to dwell for at least 6 hours
- Ensure gram positive and gram negative coverage
- **Continue usual PD regimen**

### 6–8 hours

- Determine and prescribe ongoing antibiotic treatment
- Ensure follow-up arrangements are clear or patient admitted
- Await sensitivity results

### Transfer

- If patient remains unwell may need to be transferring to other facility

## Empiric Treatment Following Culture Results

- If PD Fluid WCC above  $100 \times 10^6/L$  of which 50% are polymorphonuclear neutrophils



**Diagnosis of Peritonitis is made**

**Antibiotic Regimen depends on the results of the culture. Follow the links below to locate the correct regimen.**

*Staphylococcus aureus*  **Plan 1** *Go to Page 3*

*Streptococcus*  **Plan 2** *Go to Page 4*

*Enterococcus*  **Plan 3** *Go to Page 5*

Other gram positive organisms  **Plan 4** *Go to Page 6*

Single gram-negative  **Plan 5** *Go to Page 7*

*Pseudomonas* species  **Plan 6** *Go to Page 8*

Polymicrobial peritonitis: day 1–3  **Plan 7** *Go to Page 9*

Culture negative on day 1 and 2  **Plan 8** *Go to Page 10*

Fungi  **Plan 9** *Go to Page 11*

**If Gram stain shows fungal elements, surgically remove catheter**

## Catheter Treatment

- Consult with Nephrologist
- Continue

**Nursing care of patients**

## Plan of Care

Consider re-training after successful peritonitis treatment

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Medical Officer (print name):

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## Plan of Care 1 This plan of care is only valid if signed by a Medical Officer

Medical Officer / Nurse Practitioner (print name):	Designation:	Signature:	Date:
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**Staphylococcus aureus on culture**

- Continue gram-positive coverage based on sensitivities
- Stop gram-negative coverage (Gentamicin)
- Assess exit site again

If methicillin resistant (MRSA) change to Vancomycin

- Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5:
- Symptoms resolved
  - Bags clear

**Clinical improvement**

- Continue antibiotics
- Duration of therapy: 21 days

**No clinical improvement by 5 days on appropriate antibiotics**

- Surgically remove catheter



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## Plan of Care 2 This plan of care is only valid if signed by a Medical Officer

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Date:

**Streptococcus on culture**

- Continue Cefazolin
- Cease Gentamicin

If penicillin resistant or penicillin / cephalosporin allergic, change Cefazolin to Vancomycin

Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5:

- Symptoms resolved
- Bags clear

**Clinical improvement**

**No clinical improvement by 5 days on appropriate antibiotics**

- Continue antibiotics: duration 14 days

- Surgically remove catheter
- After surgical catheter removal: patient to remain on treatment for 14 days

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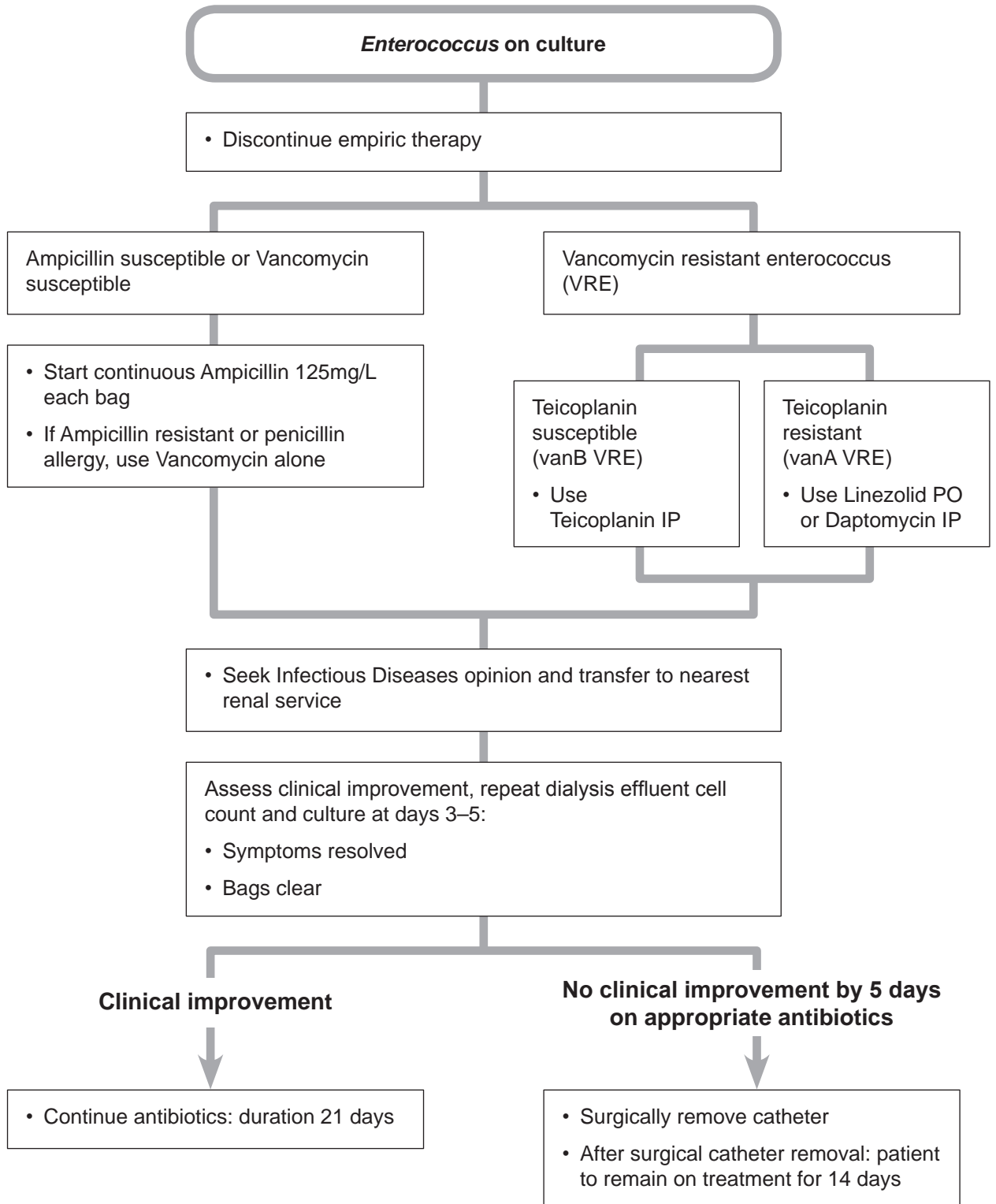
Date of birth:

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## Plan of Care 3 This plan of care is only valid if signed by a Medical Officer

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## Plan of Care 4 This plan of care is only valid if signed by a Medical Officer

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Signature:

Date:

### Other gram-positive organisms including coagulase negative *staphylococcus* on culture

- Continue gram-positive coverage based on sensitivities
- Stop gram-negative coverage

Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5:

- Symptoms resolved
- Bags clear

#### Clinical improvement

- Continue antibiotics
- Duration of therapy: 14 days

#### No clinical improvement by 5 days on appropriate antibiotics

- Surgically remove catheter
- After surgical catheter removal: patient to remain on treatment for 14 days

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## Plan of Care 5 This plan of care is only valid if signed by a Medical Officer

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### Other single gram-negative organism on culture

*Aeromonas* or 'ESCPM':  
*Enterobacter* sp.  
*Serratia* sp.  
*Citrobacter freundii*  
*Proteus vulgaris*  
*Morganella morganii*

*Acinetobacter*

*Stenotrophomonas*

Other gram-negative organisms

- Ciprofloxacin PO or Cefepime IP

- Ciprofloxacin PO

- Trimethoprim sulfamethoxazole PO

- Cefazolin susceptible: continue Cefazolin, cease Gentamicin
- Cefazolin resistant: treat according to susceptibilities either Ceftazidime IP, Cefepime IP, Ciprofloxacin PO or seek Infectious Diseases advice

Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5:

- Symptoms resolved
- Bags clear

**Clinical improvement**

**No clinical improvement by 5 days on appropriate antibiotics**

- Continue antibiotics:
  - 28 days for *Stenotrophomonas*
  - 21 days for other gram-negatives

- Surgically remove catheter
- After surgical catheter removal: patient to remain on treatment for 21 days

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## Plan of Care 6 This plan of care is only valid if signed by a Medical Officer

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***Pseudomonas* species on culture**

**Without catheter infection  
(exit-site / tunnel)**

- Give 2 different antibiotics acting in different ways that the organism is sensitive to (e.g. IP Gentamicin or oral Ciprofloxacin with IP Ceftazidime or Cefepime)

Assess clinical improvement, repeat dialysis effluent cell count and culture at days 3–5:

- Symptoms resolved
- Bags clear

**Clinical improvement**

- Continue antibiotics
- Duration of therapy: 21 days

**No clinical improvement by 5 days  
on appropriate antibiotics**

- Surgically remove catheter
- Patient to remain on treatment for 21 days after catheter removal

**With catheter infection (exit-site / tunnel) current or prior to peritonitis**

- Surgically remove catheter
- Patient to remain on treatment for 21 days after catheter removal

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### Polymicrobial peritonitis: days 1–3

#### Multiple gram-negative organisms or mixed gram negative / gram positive

- Consider GI problem

- Change therapy to oral Metronidazole in conjunction with either IP Ampicillin and Gentamicin; or IP Ceftazidime

- Obtain urgent surgical assessment

- In case of laparotomy indicating intraabdominal pathology / abscess, surgically remove catheter

- Continue antibiotics: duration minimum of 21 days

#### Multiple gram-positive organisms

- Touch contamination
- Consider catheter infection

- Continue therapy based on sensitivities: duration minimum of 21 days

#### Without exit site or tunnel infection

- Continue antibiotics
- Duration of treatment for a minimum 21 days

#### With exit site or tunnel infection

- Remove catheter



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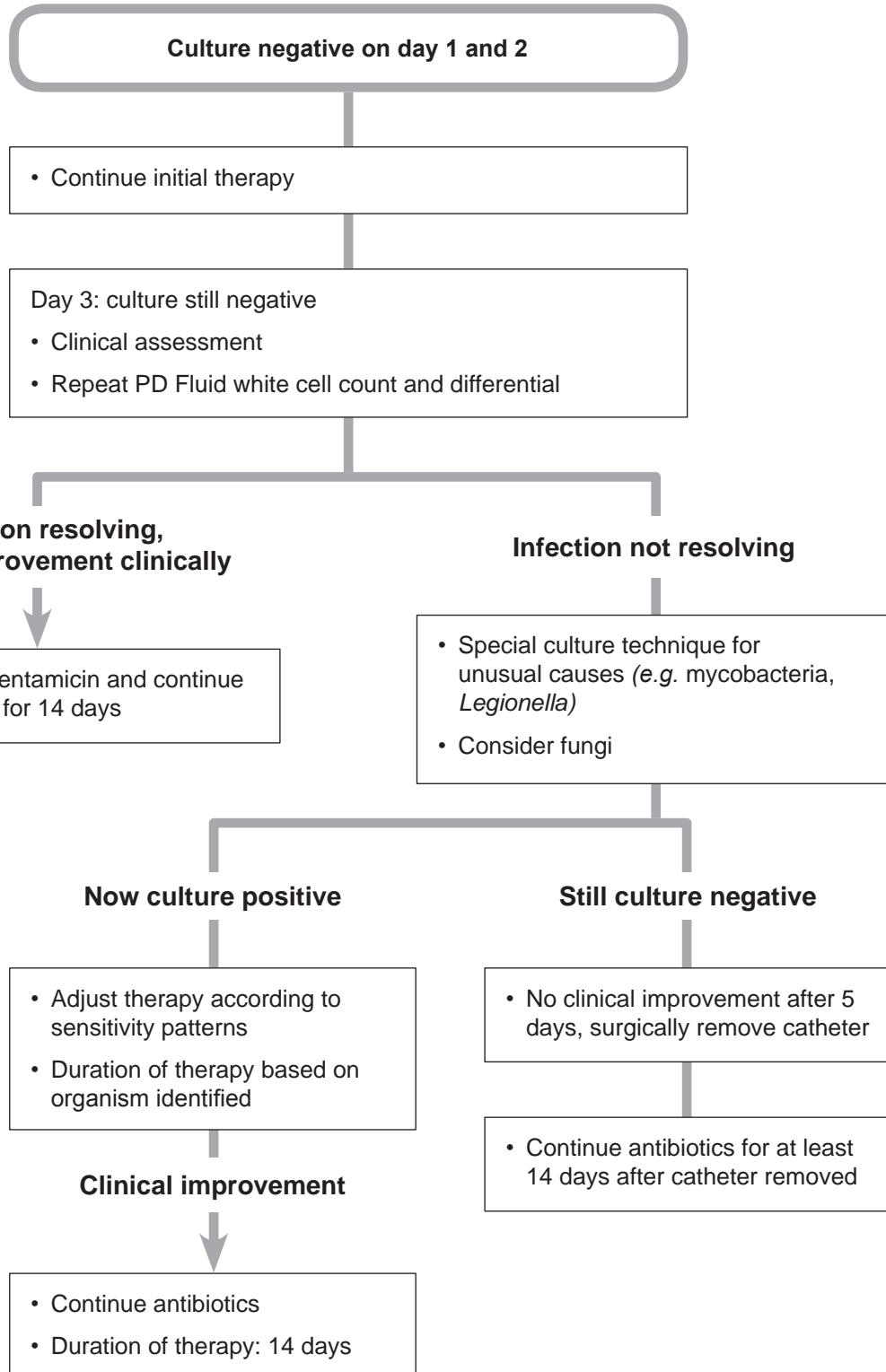
## Plan of Care 8 This plan of care is only valid if signed by a Medical Officer

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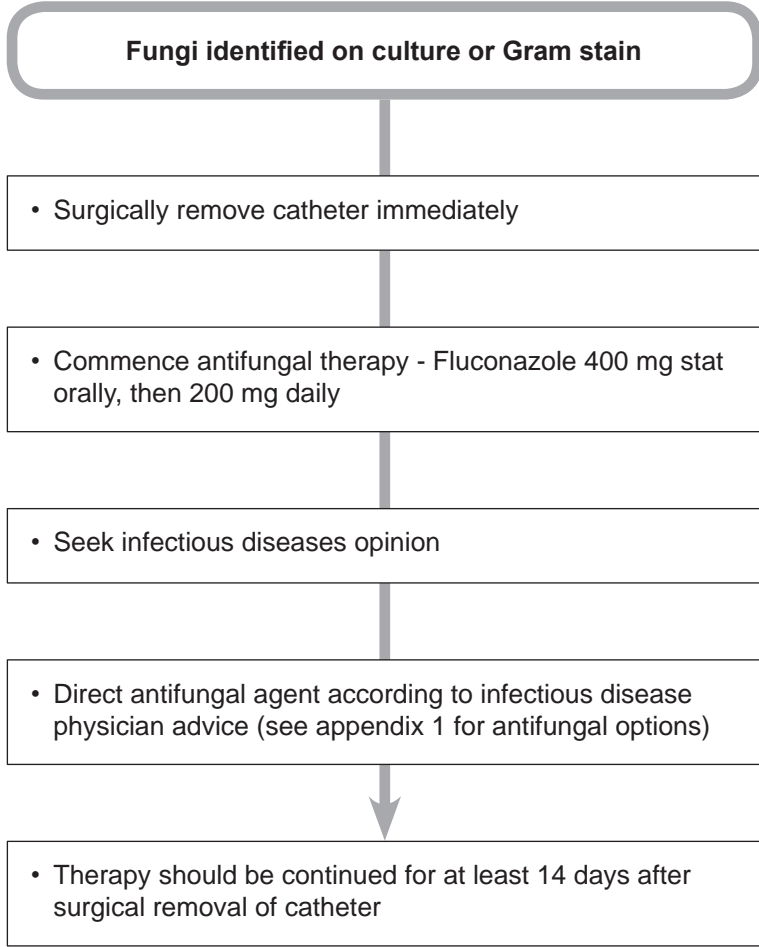
Date of birth:

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## Plan of Care 9 This plan of care is only valid if signed by a Medical Officer

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## Appendix 1

Intraperitoneal Antibiotic Dosing Recommendations for CAPD patients (a)					
Antibiotic Type			Intermittent (per exchange, once daily)	Continuous (mg / L; all exchanges)	Oral Dosing
Gram-negative cover only	Aminoglycosides	Amikacin	2 mg / kg	LD25, MD12	
		Gentamicin <i>OR</i>	0.6 mg / kg	LD 8, MD 4	
		Tobramycin	0.6 mg / kg	LD 8, MD 4	
	Cephalosporin	Cefepime	1000 mg	LD 500, MD 125	
		Ceftazidime	1000–1500 mg	LD 500, MD 125	
	Quinolones	Ciprofloxacin	ND	LD 50, MD 25	
	Others	Aztreonam	ND	LD 1000, MD 250	
Gram-positive cover only	Penicillins	Amoxicillin	ND	LD 250-500, MD 50	
		Ampicillin	ND	MD 125	
		Penicillin G	ND	LD 50,000 units, MD 25,000 units	
	Others	Daptomycin (115)	ND	LD 100, MD 20	
		Linezolid (41)	ND		200–300 mg once daily
		Teicoplanin	15 mg / kg	LD 400, MD 20	
		Vancomycin	15-30 mg / kg every 5–7 days	LD 1000, MD 25	
Gram-negative AND Gram-positive	Cephalosporin	Cefazolin	15 mg / kg		
	Others	Trimethoprim / Sulfamethoxazole			960 mg BD
Antifungals	Amphotericin		N/A	1.5	
	Fluconazole				400mg stat, then 200mg once daily

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Intermittent Dosing of Antibiotics in Automated Peritoneal Dialysis (APD)	
Drug	Intraperitoneal Dose
Cefazolin	15 mg / kg IP every day, in long day dwell (112)
Cefepime	1 g IP in 1 exchange per day
Fluconazole	200 mg IP in 1 exchange per day every 24–48 hours
Tobramycin	LD 1.5 mg / kg IP in long dwell, then 0.5 mg/kg IP each day in long dwell (112)
Vancomycin	LD 30 mg / kg IP in long dwell; repeat dosing 15 mg/kg IP in long dwell every 3–5 days (aim to keep serum trough levels above 15 µg / mL)

LEGEND				
<b>BD</b> 2 times per day	<b>LD</b> Loading Dose in mg / L	<b>N/A</b> Not Applicable	<b>a</b> For dosing of drugs with renal clearance in patients with residual renal function (defined as >100 mL / day urine output), dose should be empirically increased by 25%.	
<b>IP</b> Intraperitoneal	<b>MD</b> Maintenance dose in mg / L	<b>ND</b> No Data		

Acknowledgement: International Society for Peritoneal Dialysis. Table adapted from Dialysis-related Infections Recommendations: 2010 Update.