Current Infectious Disease Reports

Defining international critical care pharmacist contributions to sepsis and exploring variability

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Online Resource 4 (Supplementary Table). An overview of themes, sub-themes and codes for Intensive Care Unit (ICU) Clinical Pharmacy Service Characteristics: Bedside approaches

Constituents	Themes	Associated Codes
Contributions	*Medicines Reconciliation*	Medication history, medicines reconciliation, drug chart reviews, drug/feed interaction checking, high risk drugs, checking prescribing of appropriate home medications, transfer errors, de-labelling of spurious antimicrobial allergies
	Drug Administration Advice	*Nursing*: antimicrobial reconstitution, available formulations, infusion compatibility, infusion prioritisation, route advice, drug stability considerations, drug properties, dilution factor calculations, alternative routes/formulations advice, nil-by-mouth patients, administration of empirical antimicrobials within 1-hour, infusion fluid advice, peripheral or central line compatibility, feed/electrolyte interactions, adverse drug reaction (ADR) identification, evidence guided, timeliness of therapies, standardising fluid concentrations, administration error identification, appropriate concentrations *Medical*: infusion rate, continuous or intermittent infusion depending on drug pharmacokinetic/pharmacodynamic (PK/PD) properties, hydrophilic or lipophilic drug properties, tissue penetration, available formulations, fluid restricted patient considerations, unlicensed administration rate/route/duration advice, feed/electrolyte interactions, intravenous (IV) fluid choice
	Medication Ordering & Supply	Out-of-hours (OOH) dispensing, expediting antimicrobials, pre-emptive ordering of supportive/antimicrobial therapies without prescription, clinically reviewing orders, stocklists to minimise delays, ICU availability, shortage alternatives, verbal orders, situational judgement, collaborative practice policy with medical team, pharmacy technician led
	Shock Management	Differentiating shock type, fluid/vasopressor/inotrope/corticosteroid support, interventions based on experience
	Antimicrobial Stewardship (AMS) Activities	Reducing antimicrobial burden, supportive cultures, oral stepdown, stop date, indication review, independent infectious disease team review/referral, compliance to guidelines/protocols, history taking on source and origin of infection, review of timeliness of 1-hour sepsis bundle/Surviving Sepsis Campaign activities, de-escalation at 48-72 hours, allergy documentation and challenge, minimum inhibitory concentration (MIC) interpretation, IV to oral switch, AMS round attendance with microbiologist, drug combination advice in antimicrobial resistance (AMR), bioavailability advice, reducing AMR burden via deprescribing
	Sub-themes	**Associated Codes**
	Antimicrobial Dosing	Tailored based on patient factors, adjustment, best practice guidance, evidence base, balancing effectiveness with safety, organ function dependency, based on response, accounting for interactions, unlicensed/bespoke initial dosing, guided by antimicrobial PK/PD, bug-drug-patient

		principles, European Committee on Antimicrobial Susceptibility Testing (EUCAST) guidance, MIC, clinical trials, organ function, genetic factors, uncommon drugs, guided by monitoring, unlicensed dosing and >10 years' experience, maximum tolerated loading dose
	Antimicrobial Choice	Supportive blood cultures/sensitivities, source, tissue penetration, antimicrobial history, local resistance patterns, national guidelines, local guidelines, checking MIC, patient organ function/biochemistry, spectrum of activity, medication history/interactions, reviews within 6-hours, microbiology history, allergy alternatives, empirical therapy guided by AMR scoring, treatment and prophylaxis, evidence based, monitoring requirements, route considerations, research evidence guided, route switching considerations, oral step-down options
	Therapeutic Drug Monitoring (TDM)	Initiation/requirement, serum concentration timings, serum concentration monitoring, dose adjustment, protocol compliance, serum concentration interpretation, infrastructure co-ordination (assays/blood-bank/laboratory), assay choice (amino acids/antimicrobial/antiviral), aminoglycosides, glycopeptides, miscellaneous (azoles/beta-lactams/sulfamethoxazole/voriconazole/ganciclovir/activated partial thromboplastin time (APTT)/factor Xa/antiepileptics/immunosuppressants), antimicrobial PK/PD index guided, Bayesian software, calculations, high risk/extracorporeal circuits, medical/nursing guidance, point-of-care (POC), digital incorporation
	Clinical Monitoring	AMR based on MIC/clinical symptoms, symptomatic improvement, microbiological improvement, ordering repeat bloods/cultures, organ function in respect to drug dosing, antimicrobial concentrations at site of infection, serum antimicrobial concentrations, fluid balance, calorie requirements, allergy symptoms, vasopressor concentrations, adverse drug reactions, ePMA alerts based on biomarkers, ePMA advice/notifications
	Sepsis Identification	Sepsis-6 bundle, blood gases, lactate levels, ePMA assistance/triggers/alerts, early warning scores, high risk patients, source of infection, vital signs, biochemistry, deterioration, sequential organ failure assessment (SOFA) score, outreach advisory service to other wards/emergency department (ED)
Constituents	**Themes**	**Associated Codes**
Delivery	*Multidisciplinary Team (MDT) Communication*	Ward round involvement, electronic entries, co-ordination between pharmacy specialities, communication with primary care - discharge/medication history, patient counselling, multimorbidity rounds, sepsis response team, interactions informed by reviewing drug charts/patient records for 60-80% of pharmacists' time, safeguarding, documenting recommendations, unlicensed practices, legal responsibilities

	Prescribing Activities	Dose adjustment according TDM serum concentrations, local agreements, protocol based, independent prescribing within intensivist led team, protocol/local agreement based prescribing, directive for independently ordering or adjusting concentrations, experience based, MDT communication, antimicrobials, supportive therapy, dose adjustments, ordering cultures/sensitivities, ordering biochemistry, nutrition/total parental nutrition (TPN) management, bespoke loading doses in complex patients, de-prescribing inappropriate antimicrobials/TPN, IV to oral switch, restricting antimicrobial supply