

Sepsis teaching, learning and assessment - Medicine

Early Learning in Medicine (Years 2+3 of the MB ChB programme)

Coverage of Sepsis in Early Learning in Medicine (Year 2 and 3 of the MBChB)

The Otago MBChB is taught as a 'spiral curriculum', where concepts are introduced and serially revisited, with increasing complexity and integration at successive visits. The curriculum is built around core competencies, with each stage (ELM/ALM/TL) having an expected level of learning. Early Learning in Medicine, classically what might be considered as pre-clinical years, focuses on normal 'structure and function' in a biopsychosocial context, with appropriate introductory extensions to pathology and the clinical context (including clinical skills and professional behaviour). Below is a description of the core competencies related to sepsis and the expected level of learning for ELM.

With regard assessment, we undertake constructive alignment (our assessment matches our teaching in relation to quantum of exposure and level of learning), so sepsis is assessed in proportion to its curriculum coverage across any cycle of assessment.

Core Competency	Description	Level of learning
Sepsis syndromes	Includes sepsis, severe sepsis, septic shock, systemic inflammatory response syndrome (SIRS); toxic shock syndrome	Uses knowledge of body systems and sciences to understand how the condition presents and is investigated.
Meningococcal sepsis	Meningism examination	Knows and can explain the actual practice of the skill. For procedural skills it includes the procedure itself and also the post- procedure care of the patient and/or specimens obtained. The student has observed the procedure on at least one occasion. For clinical reasoning understands and can achieve individual components of clinical reasoning but not the fully integrated complex skill.
	Te Reo Māori and it's role in Māori health advancement.	Interprets, organises, understands and knows how to apply relevant knowledge, skills and/or professional attitudes/ behaviours to Māori health advancement

Core Competency	Description	Level of learning
	<p>Current health status of Pacific peoples (NZ and the region), major health needs, determinants of health, and the mechanisms that contribute to health inequalities</p>	<p>Interprets, organises, understands and knows how to apply relevant knowledge, skills and/or professional attitudes/ behaviours to Pacific health advancement</p>
	<p>Social, economic, occupational, political and environmental determinants of health and health inequities and their impact on the current and future health of individuals and communities.</p>	<p>Identifies and describes key concepts, principles and information in relation to population health, epidemiology and cultural competence.</p>
	<p>Notification and management of notifiable diseases and outbreaks</p>	<p>Identifies and describes key concepts, principles and information in relation to population health, epidemiology and cultural competence.</p>
	<p>Decision-making tools e.g. guidelines and decision support software to foster application of best available evidence in delivering quality healthcare</p>	<p>Recognises relevant examples of professional and interprofessional practice requiring application of key concepts, facts and principles and describes how these apply in particular circumstances. For interprofessional collaborative practice (IPCP) equates to Engagement.</p>

Core Competency	Description	Level of learning
Vaccine preventable diseases - other	<p>Cervical cancer, Mumps, Pertussis whooping cough, Exanthematous viral infections - other, Infections in mother and foetus / neonate, Meningococcal sepsis, Influenza, Shingles (Zoster)</p> <p>Includes Rotavirus, Pneumococcus, Diphtheria, Tetanus, Poliomyelitis, Hepatitis B, Haemophilus influenzae type B, Measles (rubeola), Human papillomavirus (HPV), Rubella (German measles)</p>	Uses knowledge of body systems and sciences to understand how the condition presents and is investigated.
Cancer-related emergencies	Includes neutropenia and neutropenic sepsis, hypercalcaemia, spinal cord compression, superior vena cava (SVC) obstruction, tumour lysis syndrome	Knows normal and abnormal structure and function of body systems, and the underlying science principles relevant to the condition
Neonatal emergencies - other	Includes apnoea, meconium aspiration, seizures, hypothermia, hypoglycaemia, neonatal sepsis, necrotising enterocolitis	Uses knowledge of body systems and sciences to understand how the condition presents and is investigated.

Sepsis teaching Dunedin School of Medicine (DSM) Advanced Learning in Medicine (ALM)

Bedside teaching on infection and sepsis occurs in 4th, 5th and 6th year on Internal Medicine, Surgery, Critical Care, Paediatrics, and Women's Health. Patients with infections and/or sepsis may also be encountered during General Practice and Rural Health placements in each year. Tutorial teaching relating to sepsis occurs on Surgery, Paediatrics, Women's Health, General Practice, Rural Health, Pathology, Microbiology/Infectious Diseases, and Pharmacology. Content and emphasis varies according to the discipline, and includes teaching about key principles (e.g. clinical signs of sepsis and shock; neutrophil response; interpreting CRP; management of neutropenic sepsis etc.) and specific types of sepsis (e.g. puerperal, post-operative, septic arthritis etc.)

Some modules include simulation exercises and/or e-learning material based on infection and/or sepsis.

Sepsis and infection are also used as exemplars for teaching about clinical reasoning and safety-netting.

MB ChB Assessments

We have 52 MCQs containing the word *sepsis*, these are used in examining ALM5 students at the end of the year and are used in the Retained Knowledge tests sat by all ELM2 – ALM5 students.

Sepsis has been the presentation in an OSCE station used in examining ALM5 students at the end of the year.

University of Otago, Christchurch

At UOC, we have sepsis teaching in:

- Oncology (one of the five oncological emergencies)
- Paediatrics (meningococcal sepsis)
- ICU, anaesthetics, ED (recognizing the sick patient)
- Advanced Medicine (NEWS and risk scores)

Oncology

Our teaching/learning opportunities are around the context of patients on cancer treatment.

We include neutropenic sepsis in our 4th year SEGO module in many ways.

(Every 4th year student is attached to Oncology while on their surgery run, for 4 weeks with 3 tutorials, 3-4 half day clinics, ward attendance to meet in-patients (and do a case history)).

We specifically cover it within one of our three tutorials which all students attend in 4th year, where it is “billed” as an Oncology emergency.

We have an on line “quiz” specifically for it where students follow through a scenario of neutropenic sepsis.

Some students meet a patient on the Ward who has been admitted with neutropenic sepsis, and they need to discuss it and its management.

It is asked as a key side effect of chemotherapy in the end of run OSCE.

In the tutorial attended over the year by the whole 4th year class, on breast cancer, it is again drawn out as a key side effect of chemotherapy.

The students attend clinic and see patients who are advised on action to take if they are unwell of have fever etc on cancer therapy.

Oncology patients in our catchment carry a card that documents the symptoms to watch for and action to take, for patient and health professionals, to

promote rapid attention to their potential life threatening neutropenic sepsis.

All the Oncology nursing team are fully educated on taking patient calls about possible sepsis and action to initiate. It is also an area we continue to audit.

These measures are demonstrated to students while attached to the oncology service and are also ways the service heightens awareness at least for their patients, families and their carers.

Paediatrics

We don't teach sepsis specifically.

We do however teach an approach to a child with fever using the NICE guidelines and approach to a seriously unwell child using the APLS guidelines both of which have an element of sepsis teaching.

Surgery, Emergency, Gastroenterology, Oncology (SEGO)

As part of SEGO, 4th year students attend a number of ED small group tutorials.

These include core ED curriculum, with one tutorial dedicated to “The Circulation and Shock”.

All types of shock are discussed in this tutorial, including septic shock. Scenario-based learning is utilised to address the recognition and management of sepsis.

Our Trainee Interns critical care run (4 weeks, covering ICU/anaesthetics/ED) is based around experiential learning. The Trainee Interns become part of the ED (ICU/anaesthetics) team – and see any patient who attends ED during their shifts. They are supervised and mentored by an emergency medicine doctor. It is highly likely that they would see at least one, or perhaps more, patients with sepsis during their 5-6 ED shifts. As part of their assessment for this

module they complete a log book of all patients seen, which includes a brief description of the presenting problem, and a focus on learning that comes from these encounters. Feedback is provided on this logbook, and so if there was confusion about, for example, management of sepsis, this could be addressed both at the time the student is in ED, as well as after submission of their logbook.

During their ED time, trainee interns use our ED clinical pathways (as do all our staff), which includes the immunosuppressed sepsis pathway.

As part of their ICU placement, trainee interns spend time with the ICU outreach service, who attends clinical emergencies in the hospital. A number of these patients could have sepsis. They also attend bedside tutorials for patients currently in the ICU. The consultants running these tutorials tend to choose patients with multi-organ involvement (to highlight learning points such as ventilation, renal replacement therapy etc), and so a patient with sepsis may be discussed in these tutorials.



UOW ALM MB ChB Sepsis teaching, learning and assessment events

Module Year	Type	Title	LO
Surgery MICN 401	1hr sepsis lecture	Sepsis	Covers definition, recognition (specifically the qSOFA score), and management with focus on resuscitation, early antibiotics and source control if appropriate. Case based discussion of a patient with cellulitis progressing to necrotising fasciitis. Questions from this lecture appear in the end of run MCQ.
Emergency and Acute MICN 601	1.5 hr small group tutorial	Sepsis	Covers similar aspects to above with focus on problem solving and expecting students to lead the discussion a bit more. Case based discussion of a complex patient with a number of comorbidities who presents with urosepsis, then deteriorates on the ward. Need to urgently manage deterioration and recognise need for source control (obstructing renal stone). Key points are recognition, resuscitation and early appropriate Ab therapy. Uses BASIC textbook which has chapter on sepsis and there is an MCQ at the beginning and end of the run which examines on this material.

Module Year	Type	Title	LO
			Manage deteriorating patients – one of the simulated patients is a septic patient with pneumonia who then has anaphylaxis to augmentin.
Medicine MICN 601	Simulation 4 Small group, interactive, case based sessions	<p>You are called to see a patient with fever</p> <p>You are called to see a patient with hypotension</p> <p>You are called to see a patient with reduced urine output</p> <p>You are called to see a patient with tachycardia</p> <p>The Puerperium</p>	<p>https://medmap.otago.ac.nz/ui/conditions/2387</p> <p>https://medmap.otago.ac.nz/ui/presentations/618</p>
Obstetrics and Gynaecology 5th	Small group teaching		Objective: Know the common complications postpartum, including postpartum haemorrhage and puerperal pyrexia.

Module Year	Type	Title	LO		
		<p>PPROM (preterm prelabour rupture of membranes) and prolonged ROM</p> <p>Sexually transmitted infections</p>	<p>Includes neonatal and maternal sepsis</p> <p>Includes sepsis</p>		
Obstetrics and Gynaecology MICN 501 and 601	Multiple teaching events		<p>National Undergraduate Curriculum</p> <p>The puerperium:</p> <ul style="list-style-type: none"> • Learning Aim 4: To be aware of the risk factors for postpartum infection • Learning Aim 5: To describe the management of postpartum endometritis, and recognition of sepsis • Learning Aim 6: To describe the complications of caesarian section including types and common complications <p>Abortion:</p> <ul style="list-style-type: none"> • Learning Aim 3: To describe the methods of abortion and their <i>common complications</i>. <p>Examination Skills:</p> <table border="1"> <tr> <td>Perform initial management of obstetric emergencies such as pre-eclampsia, preterm labour, antepartum and post-partum haemorrhage, and <i>post-partum fever</i></td> <td>Shows how</td> </tr> </table>	Perform initial management of obstetric emergencies such as pre-eclampsia, preterm labour, antepartum and post-partum haemorrhage, and <i>post-partum fever</i>	Shows how
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Module Year	Type	Title	LO
Paediatrics MICN 501 and 601			Multiple informal learning opportunities in clinical teaching settings

Feedback from the Centre for Postgraduate Nursing Studies regarding the teaching and learning about Sepsis to pre-registration students

*Please note we do not have an undergraduate programme, we offer a graduate-entry pre-registration Master of Nursing Science programme.

NURS444 Nursing Science 2 [first year of Master of Nursing Science]

- Lecture on pathophysiology of sepsis

NURS446 Nursing Clients with Altered Health States [first year of Master of Nursing Science]

- Definition and revised definition of sepsis (JAMA 2016)
- Early recognition of sepsis
- Sepsis screening and action tool "SEPSIS SIX" – NZ Sepsis Trust
- Clinical presentation of sepsis
- Sepsis research

NURS501 Nursing Science 3 (Pharmacology) [second year Master of Nursing Science]

- Students undertake directed preparations for classroom learning –
 - Pharmacology for Health Professionals (5th ed.) Bryant, Knights, Darroch, & Rowland.
 - Unit 13 Chapter 36 [overview of antimicrobial chemotherapy & antimicrobial resistance] &
 - Unit 13 Chapter 37 [antibacterial drugs] &
 - Unit 13 Chapter 38 [antifungal & antiviral drugs] &
 - Unit 13 Chapter 39 [antiprotazoal, antimycobacterial & antihelminthic drugs]
 - www.nzformulary.org New Zealand Formulary: 5. Infections
- Classroom teaching includes lectures and case study exercises, one of which is a patient with sepsis.
- The exam includes a clinical case relating to sepsis.



School of Pharmacy,
University of Otago

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Summary of teaching related to the recognition, escalation and early management of sepsis.

The School of Pharmacy runs a 3-year programme, preceded by 1 year of Health Sciences First Year (HSFY) for most students. Students graduate with a BPharm and then must complete a 1-year internship (run outside the university) before being practice ready.

In a general sense, sepsis is taught as a possible complication and a risk across our programme when teaching infectious disease topics.

Teaching specifically related to sepsis recognition, escalation, and early management of sepsis.

- **PHCY220 (60 point paper)** includes an entire module on infectious disease.

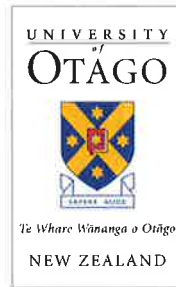
Relevant events;

- **Lectures** on the pathogenesis of infection, fever, and antimicrobial stewardship. Students are presented with and taught the NICE ‘traffic light system’ for identifying the risk of serious infection and sepsis (<https://pathways.nice.org.uk/pathways/fever-in-under-5s#content=view-node%3Anodes-identify-life-threatening-features>) as well as the general signs and symptoms of infection. The drug dosing lectures refers to the management of critically unwell patients with antibiotics like tobramycin, vancomycin etc.
- **Therapeutics workshop on fever.** The workshop includes required pre-reading from Starship Children’s Hospital Fever Investigation in children (<https://www.starship.org.nz/guidelines/fever-investigation-and-management/>) as the NICE summary of fever in children. The workshops includes static cases where students must alarm bell symptoms for severe infection (including sepsis). Workshop tasks include;

1. Describe the signs and symptoms of pyrexia in adults and children
2. Triage signs and symptoms of pyrexia in a presenting patient
3. Have a working knowledge of commonly used pyrexia references in adults and children
4. Have a brief discussion about some thermometers commonly used for measuring fever in adults and children.
5. Use the NICE Traffic Light triage system in pyrexia in adults and children
6. Perform simple calculations for paracetamol and ibuprofen dosing, in adults and children

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- **Therapeutics** workshop on cellulitis. The workshop includes static skin infection cases where students must alarm bell symptoms for severe infection (including sepsis). Tasks include;

To be aware of pertinent risk factors and red flags that require referral for further investigation
To become familiar with and recognise laboratory tests which may indicate infection
To be familiar with common pathogens associated with cellulitis
To be aware of and able to access reliable resources for antimicrobial selection guidance
To use clinical judgement alongside specific patient factors when selecting an antimicrobial regimen

- Second years practical skills: triaging cases where parents with an unwell infant or child (fever) present at a community pharmacy. The students are taught to recognise alarm bell symptoms for severe infection (including sepsis).
- **Therapeutics** workshop on treating bacteraemia. The workshop includes a static case of severe pyelonephritis – the students design a treatment, including agents and dosing, and are introduced to the risks of not treating the infection optimally.
- **PHCY320 (60 point paper)**. Relevant events;
 - **Lecture** on the risk of serious infection in pregnancy
 - **Therapeutics workshop on managing infections in cancer patients.**
- **PHCY432 (30 point paper)**. Relevant events;
 - **Therapeutics workshop on managing urinary tract infections.** Includes a patient admitted to hospital with urosepsis. The student needs to investigate how a urinary tract infection can progress in this way, and what warning signs could have been identified. Treatment and appropriate dosing are explored.
 - **An infectious disease module (1 week)**. Includes a workshop exploring the evidence base for treating meningitis

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