Anaemia and other cytopenias: investigational pathways and when to refer

This webinar will start soon.

Anaemia and other cytopenias: investigational pathways and when to refer

Zoom webinar – Thursday, 16 April 2026 – 6:30pm to 8pm

Facilitator

Dr Jonathan Choong - GP Clinical Editor, Primary Health Tasmania

- Hobart GP
- Tasmanian HealthPathways Clinical editor

Acknowledgement of traditional owners

We acknowledge the Tasmanian Aboriginal people as the traditional owners and ongoing custodians of the land on which we are meeting today. We pay our respects to Elders past and present.

We would also like to acknowledge Aboriginal people who are joining us today.

Learning outcomes

After this session, I will be able to:

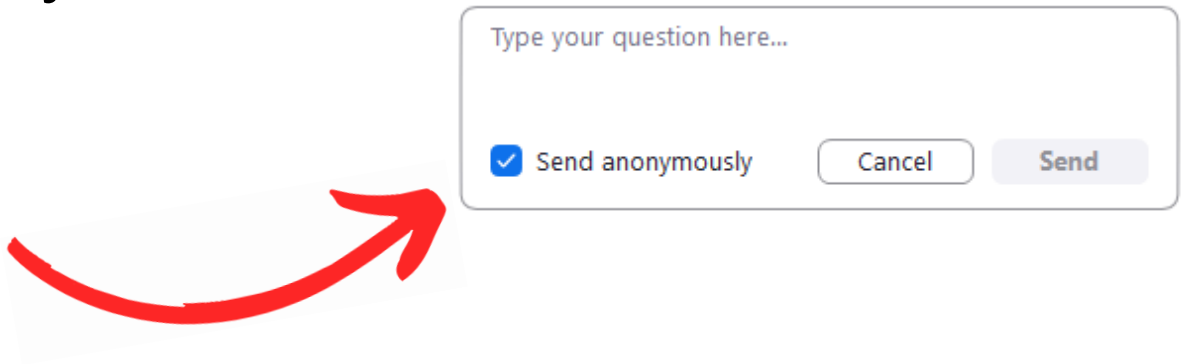
1. Discuss the three most common causes of anaemia.
2. Explore the causes and investigational pathways for neutropenia and thrombocytopenia.
3. Identify when to refer to tertiary care.

Some housekeeping

- Tonight's webinar is being recorded
- At the end of the webinar your browser will automatically open an evaluation survey. We appreciate you taking the time to complete this to help us improve our events programme
- Scan here to register for your next Primary Health Tasmania event

Q&A

- Please use the Q&A feature at the bottom of your screen
- You can ask questions throughout the session and they will be answered during the dedicated Q&A time
- Would you prefer to remain anonymous?



Presenter

Dr Victoria Hervey- Haematologist

- Specialist registrar training in Edinburgh and at the Royal Prince Alfred Hospital in Sydney
- Fellowship of the Royal Australasian College of Physicians
- Works as a clinical haematologist, treating all aspects of malignant and general haematology.

Anaemia and other cytopenias

Dr Victoria Hervey

16/4/26

Summary

Investigation and management in the community of:

- Anaemia
  - Causes
  - Iron, B12 and folate deficiencies
- Lymphopenia
- Neutropenia
- Thrombocytopenia

Anaemia causes – low or high MCV

- Low MCV
  - Iron deficiency
  - Thalassaemia trait : MCH usually below 24. Has never had a previously normal Hb or MCV
- High MCV
  - MCV up to 110
    - Myelodysplasia
    - Paraprotein (usually over 10g/l)
    - High reticulocyte count in bleeding or haemolysis
    - Drugs (MTX, azathioprine)
    - Alcohol / liver disease
    - Hypothyroid
  - MCV over 110
    - B12 or folate deficiency,
    - Hydroxycarbamide chemo

Anaemia causes – normal MCV

- Normocytic
  - Chronic disease
  - Chronic renal failure
  - Marrow infiltration/haem disease
    - Often have other cytopenias
    - And/or low retic
    - And/or abnormal film
    - Much more likely if Hb <90

Blood tests #1

- History – bleeding, weight loss, pain etc
- UEC and LFT
- Ferritin if low MCV
- B12/folate if high MCV
- If normal MCV check ferritin and B12/folate

Renal anaemia

- renal anaemia seen in
  - 1% of patients with an eGFR of 60
  - 9% patients with an eGFR of 30
  - 33 - 67% patients with an eGFR of 15
- Diagnosis of exclusion of other causes (including myeloma)
- Caused by:
  - Anaemia of chronic disease (upregulation hepcidin inhibiting release of iron from stores)
  - True iron deficiency (ferritin <200 and transferrin sat <20%)
  - Relative iron deficiency in haemodialysis patients if ferritin <500 and transferrin saturation <30%

Iron deficiency anaemia

- Causes:
  - GI
  - Menorrhagia (consider tranexamic acid 1g tds PRN)
  - Urine
- Please note ferritin is an acute phase reactant therefore can be falsely normal.
  - Chronic disease
  - Liver disease/alcohol
  - Acute infection/illness/surgery
- Ferritin <80-100 with no other obvious cause of anaemia, consider a trial of iron for 3 months

Oral iron replacement

- Note that oral iron is an irritant
- Many trials now show that 1 tablet alternate day, or MWF, allows settling of GI side effects, with no reduction in efficacy (down regulation of hepcidin in days off replacement so improved absorption on days when taken)

Preparation	Formulation	Elemental Iron	PBS Subsidy	Amount / Repeats
Ferrous sulfate (Ferro-gradumet)	325 mg slow release	105 mg	OTC	N/A
Ferrous sulfate with ascorbic acid (Ferrograd C)	325 mg/500 mg slow release	105 mg	OTC only	N/A
Ferrous fumarate with folic acid (Ferro-F tab)	310 mg/ 350 micrograms immediate release	100 mg	RPBS only	60/1
Iron polymaltose (Maltofer tablet)	370 mg immediate release	100 mg	OTC only	N/A
Iron polymaltose oral liquid	370 mg/10 mL	100 mg/10 mL	OTC only	N/A
Ferrous fumarate (Ferro tab)	200 mg immediate release	65.7 mg	RPBS only	60/1
Ferrous sulfate liquid (Ferro-liquid)	30 mg/mL	60 mg/10 mL	Yes	250 mL/2

IV iron

- Indications
  - Side effects to oral iron
  - Poor absorption oral iron
  - Rapid rise in Hb needed
- https://tasmania.communityhealthpathways.org/288018_1.htm
- Dosing

Simplified method (for patients with a body weight of ≥ 35 kg)

Haemoglobin (Hb) (g/L)	Body weight 35 to < 70 kg	Body weight ≥ 70 kg
< 100	1500 mg	2000 mg
≥ 100	1000 mg	1500 mg

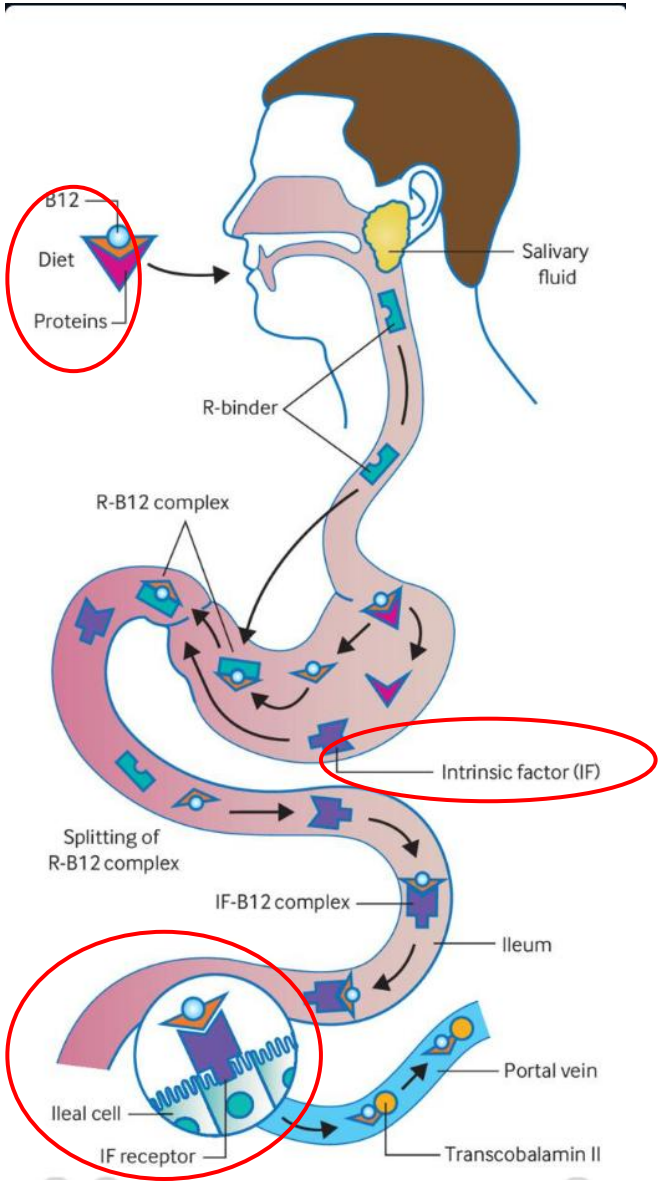
IV iron administration

- Can be given in GP practice
  - Ferrinject
  - Slow bolus, observe/obs every 5 mins for 30mins
  - Repeat bloods 6-12 weeks later
  - Side effects: allergy (<1%), anaphylalxis (<0.01%), myalgia (due to hypophosphataemia), skin discolouration if cannula tissues
  - Monofer does not affect phosphate and may be better for bone health if recurrent infusions
- Or refer to hospital.
  - Referral pathways statewide on the below link
  - https://tasmania.communityhealthpathways.org/58772.htm

B12 deficiency

B12 deficiency

- Stores for 3 years
- Dietary sources are animal products such as meat, eggs, milk, fortified food
- B12 binds to intrinsic factor in the duodenum (IF, secreted by gastric parietal cells). This B12-IF complex is carried down to the terminal ileum, where it attaches to IF receptors and is absorbed into the bloodstream
- Dietary deficiency
- Malabsorption
  - Pernicious anaemia – levels often very low
  - Gastric surgery
  - Crohn's of small bowel
  - Coeliac disease (usually iron/folate def)



B12 tests

- Tests:
  - **Total B12:** Measures B12 attached to haptocorrin (80%) and transcobalamin (20%). Common initial screening test
  - **Active B12:** Only measures the B12 bound to transcobalamin I2, the only form capable of entering cells. Often used as a "reflex" test if the total B12 result is borderline or low (135–330 pmol/L) to confirm a true deficiency
  - Raised B12 – ignore if FBE/LFTs are normal and no symptoms
- Immunology tests for pernicious anaemia
  - Intrinsic factor specific but only positive in 50% of cases
  - Parietal cell antibodies positive in most cases but not specific
  - I rarely check as does not change my clinical management

B12 deficiency symptoms

- Macrocytic anaemia
- Neurological
  - Peripheral neuropathy
  - Subacute combine degeneration of the cord - demyelination of the spinal cord's dorsal and lateral columns. It causes sensory loss, ataxia, paresthesia, and weakness. May progress to spasticity and paraplegia.
  - Cognitive impairment
  - Depression
  - Psychosis
  - Personality changes
  - Insomnia, forgetfulness
  - Restless legs

B12 treatment

- The decision of how to treat is a balance of
  - The fact that in malabsportion/pernicious anaemia only intramuscular B12 will work. Neurological symptoms need rapid IM treatment.
  - Vs not wanting to overtreat or medicalise patients with dietary deficiency
- If macrocytic anaemia or neuro symptoms
  - Then give 1 mg hydroxocobalamin IM on MWF for two weeks.
  - After the initial loading, lifelong maintenance treatment is required with 1 mg hydroxocobalamin IM every three months.
- If dietary deficiency with no neuro symptoms, then try oral cyanocobalamin 100mcg daily for 3 months – Note these cases often have minimal anaemia and only borderline low B12
- In between cases suggest loading injections x 3-5. No maintenance unless proven benefit or drop in B12 level again
- Note B12 is a cofactor for neurotransmitter synthesis, affecting dopamine, serotonin, and norepinephrine levels to regulate mood and cognitive function.
  - Mood stimulant, but no need to give maintenance more frequently that 3 monthly

Folate deficiency

folate

- Stores last for a few months
- Absorbed duodenum and jejunum
- Deficiency
  - Dietary
  - Drugs
    - Methotrexate, phenytoin, alcohol
  - Malabsorption
    - Coeliac, Crohn's, bariatric surgery
  - Increased requirements (high cell turnover)
    - Bleeding, haemolysis, pregnancy
- Treatment is folic acid 5mg daily for 3 months (even in malabsorptive causes)
  - If combined with B12 deficiency, start B12 replacement 24hrs prior

Anaemia bloods #2

- Haemolysis screen only needed if raised bilirubin/LDH:
  - FBE, reticulocytes, film
  - UEC, LFT, LDH, haptoglobin
  - Direct coombes test/direct antiglobulin test
- How to be confident that this is not a haem malignancy
  - FBE, reticulocytes, film
  - B12/folate, ferritin
  - UEC, LFT, calcium, LDH (raised in liver disease, aggressive malignancy, haemolysis)
  - Serum electrophoresis

Serum electrophoresis

- Reactive increase in globulins are common

ELECTROPHORESIS

Total Protein	73	63 - 80	g/L
EP Albumin	**29 L**	38 - 51	g/L
Alpha-1 Globulin	**5.8 H**	2.2 - 4.1	g/L
Alpha-2 Globulin	**13.4 H**	4.9 - 8.7	g/L
Beta 1 Globulin	4.9	3.4 - 5.8	g/L
Beta 2 Globulin	**6.6 H**	2.1 - 4.9	g/L
Gamma Globulin	13.7	6.0 - 16.0	g/L

Electrophoresis shows mild elevation of some globulin fractions, but no discrete paraprotein band detected.

IMMUNOFIX. PROTEINS

Immunofixation Electrophoresis

No monoclonal protein was detected.

Comments

There is poorly defined, faint oligoclonal banding on immunofixation. This may reflect an inflammatory/reactive process.

Serum electrophoresis

- Concerning finding is the presence of a monoclonal protein/paraprotein

ELECTROPHORESIS

Total Protein	69	63 - 80	g/L
EP Albumin	38	38 - 51	g/L
Alpha-1 Globulin	2.1 L	2.2 - 4.1	g/L
Alpha-2 Globulin	19.6 H	4.9 - 8.7	g/L
Beta 1 Globulin	3.3 L	3.4 - 5.8	g/L
Beta 2 Globulin	2.4	2.1 - 4.9	g/L
Gamma Globulin	4.0 L	6.0 - 16.0	g/L
Paraprotein CE	10.6		g/L
See comment			

Comments

From the 19/8/2024 serum EPG is performed on the Sebia Cap 3 by capillary electrophoresis (CE).
Electrophoresis of serum shows two paraprotein bands in the beta 2 region, from anode to cathode they measure 10.6 g/L and 2.0 g/L respectivley.

IMMUNOFIX. PROTEINS

Immunofixation Electrophoresis

See comment

Comments

IFE of serum shows two protein bands in the beta 2 region, both are of the class IgA with kappa light chains.

When to refer anaemia to haem clinic

If no obvious cause on anaemia bloods #2:

- Young fit female, Hb <115 with no iron deficiency
- Young fit male, Hb <120
- Older/co-morbid patients Hb <100

If Hb >100 in older/co-morbid patients, no other cytopenias and anaemia bloods #2 are normal then very unlikely to have a significant haem disorder and can be managed in community

  - Possible early myelodysplasia, but if so, we would not do a bone marrow biopsy until Hb <100
  - Normal LDH, retic, film and bilirubin rules out clinically significant haemolysis so no real need to do DAT or haptoglobin

Lymphopenia

Lymphopenia

- Low lymphocytes
- In isolation this does not have a haematological cause.
- Common causes
  - Autoimmune disease
  - Steroids/immune suppressants
  - Viral infections

Neutropenia

Neutropenia

- Mild if 1.0 to 1.5 × 10^9/L.
- Moderate if 0.5 to 1.0 × 10^9/L.
- Severe if lower than 0.5 × 10^9/L.
- Causes:
  - Transient viral infection, EBV or post vaccination
  - Drugs
    - anticonvulsants, antithyroid drugs, chemo, antibiotics and psychotropics
  - B12 or folate deficiency
  - anorexia
  - Duffy null neutropenia (previous benign ethnic neutropenia)
  - HIV, hepatitis B/C
  - Autoimmune disease eg Rheumatoid or SLE
  - Haematological disorder

Duffy null neutropenia

- Normal neutrophil count can vary between ethnic groups:
  - The widely accepted lower neutrophil level of 1.5×10^9/L is appropriate for Caucasians.
  - Mild to moderate neutropenia is common in some ethnic groups e.g., people of Middle Eastern ethnicity, people of African descent, and Sephardic Jewish people. This is a normal variant.
- Duffy-null associated neutropenia should be considered in patients of these backgrounds with:
  - Persistent absolute neutrophil count (ANC) < 1.5/L on repeat FBE one month apart for 2 to 3 months
  - Normal peripheral smear
  - No infections
  - Normal examination
  - Normal results on further investigations/no other cytopenias.
- Duffy null phenotype can be confirmed by arranging investigations for "Duffy red cell phenotype". (request on blood cross match form)
- If the Duffy-null phenotype is present, no further investigation is required provided that neutrophils remain > 0.5×10^9/L in the absence of other significant blood count abnormalities.

Neutropenia investigations

- History – alcohol, diet, weight loss, medications, infections, vaccinations
- Exam – lymph nodes, liver, spleen
- Bloods #1
  - Do at 1 week if neuts <0.5, do at 2-4 weeks if >0.5
  - FBE, film
  - B12, folate
  - UEC, LFT
- Bloods #2 if no answer from above
  - FBE, film, retic
  - UEC, LFT, calcium, LDH
  - Serum electrophoresis
  - HIV, hepatitis, EBV
  - Consider duffy red cell phenotyping on transfusion form

neutropenia

- If low B12/folate then replace
- If post viral/vaccination then watch and repeat
- If possible drug cause, change medications and repeat
- When to refer to haem
  - Cause unknown after bloods #2 and neuts <1.5
  - Other cytopenias or splenomegaly
  - Associated fever/sepsis – send to ED

Thrombocytopenia

Thrombocytopenia thresholds

- Normal >150
- Surgery usually >50
- For anticoagulation/antiplatelets to be considered safe – 50-70
- Spontaneous bruising/bleeding unlikely if platelets >30 and not on anticoagulants/antiplatelets
- Be aware of contributory easy bruising from sun damaged skin – forearms and hands
- Dental surgery/extraction
  - No guidelines
  - Ideally OK to proceed if platelet count of >30
  - Tranexamic acid 1g tds for 5 days if platelets <50

Thrombocytopenia

- Causes:
  - Spurious- platelet clumping
  - Alcohol (can drop as low as 30 after binge drinking)
  - Chronic liver disease
  - Drugs and herbal remedies
  - Transient viral illness/vaccination (recovery usually in 1-2 weeks)
  - B12, folate deficiency (replacement takes 5 days for improvement in counts)
  - Autoimmune disease – rheumatoid, SLE
  - HIV, hep C
  - Haematological
    - Immune - ITP
    - Bone marrow infiltration/malignancy
    - Consumptive – microangiopathic haemolysis
    - Associated with von willibrand disease

Thrombocytopenia investigations

- History – diet, alcohol, bleeding, weight loss, medications, viral
- Exam – liver, spleen, lymph nodes
- Bloods #1
  - FBE, film
  - UEC, LFT
  - B12/folate
- Bloods #2
  - FBE, film,
  - UEC, LFT, calcium, LDH
  - Serum electrophoresis, immunoglobulins
  - HIV, hep B/C
  - If platelet clumping ask for ‘citrated platelet count in coagulation bottle’

Thrombocytopenia – when to refer

- Urgent
  - The scary haem disorders – acute leukaemia and MAHA will be picked up by lab – reflex film made and referral to haematologist
  - Sudden drop in platelet count within 10 days of starting heparin
  - Platelets <30
- Routine
  - Platelets 30-80 with no obvious cause on bloods/history
  - Thrombocytopenia with additional anaemia/neutropenia with no obvious cause
  - Platelet count has never been normal/family history of bleeding
- Advice if platelets 80-100 with no obvious cause

Thrombocytopenia community monitoring

- Platelets clumping, no bleeding
- platelets stable >100, no additional cytopenias and no obvious cause
- Platelets >50 and known chronic liver disease/alcohol
- Post viral/vaccination - repeat
- Medication related
  - Trial of ceasing
  - If platelets >75 and stable and benefit from medication, reasonable to continue

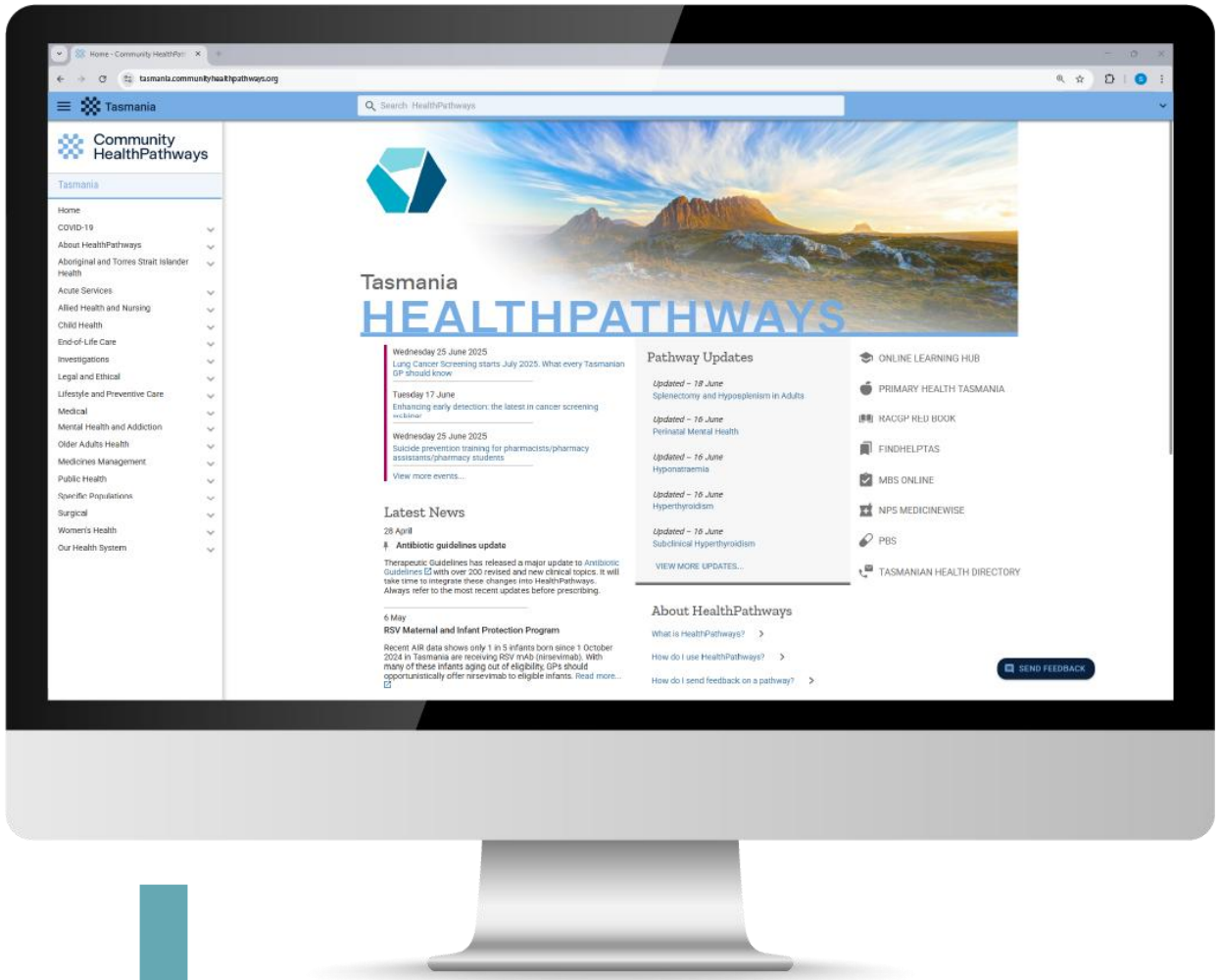
Questions?

Community HealthPathways

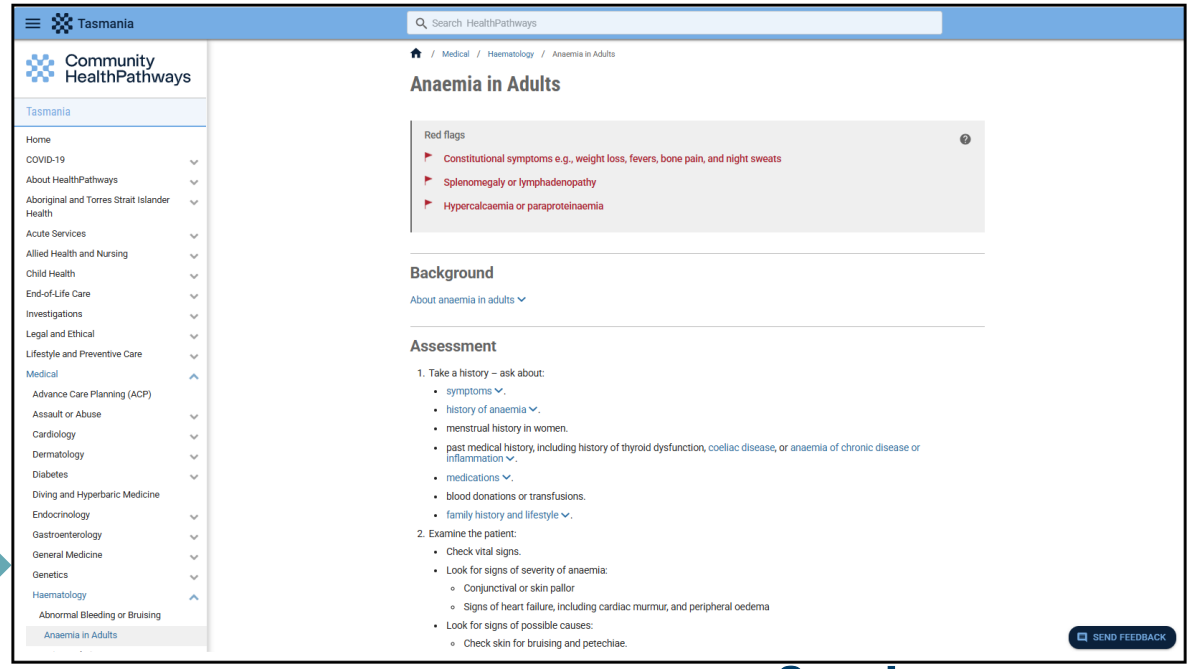
Tasmanian HealthPathways

is a web-based information portal developed by Primary Health Tasmania. It is designed to help primary care clinicians plan local patient care through primary, community and secondary healthcare systems.

tasmania.communityhealthpathways.org



Community HealthPathways



Scan here

To sign in or register, please visit the Tasmania HealthPathways home page.

Some final words

- After this webinar end, your browser will open a link to an evaluation survey.
- Statements of attendance will be emailed to participants.
- For event queries, please contact events@primaryhealthtas.com.au

Thank you

Disclaimer

- Information presented in webinars organised by Primary Health Tasmania can come from a number of sources, and does not necessarily reflect the views of Primary Health Tasmania. Every reasonable effort is taken to ensure the information is accurate and current.
- The content is general in nature – please refer to any referenced guidelines or standards for further information. Health professionals should rely on their own independent inquiries and professional judgement when making any decisions.
- Primary Health Tasmania and the Australian Government are not responsible for any injury, loss or damage however arising from the use of or reliance on the information provided in this webinar.

Stay informed

primaryhealthtas.com.au

facebook.com/primaryhealthtas

linkedin.com/primary-health-tasmania