Inside Out: Gastroenterology & Hepatology Workshop

Saturday 25 October 2025
Clinical Skills Development Service | RBWH

phn BRISBANE NORTH
An Australian Government Initiative

Queensland Government
Metro North Health

Abnormal LFTs

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Case studies: Abnormal LFTs

25/10/2025

ENOKA GONSALKORALA

RBWH, STARS

Abnormal LFTs – Tips

History – time-line, triggers?

Medication, medication, medication….

- LiverTox online

PMHX – especially autoimmune disease

Social history – wt, alcohol, recreational drugs, travel

Previous bloods

- Pattern of abnormal LFTs -> cholestatic (ALP, GGT) vs hepatocellular (ALT, AST) vs mixed

Pattern

Elevated ALT and AST levels:

- Mild (2–5 × ULN)
- Moderate (5–15 × ULN)
- Severe (>15 × ULN)

Hepatocellular – elevated ALT and AST

- Mild – MASLD, medications, chronic alcohol consumption
- Moderate / severe – viral, alcohol-related hepatitis, autoimmune hepatitis, drug induced liver injury, ischaemic hepatitis

Cholestatic – elevated ALP and GGT

- Mechanical obstruction – gallstones, tumour, bile duct injury
- Functional – drugs, hereditary, microscopic bile duct injury

Jaundice, prolonged INR, encephalopathy – indicative of acute liver failure (ALF)

Synthetic dysfunction – low alb, elevated INR, elevated bili

Portal hypertension – low platelet count

Case 1 – Ms BG

19F, Caucasian

3/12 of worsening lethergy

PHMx

- Hay fever, acne
- BMI 30

Medication – nil

Work – apprentice hairdresser

No EtOH

Blood tests

Bili 40, Alb 34, ALT 640, AST 410, ALP 220, GGT 74

Hb 130 Plt 237 INR 1.7

Cr 150 Ur 5

Thoughts?

What else?

Other symptoms – joints, skin, pain, weight loss

Drug history

- Lymecycline – completed 4mths prior to presentation
- No herbs, OCP, over the counter meds, gym supplements, NSAIDs

Travel

- Camping, ?water ?party drugs ?tattoos
- Returned home 1mth prior to development of symptoms

Sexual history

- Not sexually active

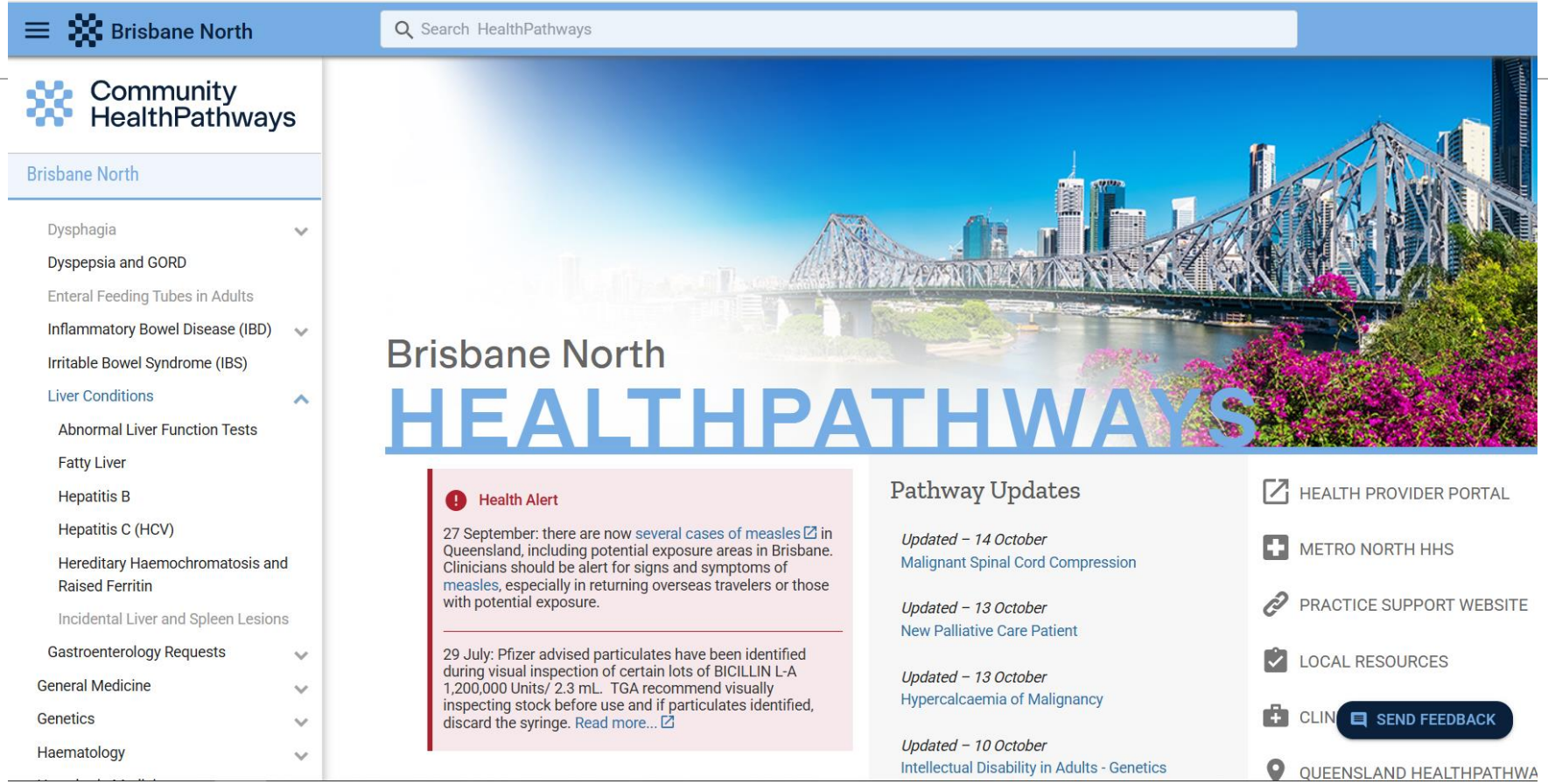
Family history

- Uncle ankylosing spondylitis, great-aunt pemphigoid, uncle scleroderma

What are the differentials?

1. Drug Induced Liver Injury (DILI)
2. Infection – biliary, leptospirosis, HBV
3. Autoimmune hepatitis
4. MASLD (Metabolic dysfunction associated steatotic liver disease)

Where to now?


Brisbane North
Search HealthPathways
Community HealthPathways
Brisbane North
Dysphagia
Dyspepsia and GORD
Enteral Feeding Tubes in Adults
Inflammatory Bowel Disease (IBD)
Irritable Bowel Syndrome (IBS)
Liver Conditions
Abnormal Liver Function Tests
Fatty Liver
Hepatitis B
Hepatitis C (HCV)
Hereditary Haemochromatosis and Raised Ferritin
Incidental Liver and Spleen Lesions
Gastroenterology Requests
General Medicine
Genetics
Haematology
Brisbane North
HEALTHPATHWAYS
Health Alert
27 September: there are now several cases of measles in Queensland, including potential exposure areas in Brisbane. Clinicians should be alert for signs and symptoms of measles, especially in returning overseas travelers or those with potential exposure.
29 July: Pfizer advised particulates have been identified during visual inspection of certain lots of BICILLIN L-A 1,200,000 Units/ 2.3 mL. TGA recommend visually inspecting stock before use and if particulates identified, discard the syringe. Read more...
Pathway Updates
Updated – 14 October
Malignant Spinal Cord Compression
Updated – 13 October
New Palliative Care Patient
Updated – 13 October
Hypercalcaemia of Malignancy
Updated – 10 October
Intellectual Disability in Adults - Genetics
HEALTH PROVIDER PORTAL
METRO NORTH HHS
PRACTICE SUPPORT WEBSITE
LOCAL RESOURCES
SEND FEEDBACK
QUEENSLAND HEALTHPATHWA

Assessment

Practice point

Avoid routine screening for LFTs

Arrange only if the patient has signs, symptoms, or risk factors of liver injury or disease. Routine monitoring of LFTs in asymptomatic patients is not recommended.

1. If abnormal LFTs, take a
2. Check for signs and sy
3. Arrange investigations:
   - Request abdominal u antigen (HepBsAg) (
   - Base further investig

Management

1. Request acute hepatology assessment if:
   - Alanine Transaminase (ALT) > 500.
   - Suspected decompensated liver disease (e.g., ascites, jaundice, encephalopathy).
2. If reduced seru liver injury and i
3. If isolated raise intake, fatty live
4. Further investig
   - isolated rai
   - isolated rai
   - predominar appropriate
   - predominar and arrang
5. If cause of abn
   - consider nc persistently
   - consider fu
   - request nor
6. If any other cor

Request

- Request acute hepatology assessment if:
  - Alanine Transaminase (ALT) > 500.
  - Suspected decompensated liver disease (e.g., ascites, jaundice, encephalopathy).
- If suspected impaired synthetic function (liver failure), seek hepatology advice or request acute hepatology assessment.
- If extrahepatic biliary obstruction or space occupying lesion on ultrasound, seek general surgery advice.
- Request non-acute hepatology assessment if:
  - ultrasound findings suggest:
    - biliary dilation (where extrahepatic obstruction not identified)
    - infiltration (mark as urgent)
    - cholestasis
    - liver cirrhosis or fibrosis
  - suspected:
    - autoimmune liver disease
    - alpha-1 antitrypsin deficiency
    - Wilson disease
  - persistent unexplained abnormal LFTs
- Request non-acute general surgery assessment if ultrasound findings suggest:
  - pancreatic cancer or cholangiocarcinoma (mark as urgent).
  - benign or inflammatory strictures.
- If suspected haemolysis, seek haematology advice.
- If any other concerns, seek gastroenterology or hepatology advice.

Causes

Hepatic causes of raised AST and ALT, with or without raised GGT

- Common causes:
  - Non-alcoholic fatty liver disease (NAFLD) including non-alcoholic steatohepatitis (NASH)
  - Alcohol-related liver disease
  - Hepatitis C
  - Hepatitis B
  - Medications
  - Haemochromatosis

Non-hepatic causes

- Thyroid disease (mechanism unclear) – check thyroid-stimulating hormone (TSH) and if abnormal, follow the thyroid function tests pathway.
- Coeliac disease – mildly elevated transaminases can be seen in undiagnosed patients.
  - Check tissue transglutaminase antibody (anti-tTG) and serum IgA.
  - Expect transaminases to return to normal following a gluten-free diet. See Coeliac Disease - Adults or Coeliac Disease in Children.
- Muscle disease – associated with increased creatine kinase:
  - Polymyositis
  - Heavy exercise e.g., long-distance running
  - Rarer causes e.g., inherited myopathy

Investigations for less common hepatic causes

- Auto-antibodies:
  - antinuclear antibody (ANA)
  - antimitochondrial antibody (AMA) e.g., associated with primary biliary cirrhosis
  - anti-liver kidney microsomal antibody (LKM) e.g., auto-immune chronic hepatitis
  - smooth muscle antibody (SMA) e.g., auto-immune chronic hepatitis
- Wilson disease screen:
  - caeruloplasmin
  - serum copper
- Alpha-1 antitrypsin

If suspected autoimmune liver disease, alpha-1 antitrypsin deficiency, or Wilson disease, request non-acute hepatology assessment.

Liver ultrasound

CPC

Minimum Referral Criteria

Category 1 (appointment within 30 calendar days)	• Abnormal liver function test persistent ALT >300U/L and/ • Evidence of liver decor encephalopathy • Newly abnormal liver functi
Category 2 (appointment within 90 calendar days)	• Persistently abnormal live concerning features ident NB Category 2 cases can be ref general physician if gastroente available
Category 3 (appointment within 365 calendar days)	• No category 3 criteria

1. Reason for request Indicate on the referral

- To establish a diagnosis
- For treatment or intervention
- For advice and management
- For specialist to take over management
- Reassurance for GP/second opinion
- For a specified test/investigation the GP can't order, or the patient can't afford or access
- Reassurance for the patient/family
- For other reason (e.g. rapidly accelerating disease progression)
- Clinical judgement indicates a referral for specialist review is necessary

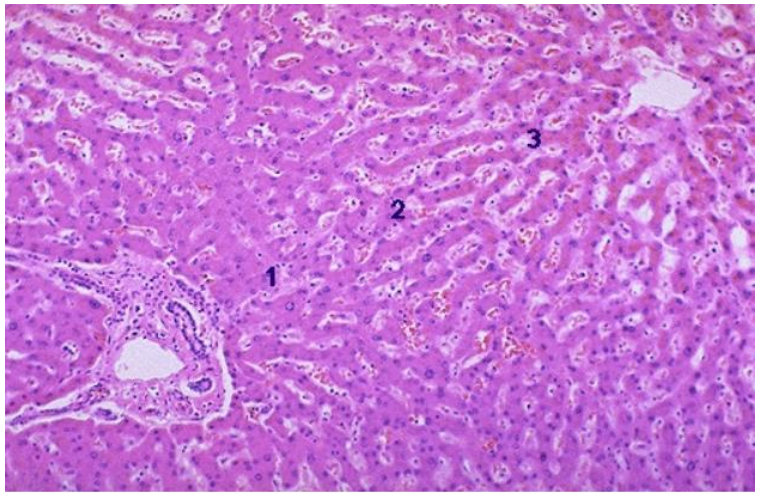
2. Essential referral information Referral will be returned without this

- Details of presenting issues
- Comorbidities and past medical history
- Alcohol and medication history (including non-prescription, herbs and supplements)
- Risk factors for viral hepatitis
- Height, weight and BMI
- FIB-4 (Fib-4 calculator), ELFT, FBC results less than 3 months old
- HBV, HCV serology results
- Recent upper abdominal ultrasound or CT reports

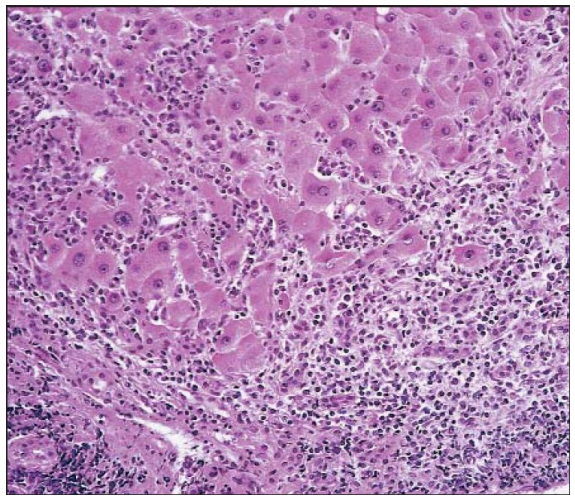
Progress

ANA 1/640, smooth muscle anti-body positive

Liver biopsy – autoimmune hepatitis



Normal



AIH

Management

Prednisolone – 40mg daily for two weeks, then wean. Initially weekly blood tests

- Excellent biochemical response

Commenced 6-mercaptopurine 8 weeks post as steroids sparing agent

Autoimmune Hepatitis

Multifactorial aetiology – genetics, immune dysregulation, environment

Insidious onset, F >M

Diagnostic criteria

Treatment

- Prednisolone
- Taper steroids, add steroid sparing agent – azathioprine, 6-mercaptopurine (mycophenolate, tacrolimus)

AZA/6MP side effects

- Cholestatic hepatitis, pancreatitis, infections, rash, N+V, opportunistic infections – 10%
- Cytopaenia 5%

Implication for GP

- Steroid and immunosuppression complications
- 6 monthly skin review whilst on immunosuppression

Case 2

71F referred for management of abnormal LFTs

History

- Normal LFTs 2019
- Became abnormal in Jul 2020
- Atorvastatin 80 changed to Rosuvastatin 40mg
- EtOH – 15 units a week
- No abdominal pain

PMHx – COPD, carotid stenosis, T2DM, osteoporosis

Med – risedronate, amlodipine, aspirin, citalopram, emplagliflozin/metformin, thiamine, pregabalin, esomeprazole, vit D, calcium

Exam – no stigmata CLD, no organomegaly. BMI 40

Investigations

Date	28/02/19	27/03/19	28/05/19	28/08/19	20/07/20	31/12/20	04/01/21		
Time	10:10	08:39	08:25	10:31	11:55	07:14	06:45		
Lab No	71580641	71679235	71117587	73364678	72341693	28390294	28390382		
	FASTING	FASTING	FASTING	FASTING	FASTING	RANDOM	FASTING		FASTING
Sodium	143	143	145	143	145	143	143	mmol/L	(137-147)
Potass.	4.3	4.2	4.2	4.3	3.9	4.3	4.5	mmol/L	(3.5-5.0)
Chloride	112	109	111	109	105	107	111	mmol/L	(96-109)
Bicarb	26	28	27	27	28	28	27	mmol/L	(25-33)
An.Gap	9	10	11	11	16	12	10	mmol/L	(4-17)
Gluc	8.1	10.2	8.7	7.9	7.0	13.6	9.2	mmol/L	(3.0-6.0)
Urea	4.3	4.9	5.0	4.6	5.9	5.8	5.6	mmol/L	(2.5-7.5)
Creat	62	73	64	70	67	71	66	umol/L	(50-120)
eGFR	87	71	84	75	79	74	81	mL/min	(over 59)
Urate	0.36	0.35	0.30	0.29	0.29	0.23	0.31	mmol/L	(0.14-0.35)
T.Bili	9	14	11	11	11	11	11	umol/L	(2-20)
Alk.P	74	77	92	70	56	4	5	umol/L	(0-8)
GGT	14	11	12	12	21	71	67	U/L	(30-115)
ALT	49	43	30	42	50	100	94	U/L	(0-45)
AST	94	37	28	30	37	434	276	U/L	(0-45)
LD	338	219	200	210	204	237	150	U/L	(0-41)
Calcium	2.18	2.29	2.28	2.42	2.58	305	249	U/L	(80-250)
Corr.Ca	2.33	2.42	2.35	2.49	2.60	2.35	2.27	mmol/L	(2.15-2.60)
Phos	1.0	1.3	1.3	1.4	1.6	2.36	2.31	mmol/L	(2.15-2.60)
T.Prot	58	62	64	62	63	1.5	1.4	mmol/L	(0.8-1.5)
Alb	37	38	40	40	42	63	59	g/L	(60-82)
Glob	21	24	24	22	21	42	41	g/L	(35-50)
Chol	2.9	3.4	3.4	2.8	2.9	21	18	g/L	(20-40)
Trig	0.8	1.4	1.1	0.8	1.4	2.8	2.5	mmol/L	(3.6-7.3)

Liver US – normal liver, normal biliary system, normal spleen

Any other questions?

What are the causes?

- Alcohol
- NAFLD
- Autoimmune hepatitis
- Drug induced liver injury
- Other

Management

CLD screen – unremarkable

Remain off statin

Phone consult one month later – results explained LFTs improving

Bloods March 2021

What's going on?

SERUM LIVER FUNCTION TESTS

	Total Bilirubin	13	umol/L	(2-20)
	Alk. Phos.	84	U/L	(30-115)
+++	Gamma G.T.	138	U/L	(0-45)
+++	ALT	231	U/L	(0-45)
+++	AST	153	U/L	(0-41)
	LD	246	U/L	(80-250)
	Albumin	44	g/L	(35-50)
	Globulins	21	g/L	(20-40)

CUMULATIVE SERUM BIOCHEMISTRY

Date	31/03/21	27/04/21	25/05/21	14/06/21	0
Time	11:03	09:56	15:54	09:03	
Lab No	28972448	29413348	29782921	28310295	
	FASTING	RANDOM	RANDOM	FASTING	
Sodium	142	145	143	144	
Potass.	4.5	4.1	4.0	4.3	
Chloride	110	109	109	111	
Bicarb	26	25	25	28	
An.Gap	11	15	13	9	
Gluc	6.2	12.2	5.7	10.0	
Urea	6.2	5.2	6.0	6.3	
Creat	62	76	73	77	
eGFR	86	68	71	66	
Urate	0.33	0.37	0.34	0.44	
T.Bili	11	8	6	10	
Alk.P	64	67	63	58	
GGT	40	23	16	16	
ALT	20	17	21	23	
AST	25	22	24	24	
LD	193	189	223	190	
Calcium	2.40	2.38	2.40	2.33	
Corr.Ca	2.44	2.42	2.41	2.32	
Phos	1.2	1.2	1.3	1.3	
T.Prot	61	62	64	63	
Alb	41	41	42	43	
Glob	20	21	22	20	
Chol	4.4	5.1	5.3	3.8	

Approach to DILI

LiverTox online is an excellent resource

- Type of liver injury and frequency
- Severity
- Potential treatment

Detailed medication history including doses

Look at pattern over time

Never reintroduce offending agent – can lead to acute liver failure

Case 3 – Mr ND

50M, Caucasian

New patient to your practice

PMHx

- T2DM
- Dyslipidaemia
- Ischaemic heart disease

Medication

EtOH – 15 units/wk

Exam – BMI 27, central adiposity

Routine blood tests

Alb 33, Bili 4, ALT 30, AST 67, GGT 300, ALP 250

Hb 120, Plt 140, INR 1.1

HbA1c 8%

Choles – within normal range

Concerns?

Further tests → Health Pathways

- Liver screen negative

Interpretation

1. Alcohol-associated liver disease
2. Metabolic dysfunction associated steatotic liver disease
3. Met-ALD
4. Advanced liver disease
5. Drug induced liver disease
6. Autoimmune hepatitis

Low albumin
Low platelets

What next?

- Liver US – nodular liver, splenomegaly, 3cm lesion

Tertiary management

Seen as Cat 1 pt

No symptoms of hepatic decompensation (ascites, variceal bleed, hepatic encephalopathy)

Multi-phase CT confirmed 3cm HCC without extra hepatic spread

- Discussed at hepatoma MDT
- Not suitable for locoregional *curative* therapy
- Referred for consideration of liver transplantation – accepted

Who to refer with abnormal LFTs?

ALL patients with cirrhosis (decompensation, bloods, imaging)

Healthcare Pathways

- Request acute hepatology assessment if:
  - Alanine Transaminase (ALT) > 500.
  - Suspected decompensated liver disease (e.g., ascites, jaundice, encephalopathy).
- If suspected impaired synthetic function (liver failure), seek hepatology advice or request acute hepatology assessment.
- If extrahepatic biliary obstruction or space occupying lesion on ultrasound, seek general surgery advice.
- Request non-acute hepatology assessment if:
  - ultrasound findings suggest:
    - biliary dilation (where extrahepatic obstruction not identified)
    - infiltration (mark as urgent)
    - cholestasis
    - liver cirrhosis or fibrosis
  - suspected:
    - autoimmune liver disease
    - alpha-1 antitrypsin deficiency
    - Wilson disease
  - persistent unexplained abnormal LFTs

How to identify patients with cirrhosis

History – known diagnosis, presentation with hepatic decompensation (ascites, variceal bleed, hepatic encephalopathy)

Exam – above

Investigations

- Blood tests – ***low normal plt count***, elevated bilirubin, elevated INR, AST=2×ALT
- US – nodular liver outline
- Features of portal hypertension on imaging – splenomegaly, ascites, varices, recanalization of umbilical vein
- Liver biopsy
- Fibroscan or Shearwave elastography

Take home…

Framework to tackle abnormal LFTs – Health Pathways

Include as much history as possible in referral – CPC guidelines

Recognise the cirrhotic patient – low normal plt count

Online resources

- LiverTox LiverTox - NCBI Bookshelf
- GESA "Understanding Liver Tests 2024" https://www.gesa.org.au/public/13/files/Education%20%26%20Resources/Clinical%20Practice%20Resources/Understanding%20Liver%20Tests/Understanding%20Liver%20Tests_2024_update%20(1).pdf
- Clinical Prioritisation Criteria- abnormal LFTs https://www.health.qld.gov.au/cpc/hepatology/abnormal-liver-function-tests-jaundice
- Health pathways

Abnormal Liver Function Tests

Red flags

- Alanine transaminase (ALT) > 500
- Suspected decompensated liver disease (e.g., ascites, jaundice, encephalopathy)

Background

About abnormal liver function tests (LFTs)

Assessment

Practice point

Avoid routine screening for LFTs

Arrange only if the patient has signs, symptoms, or risk factors of liver injury or disease. Routine monitoring of LFTs in asymptomatic patients is not recommended.

1. If abnormal LFTs, take a history and consider risk factors of liver injury or disease.
2. Check for signs and symptoms of liver disease (may not be present in early liver impairment).
3. Arrange investigations:
   - Request abdominal ultrasound in anyone with significantly abnormal liver enzymes or positive hepatitis B surface antigen (HepBsAg) (even if normal liver enzymes).
   - Base further investigations on the pattern of abnormal LFT results and the clinical context, as below.

Management

1. Request acute hepatology assessment if:
   - Alanine Transaminase (ALT) > 500.
   - Suspected decompensated liver disease (e.g., ascites, jaundice, encephalopathy).
2. If reduced serum albumin and raised international normalised ratio (INR) and prothrombin time (PT), this indicates severe liver injury and impaired synthetic function. Seek hepatology advice or request acute hepatology assessment.
3. If isolated raised gamma glutamyl transpeptidase (GGT), this seldom reflects significant liver disease – consider alcohol intake, fatty liver, or enzyme induction by medications.
4. Further investigate or manage:
   - isolated raised alkaline phosphatase (ALP)

Queensland Government | Smart Referrals

Dr Fred Findacure

Patient name: Nicole METRONORTH DoB: 29 Sep 1977

Request information

Request date	21 Oct 2025
* Request type	New referral | Update | Continuation | Request for advice
* Reason for referral	(•) New condition requiring specialist consultation ( ) Deterioration in condition, recently discharged from outpatients < 12 months ( ) Other
* Priority	Urgent | Routine
* Provider	QHSR | Private

Consents

* Date patient consented to request	21 Oct 2025
* Patient is willing to have surgery if required?	Yes | No | Not applicable
* Condition and Specialty	Gastroenterology - Abnormal liver function tests / jaundice (Hepa — HealthPathways
Suitable for Telehealth?	Yes | No
* Are you the patient's usual GP?	Yes | No

Request recipient

* Service/Location	Please select
Specialist name	
Organisation details	

Hepatology	ROYAL BRISBANE & WOMEN'S HOSPITAL	6.4 km	
Hepatology	THE PRINCE CHARLES HOSPITAL	12.2 km	
Hepatology	REDCLIFFE HOSPITAL	31.5 km	
Hepatology	PRINCESS ALEXANDRA HOSPITAL	1.8 km	Out of catchment

Condition specific clinical information

Minimum Referral Criteria

* Minimum referral criteria

nd/or
alopathy)

History and Examination

Abnormal liver function tests/jaundice

Emergency department referrals

All urgent cases must be discussed with the on call Registrar to obtain appropriate prioritisation and treatment. Contact through:

- Royal Brisbane and Women's Hospital (07) 3646 8111
- The Prince Charles Hospital (07) 3139 4000
- Redcliffe Hospital (07) 3883 7777
- Caboolture Hospital (07) 5433 8888

Urgent cases accepted via phone must be accompanied with a written referral and a copy faxed immediately to the Central Patient Intake Unit: 1300 364 952.

Potentially life-threatening symptoms suggestive of:

- Acute severe GI bleeding
- Acute liver failure: (acutely abnormal liver blood tests in absence of cirrhosis, associated with development of coagulopathy and hepatic encephalopathy)
- Sepsis in a patient with cirrhosis
- Severe encephalopathy in a patient with liver disease
- New significant renal dysfunction in a patient with cirrhosis

Does your patient wish to be referred?

Minimum referral criteria

Does your patient meet the minimum referral criteria?

Category 1 Appointment within 30 days is desirable	• Abnormal liver function tests with ALT >500U/L or over one month of persistent ALT >300U/L and/or **concerning features:** ◦ Evidence of liver decompensation i.e. jaundice and/or ascites and/or encephalopathy • Newly abnormal liver function tests in a pregnant patient
Category 2 Appointment within 90 days is desirable	• Persistently abnormal liver function tests **without** concerning features identified in category 1
Category 3 Appointment within 365 days is desirable	• No category 3 criteria

If your patient does not meet the minimum referral criteria

Consider other treatment pathways or an alternative diagnosis.

If you still need to refer your patient:

- Please explain why (e.g. warning signs or symptoms, clinical modifiers, uncertain about diagnosis, etc.)

+ Other Hepatology conditions

Send referral

Hotline: 1300 364 938

Electronic:
GP Smart Referrals (preferred)
eReferral system templates
Medical Objects ID: MQ40290004P
HealthLink EDI: qldmnhhs

Mail:
Metro North Central Patient Intake
Aspley Community Centre
776 Zillmere Road
ASPLEY QLD 4034

Health pathways

Access to Health Pathways is free for clinicians in Metro North Brisbane.

For login details email:
healthpathways@brisbanenorthphn.org.au

Login to Brisbane North Health Pathways:
brisbanenorth.healthpathwayscommunity.org

Locations

Caboolture Hospital
Redcliffe Hospital
Royal Brisbane and Women's Hospital
The Prince Charles Hospital

Resources

Specialists list
General referral criteria