



common causes of

ABNORMAL BIOCHEMICAL RESULTS

	INCREASED	DECREASED
Sodium	Water loss (eg. dehydration, diabetes insipidus) Salt overload Renal impairment	Water overload (eg. cirrhosis, CCF, inappropriate ADH) Salt loss (eg. diuretic therapy, adrenal failure, gut or sweat loss, renal impairment)
Potassium	Oral overload, cell leakage (sepsis or post-collection), renal disease, adrenal insufficiency Acidosis (ketoacidosis, lactic acidosis)	Diuretics, dietary deficiency, renal tubular disease, steroid excess, gut loss, insulin effect
Chloride	Dehydration, diarrhoea, pancreatic or biliary drainage, renal tubular acidosis, ureterosigmoidostomy	Vomiting, water overload, diuretics Children - cystic fibrosis
Bicarbonate	Respiratory acidosis - lung disease Metabolic alkalosis - vomiting, diuretics, oral antacids, steroid excess	Respiratory alkalosis - hyperventilation Metabolic acidosis - renal failure, liver failure, diabetes mellitus, diarrhoea, drugs, dehydration
Anion Gap	Metabolic acidosis - renal or liver failure, diabetic ketoacidosis, salicylates, other abnormal acids	Low serum protein, hypercalcaemia
Glucose	Non-fasting state, diabetes mellitus, infection, excess endogenous or exogenous steroid, burns, hypokalemia	Excess exogenous or endogenous insulin, early glucose intolerance, adrenal or pituitary failure, severe liver disease, oral hypoglycaemics
Urea	Renal impairment, excessive protein catabolism, GI bleeding, congestive cardiac failure, dehydration	Protein deficient diet, diuresis, pregnancy
Creatinine	Renal impairment, acute muscle wasting	Chronic muscle wastage
Uric Acid	Gout, malignancy, viral infection, psoriasis, renal failure, toxemia of pregnancy, acidosis	Allopurinol, uricosuric drugs, diuresis, renal tubular disease, inappropriate ADH
Bilirubin Total	Adult - Gilbert syndrome, hepatitis, malignancy, gall stones, cirrhosis, Dubin-Johnson syndrome Infants - physiological, biliary atresia, haemolysis, hepatitis, Crigler-Najjar syndrome	Not clinically significant
Bilirubin Conjugated	Biliary obstruction - stones, malignancy, fibrosis, congenital Intrahepatic cholestasis - drugs, chemicals, Dubin-Johnson syndrome	Not clinically significant
Alkaline Phosphatase	Liver - obstruction, malignancy, hepatitis Bone - Paget's, malignancy, fracture, hyper-PTH, period of rapid bone growth Other - third trimester pregnancy, transient benign hyperphosphatasia of childhood	Zinc deficiency, congenital hypophosphatasia (not common but important)
Gamma GT	Hepatitis, biliary obstruction, drugs, alcohol, renal damage, pancreatitis	Rarely significant
ALT (SGPT)	Liver disease or damage eg. hepatitis (>500), non-specific viraemia, drugs, fatty liver, alcohol, haemochromatosis	Renal failure, vitamin B6 deficiency
AST (SGOT)	Myocardial damage or necrosis, liver disease, skeletal muscle damage, muscular dystrophy, haemolysis	Renal failure, vitamin B6 deficiency

This table lists only the common and most important causes for the given abnormal results. When there is a diagnostic problem, please consult your local QML Pathologist or Dr Charles Appleton, Dr Nigel Brown, Dr Kerry DeVoss on (07) 3840 4444.

	INCREASED	DECREASED
Lactate Dehydrogenase (LDH)	Myocardial damage or necrosis, liver disease, muscle disease, malignancy, haemolysis, post-collection cell leakage	Rarely significant
Calcium	Hyperparathyroidism, malignancy (including myeloma), vitamin D & A excess, sarcoidosis, thyrotoxicosis, milk-alkali syndrome	Low albumin, acidosis, renal disease, hypoparathyroidism, vitamin D deficiency, acute pancreatitis (significant values <2.10 mmol/L)
Adjusted Calcium	As for calcium - Note: if abnormality is unexplained, ionised calcium assay avoids protein binding effects	As for calcium with the exception of low albumin (corrected for changes in albumin)
Phosphate	Post-collection cell leakage, haemolysis, renal impairment, severe illness, acidosis, hypoparathyroidism	Low phosphate intake (eg. poor diet, prolonged I.V. therapy) alcoholism, diuresis, renal tubular disease, hyperparathyroidism
Total Protein	Multiple myeloma, chronic liver disease, chronic inflammation or infection, dehydration	Malnutrition, severe liver disease, water overload, nephrotic syndrome, protein-losing enteropathy
Albumin	Dehydration, tourniquet artifact	Chronic liver disease, malnutrition, chronic inflammation, nephrotic syndrome, protein-losing enteropathy, burns.
Globulins	HIV infection and as for total protein	Immunodeficiency and as for total protein
Iron	Oral iron, haemochromatosis, gastrointestinal bleeding	Iron deficiency, infection, chronic inflammation
Cholesterol	Familial hyperlipidaemia, hypothyroidism, liver disease, renal disease, diabetes mellitus	Hyperthyroidism, infection, myocardial infarction, inherited hypolipidaemias
Triglyceride	Non-fasting state, alcohol intake, diabetes mellitus, familial hyperlipidaemia	Malnutrition, fasting state

tissue sources of ELEVATED ENZYMES

	MOST COMMON	OTHER
*+ Alkaline Phosphatase	Liver (obstruction) Bone - osteoblastic regenerative response	Intestine, placenta, atypical (immunoglobulin-bound) enzyme
Gamma GT	Liver (obstruction or drugs)	Kidney, intestine, pancreas
ALT (SGPT)	Liver	Myocardium, skeletal muscle
+ AST (SGOT)	Myocardium, skeletal muscle	Liver
*+ Lactate Dehydrogenase (LDH)	Red blood cells (post-collection leakage, haemolysis), myocardium, muscle	Liver, lymphoid and epithelial tissue
*+ CK (CPK)	Myocardium, skeletal muscle, atypical ("macro")	Brain, intestinal smooth muscle
+ CK-MB	Myocardium	Muscle, atypical (immunoglobulin-bound)
Amylase	Pancreas	Salivary glands, fallopian tubes

Relative concentrations of ALT & AST differ in liver and myocardial disease.

	Liver Damage	Myocardial Damage
ALT	++	+
AST	+	++

* Isoenzyme subunit fractionation is available to further differentiate sources of excess activity.

+ Troponin is the most sensitive and specific marker of myocardial disease/damage.

CPD Calendar

QML is committed to providing medical education to Queensland doctors. To assist you with choosing a CPD seminar to suit your needs, a calendar is provided below listing upcoming events over the next few months.

August

AMA Ipswich Monthly Meeting

Date: 21st August
Time: from 6.30pm
Venue: The Ipswich Club, 15 Gray St, Ipswich
Topic: Role of Pap A in First Trimester Screening
Speakers: Dr Dean Townsend & Dr Frank Carmody

For further information, please contact Dr Thomas McEniery on (07) 3281 1177.

Gold Coast & Tweed Valley Division of GP Annual Conference

Date: 29th - 31st August
Venue: Couran Cove Resort, Stradbroke Island
Topics: including Paediatrics, Obstetrics, Vaccine Information, Cardiac Treatment Update
Speakers: including Dr Robert Labrom, Dr Guy Wright-Smith, Dr Ben Bopp, Dr Norman Hohl

Please contact Trish at the Division for further information on (07) 5526 2966.

September

Pindara Private Hospital Grand Rounds

Date: 3rd September
Time: 7am - 8am
Venue: QML Conference Room
Topic: Confusion
Speaker: Dr Rick Adams

Please contact Jo Wilson-Farr on (07) 5571 4444 for further information.

QML CPD Logan

Date: 10th September (TO BE CONFIRMED*)
Time: 6.30pm for 7pm start - 9.30pm
Topic: Women's Health

* Please watch out for your invitation detailing more information or contact Jo Wilson-Farr on (07) 5571 4444.

Urological Society of Australasia Annual Scientific Meeting

Date: 12th - 14th September
Venue: Couran Cove Resort, Stradbroke Island
Topics: including Urological Trauma, Sexually Transmitted Diseases, Advances in Urological Oncology, Tropical Diseases and Urethral Strictures
Speakers: Prof Johan Norde, Dr Michael Whitby, Dr David Grimes

For further information, please contact the Urological Society on (07) 5444 0672.

John Flynn Grand Rounds

Date: 18th September
Time: 6pm - 7:30pm
Venue: John Flynn Auditorium
Topic: Renal Biopsy
Speaker: Dr Troy Kay

Please contact Jo Wilson-Farr on (07) 5571 4444 for further information.

October

Pindara Private Hospital Grand Rounds

Date: 1st October
Time: 7am - 8am
Venue: QML Conference Room
Topic: Atypical Pneumonias
Speaker: Dr Iain Feather

Please contact Jo Wilson-Farr on (07) 5571 4444 for further information.

QML CPD Gold Coast/Tweed

Date: 7th October (TO BE CONFIRMED*)
Time: 6.30pm for 7pm start - 9.30pm
Venue: Southport Golf Club
Topic: Women's Health

* Please watch out for your invitation detailing more information or contact Jo Wilson-Farr on (07) 5571 4444.

RACGP Qld Sunshine Coast Weekend

Date: 11th & 12th October
Venue: Sheraton Noosa Resort
Topics: including Eustacian Tube Dysfunction & Middle Ear Disease in Children, Acute Eye Problems, Cataract Surgery, Laser Surgery for Refractive Error, Head & Neck Lumps
Speakers: Dr Chis Perry, Dr Bill Glasson, Dr Maurice Stevens, Dr Graham Lee, Dr Guy D'Mellow, Dr David Bell-Allen, Mr John Mountford

Please contact the RACGP on (07) 3878 9242 for further information.

2003 Annual Paediatric Weekend

Date: 17th -19th October
Venue: Couran Cove Resort, Stradbroke Island
Topics: including Infant Mental Health, NHMRC Screening, Neonatal, Psychopharmacology, ENT, Endocrinology, Genetics, Emergency Medicine

For further information please contact the RACP on (07) 3839 3710.

John Flynn Grand Rounds

Date: 23rd October
Time: 6pm - 7:30pm
Venue: John Flynn Auditorium
Topic: Practice Innovations

Please contact Jo Wilson-Farr on (07) 5571 4444 for further information.

QML Focused on Medical Education

A focus on ongoing education initiatives are part of QML's new commitment to supporting clinicians and the medical community throughout Queensland. QML's comprehensive Continuing Professional Development (CPD) calendar is already proving itself to be invaluable to hundreds of medical practitioners.

Developed with the needs of the busy doctor in mind, these



Dr Neal Walker presents at the RBH Vocational Expo

CPDs are available at a variety of times and locations, covering many popular topics.

Over the weekend of the 26-27 July, QML Pathology, in conjunction with the AMA, hosted a series of CPD seminars at the Brisbane Convention Centre, as part of the AMA Health Expo for 2003.

All seminars received positive feedback, with a wide range of topics covered including dermatopathology, haemochromatosis, infectious diseases and first trimester down screening. Thank you to QML Pathologists Rohan Mortimore, Kerry DeVoss, Nigel Brown and David Drummond who presented over the weekend, with special thanks going to guest speakers Dr Brian De'Ambrosis, Dr Jim Muir and Dr Frank Carmody who also gave up their time to present on behalf of QML.

Aside from developing and conducting independent CPD events, QML is also a major supporter of educational events for medical practitioners, nurses,

practice staff and medical students. QML provides support for many CPD programs including seminars for the AMA, St Andrew's, the Wesley, Royal Brisbane and many other hospitals throughout Queensland, various metropolitan and regional GP divisions as well as Specialist associations.

As part of this focus on medical education, QML has recently appointed a dedicated CPD Coordinator, Jo Wilson-Farr. A qualified RN, Jo brings over 25 years experience in Pathology, Paediatrics, Intensive care, and all facets of general medical conditions to the role. She has also successfully coordinated many popular CPD programs as part of her former position as QML Gold Coast Medical Liaison Officer over the past 8 years.

For further information regarding past or upcoming QML CPDs, please contact QML Marketing on (07) 3840 4506 or QML CPD Coordinator, Jo Wilson-Farr on (07) 5571 4444.



New Guide Gives Access to Expert Advice

Providing medical practitioners with direct access to expert pathology information and advice, the new QML Pathologist Guide contains contact details and areas of specialty for every QML Pathologist throughout Queensland. Produced in conjunction with QML's 35 consultant pathologists, the Guide also features a full listing of QML Collection Centres for your convenience.

To reserve your complimentary copy, please contact your local Medical Liaison Officer or QML Marketing on (07) 3840 4506.

Doctors' Notice Board

Dr Mark Coulthard, Paediatrician, is commencing practice in General Paediatrics at the Private Practice Clinic, Level 1, Surgical Building, Royal Children's Hospital, Herston. For consultations and appointments please telephone (07) 3636 7000 or (07) 3636 9133.

Dr Paul McEnery, Cardiologist, is extending his hours of consultation at the Chermside Specialist Centre, Wallace St (cnr Gympie Rd) to Tuesdays 1-5pm, Wednesday 9am-1pm and Thursdays 1pm-5pm and will no longer consult at the Chermside Specialist Centre on Saturdays. For appointments at Chermside Specialist Centre please telephone (07) 3359 9622. Dr McEnery continues to consult at the Holy Spirit Northside Medical Centre 'Queensland Cardiology' on Mondays and Fridays - please call (07) 3861 5522 to make an appointment.

QML Pathology.

This newsletter has been prepared and published by QML Pathology for the information of referring doctors. Although every effort has been made to ensure that the newsletter is free from error or omission, readers are advised that the newsletter is not a substitute for detailed professional advice.

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