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Editorial Board:

Chemistry: Dr C Balion
Microbiology: Dr M Smieja
Pathology: Dr C Ross
Genetics: Dr D
Grafodatskaya
Hematology: K Moffat

Editorial Office:

Co-Editors: Dr C Ross;
K Moffat

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- West Lincoln site *Moving Forward* with Cellavision
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- **Happy Holidays** from the HRLMP

Urine Drug Screens: The Basics

Urine drug testing in a hospital setting is typically done to assist in the diagnosis and emergency treatment of patients who exhibit signs of intoxication, in pain management compliance and for patient management in drug addiction treatment.

The Hamilton Regional Laboratory Medicine Program (HRLMP) provides urgent/stat urine drug screening using point of care (POC) devices within all Core Laboratories for patients where test results are needed quickly; those in the Emergency Department and in Labor and Delivery. Testing is available 24 hours per day. Point of care testing (POCT) is also performed within the Forensic Psychiatry Program and in the Michael G. DeGroot Pain Clinic.

Routine drug screening is performed in the Clinical Chemistry and Immunology Laboratory on an automated platform. The turn around time is usually 24 – 48 hours. Also included in this screen are tests for sample tampering which include urine creatinine and specific gravity.

Both the POC and routine methods are based on immunoassay; binding of a specific antibody that recognizes the drug or metabolite of interest. The immunoassay is the most commonly used urine drug screen method because it is inexpensive and rapid. However, this method lacks sufficient sensitivity and specificity to be considered confirmatory or definitive. The recommended confirmatory method is gas chromatography-mass spectroscopy (GC-MS) which is more expensive and time consuming.

Drugs Detected

The number and types of drugs detected depends on the testing platform. Table 1 lists the drugs and metabolites along with the specific drug or metabolite that establishes the cut point for the assay. The specificity or cross-reactivity of each drug test varies on the type of drug or metabolite and its concentration. A positive result does not indicate or measure intoxication.

Limitations

All laboratory tests are subject to false-negatives and false-positives. In drug testing false-negatives may result from the drug being present in concentrations below the cut point of the method, drug metabolites or variants that are not recognized by the antibody, sample tampering, or poor sample handling/storage. Results that screen negative do not necessarily mean that the urine is drug free. The time frame for detection of drugs can depend on the test used, dosage/concentration, and patient parameters (e.g., age, metabolism, mass, hydration level and medical status).

Similarly, false-positive results may occur from cross-reacting substances from food, supplements or medications that are recognized by the detection antibody. The potential of a cross-reaction occurring depends on the immunoassay method and drug test. For example, herbal and plant products containing ephedra and/or metabolites of ephedra may cross-react with the amphetamine/methamphetamine immunoassays. Similarly, products containing poppy seeds, or medications containing opiate derivatives (e.g., cough medications) may generate positive results.

Urine Drug Confirmation

Urine drug screen results should be interpreted with the above cautions in mind. If required, confirmatory testing is available by GC-MS, which is not subjected to most of the limitations of immunoassays. Table 2 provides a list of tests detected. This is a qualitative test and reported as Not Detected or Positive. Creatinine is also reported along with other additional findings and comments.

Confirmatory testing is sent to a referral laboratory. Requests must be made within 72 hours of urine collection.

Please consult the Laboratory Test Information Guide (LTIG) for ordering and sample collection information.

Dr. Barry Kyle, Clinical Biochemistry Fellow

Dr. Cynthia Balion, Biochemist, HRLMP

Dr. Stephen Hill, Biochemist, HRLMP

(Tables on next page)



Drug Group or Metabolites		Calibrator	Routine ¹ Cut point (ng/mL)	POCT ² Cut point (ng/mL)
Amphetamines	AMP	Amphetamine d-Methamphetamine	1000 ³	1000
Barbiturates	BAR	Secobarbital		300
Benzodiazepines	BZO	Oxazepam	200	300
Cannabinoids	THC	11-nor- Δ^9 -THC-COOH	50	50
Cocaine	COC	Benzoylcegonine	150	300
Ecstasy	MDMA	D-Methylenedioxy methamphetamine	500 ³	500
NEW Fentanyl ⁴	FEN	Norfentanyl		20
Methadone	MTD	Methadone		300
Methadone Metabolite	EDDP	EDDP	100	
Methamphetamine	MET	D-methamphetamine	1000 ³	1000
Opiates	MOR	Morphine	300	300
Oxycodone	OXY	Oxycodone	300	100
Tricyclic Antidepressants	TCA	Nortriptyline		1000

¹ CEDIA assays, Thermo Fisher Scientific

² Multi Drug Panel, Nova Century Scientific (NCS)

³ Included in the Amphetamines/Ecstasy assay. One result only.

⁴ Ordered as separate test; not part of the routine or POCT urine drug screen. Rapid Response, BTNX

Abbreviations: EDDP, 2-Ethylidene-1, 5-Dimethyl-3,3-Diphenylpyrrolidine; THC, tetrahydrocannabinol

Table 2: Drug/drug class and metabolites detected in urine drug screens

Amitriptyline/Nortriptyline	Lidocaine
Benzodiazepine	Loxapine/Amoxapine
Chlorpromazine	MDMA/MDA
Clozapine	Meperidine
Cocaine	Methadone
Cocaine Metabolite	Methamphetamine/Amphetamine
Codeine	Methotrimeprazine
Dextromethorphan	Morphine
Diphenhydramine/Dimenhydrinate	Norpseudoephedrine/Phenylpropanolamine
Doxepin	Oxycodone
EDDP	Paroxetine
Ephedrine/Pseudoephedrine	PCP
Fluoxetine	Perphenazine
Fluvoxamine	Ranitidine
Heroin Metabolite	Risperidone
Hydrocodone	Sertraline
Hydromorphone	Venlafaxine
Imipramine/Desipramine	

¹ THC is available as a separate test on request

News from HRLMP

News from Administration



Recently, a MLT who has worked for many years in the HRLMP microbiology laboratory made a generous contribution to the recovery of a dog for an Alzheimer's patient. The MLT is **Lawrence Dalle Vedove**.

What Lawrence did was **extraordinary!!**

Lawrence, who did not know Karl Daniels or his family personally, offered \$5,000 to reunite Mr. Daniels with his best friend, Kimbo.

Lawrence, you are an inspiration to us all, and the entire HRLMP is proud of your efforts.

Please click on the links below for the full stories:

<https://www.thestar.com/news/gta/2016/11/01/kimbo-reunited-with-his-family.html>

<https://www.thestar.com/news/gta/2016/11/02/hero-who-paid-to-return-strangers-dog-rewarded-for-generosity.html>

<http://www.metronews.ca/news/toronto/2016/11/02/stranger-pays-5k-to-reunite-kimbo-the-dog-with-his-family.html>

Education News



On Saturday November 26th, 2016 the HRLMP hosted its **9th Annual Rapid Fire Showcase**. The event was a great success with over 100 attendees. The theme of this year's event was "**Putting Patients First**" and each of the eleven presentations showcased how we are doing just that – from new testing methods, to participation in research studies, and novel instrumentation that decreases the turnaround times for results.

The presenters were our own MLTs and MLAs from nine disciplines who shared their stories and experiences to showcase how they contribute to better patient care.

Thank you to all our presenters for doing a great job showcasing the HRLMP!

We're looking forward to hosting our **10th Annual Rapid Fire Showcase** in 2017 – we hope to see you there!



News from Genetics

Welcome!

The HRLMP Genetics Laboratory welcomes **Dr. Suzanne Demczuk** to the Genetics Service as the new Head of Cancer Cytogenomics, effective December 2016.

Dr. Demczuk completed the Canadian College of Medical Genetics (CCMG) fellowships in cytogenetics at Montreal Children's Hospital/McGill University and molecular genetics at Children's Hospital Of Eastern Ontario and previously worked as director of the Cytogenetics Division, Saskatoon Health Region.

Dr. Demczuk will be active in the services of cytogenetics, molecular genetics and cancer genetics.

We wish her much success in her new position!

Hematology News



The Core Laboratory at the West Lincoln site went live with Cellavision – a technology that allows blood smears to be prepared and loaded on the Cellavision with reading of the smear by technologists in the Malignant Hematology laboratory at the Juravinski site.

Click on the link below for the full story:

<http://hhsshare.ca/2016/11/cellavision/>



We are proud to announce that **Dr. Irwin Walker's** paper on the use of ATG in BMT, published in *Lancet Oncology*, has been chosen "**Best Paper of the Year**" by the Canadian Hematology Society.

A dinner award ceremony was held at the 58th American Society of Hematology (ASH) Annual Meeting in San Diego, CA.

The PubMed link can be accessed clicking the link below:

<https://www.ncbi.nlm.nih.gov/pubmed/?term=Lancet+AND+walker+AND+atg>

Congratulations to Dr. Walker and his co-authors for receiving this award!

Congratulations also to **Professor Nancy Heddle** and **Dr. J. Eikelboom** who recently published results from an international study in the *New England Journal of Medicine*. These results provide needed evidence that transfusing fresher blood, compared to older blood, does not improve patient outcome.

To read the interview with Professor Heddle, please click on the link below:

https://fhs.mcmaster.ca/main/news/news_2016/old_blood_as_good_as_new.html

To read the full NEJM article, click below:

<http://www.nejm.org/doi/pdf/10.1056/NEJMoa1609014>



Dr. John Kelton, has been awarded the **Lifelong Achievement Award** from the Michael DeGroot School of Medicine Division of Geriatric Medicine and the Regional Geriatric Program Central. Congratulations!!

To read the story on this prestigious honour, please click on the links below:

https://fhs.mcmaster.ca/main/news/news_2016/inspirational_leader_lifelong_achievement_award.html

<http://www.thespec.com/news-story/6998475-mcmaster-professor-wins-lifelong-achievement-award/>



HEMATOLOGY & THROMBOEMBOLISM

4th Annual Winter Gala

Saturday, February 25, 2017

The Waterfront Banquet and Conference Centre

Request tickets using the

link: <https://goo.gl/forms/w6nyAH4NfEiXPm5k1>

Microbiology News



Dr. James Mahony, Professor of Pathology and Molecular Medicine, is retiring on Dec. 31, 2016, after almost four decades as a clinical virologist with the Regional Virology Laboratory at St. Joseph's Healthcare Hamilton. He received a PhD from the University of Toronto, followed by a Post- Doctoral Fellowship at the Banting and Best Institute. In 1980 he joined St. Joe's as a Clinical Virologist and was appointed Assistant Professor in the Dept. of Pathology & Molecular Medicine. In 1993 he was promoted to Full Professor, and was appointed Head of the Regional Virology & Chlamydiology Laboratory, a position he held for 19 years. He is a Fellow of the Canadian College of Microbiology (FCCM) and of the American Academy of Microbiology (FAAM). He is Past President of the Canadian Association for Clinical Microbiology and Infectious Diseases (1990-1992) and Past President of the Pan American Society for Clinical Virology. Dr. Mahony led local efforts to develop diagnostic tests for SARS-Coronavirus, Influenza, and other respiratory viruses, and developed the first Health Canada/Food and Drug Administration (FDA)-approved multiplex PCR test for respiratory viral infections. His research accomplishments were recognized by his peers, who awarded him the Diagnostic Virology Award from the Pan American Society for Clinical Virology in 2014.

In education, he served as Assistant Dean of the Medical Sciences Graduate Program from 2010-2015. Since 2000 he has supervised 15 Masters and 7 PhD students, and received the President's Award for Excellence in Graduate Student Supervision in 2005.

In 2013 he started a biotech company, Advanced Theranostics Inc., to develop an instrument-free, hand held Point-of-Care test device to provide

clinicians with a 20-minute diagnosis of infectious diseases. ATI won McMaster University Innovation Factory's inaugural Synapse Life Competition for best start-up company in 2014.

Professor Emeritus Mahony will continue his research work and graduate teaching, and we wish him continued success. Jim, I sincerely thank you for your many years of service to St. Joe's, the HRLMP and to McMaster University, and for your pioneering virology diagnostics research and mentoring of so many residents and graduate students. Enjoy your well-deserved "retirement".

Marek Smieja, MD, PhD

Discipline Director, Microbiology, HRLMP

News from Pathology



The new grossing station at the Juravinski site has been installed. This was needed to help with workflow due to the large number of complex cancer resection specimens at this site. A lot of renovation of the space was required for proper installation.

It is now up and functioning and will be a great asset in alleviating some of the delays created by the space and time issues in the pathology lab.

Many thanks to the support of the Juravinski Hospital and Cancer center, Pathology laboratory manager Linda Turner-Smith and particularly JHCC vice president Dr. Ralph Meyer for championing this endeavor.

CONGRATULATIONS to **Dr. Martin Hycza** from HRLMP St. Joseph's site who won an award for **best oral presentation** at the *Pediatric and Placental Pathology* session of the combined Congress of the European Society of Pathology and the International Academy of Pathology. His talk was entitled "*Comparison of ultrastructural features of pediatric mammary analogue secretory carcinoma of the salivary glands and the secretory breast carcinoma.*"



The Pathology department at St Joseph's recently received a Cancer Care Ontario (CCO) certificate for **excellent Turn Around Times** in Cancer Surgical Pathology reporting on 2015-2016. Congratulations!

Quality News



Congratulation to **Susie Maia-Castallan**, Quality Specialist, HRLMP, for successfully completing her Bachelor of Technology from the Fisheries and Marine Institute of Memorial University, Newfoundland.

Congratulations Susie – this is a great accomplishment!



Research News

HHS and the HRLMP continually demonstrate our commitment to research, both in basic science research and participating in clinical trials. Too often research is thought to only happen behind closed laboratory doors and have no direct impact on patient lives – this perception needs to change.

As quoted in a recent Share story, “Research is not only about unlocking new possibilities for tomorrow’s patients; it is also about improving the health of our patients today, helping them live longer, healthier lives.”

To read the full story on how research is helping patients now, click on the links below:

<http://hsshare.ca/2016/11/blog-research-impact/>

<http://www.thespec.com/opinion-story/7026156-health-research-is-improving-lives-today-and-for-the-future/>

