

Tips to stay active at work

- Take stairs whenever possible
- Enjoy a brisk walk outside during lunch breaks
- Stretch at your desk regularly
- Walk and talk instead of emailing or calling
- Challenge yourself: walk to a subway station that is farther from your usual station
- Follow these tips along with additional daily exercise to promote a healthy lifestyle



The Student Voice production team

Chris Nelson

Student reporter and editor



Chris Nelson is a third-year public relations student at the University of Guelph-Humber in Etobicoke. This is Chris's first summer at OAHPP as a member of its Communications team where he is gaining real-world experience in public relations. In his spare time, Chris enjoys rollerblading, swimming and going to the movies.

Candice Reggi

Student reporter and editor



Candice Reggi is a third-year public relations student at the University of Guelph-Humber in Etobicoke. This is Candice's first summer at OAHPP as a member of its Communications team where she is gaining valuable experience in media relations, internal and external communications. In her spare time, Candice enjoys watching movies, playing soccer and spending time outdoors.

Julia Schippke

Student reporter and editor



Julia Schippke is a third-year health sciences student at the University of Western Ontario with an honours specialization in health promotion. This is Julia's second summer at OAHPP where she provides support to its Knowledge Exchange and Communications teams. Her expertise includes implementing strategies that encourage students to gain valuable experience in the field of public health.



The Student Voice

VOLUME 1, ISSUE 1

JULY 2010

OAHPP's first Student Research Showcase



Welcome to the Ontario Agency for Health Protection and Promotion (OAHPP) inaugural Student Research Showcase, hosted by OAHPP Research Operations and Knowledge Exchange and Communications. During the

past year, more than 70 students with a range of training and experience have been working on many interesting projects. This event celebrates their excellent work in a fun and educational environment. This first issue of the Student Voice provides students an opportunity to

share their projects with colleagues. The collection of abstracts and interviews is a summary of students' work at OAHPP. Congratulations to all participants on the high-calibre work... Enjoy!

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Why students make a difference

The Student Voice sat down with Vivek Goel, president and CEO of OAHPP, and Sonya Corkum, vice-president of Knowledge Exchange and Communications, to discuss the Student Research Showcase. Reporters Julia Schippke, Candice Reggi and Chris Nelson uncovered why students are a valuable resource at OAHPP.

Q: Why is the Student Research Showcase important?

Vivek Goel: We thought it would give students an opportunity to hear about one an-

other's work and allow OAHPP employees to learn about their projects. We would like students to go back to their programs and home institutions and talk about their experience here. Since students in science-based courses wouldn't normally learn communication skills, we thought it would be an appropriate theme for the day.

Q: Why is it important for budding public-health professionals to learn how to communicate their research?

Vivek Goel: In public-health research, we sometimes focus too much on communicating with other public-health researchers and not enough when it comes to reaching the public. Teaching and preparing public-health professionals to communicate the results of their research is a fundamental part of public practice.

Sonya Corkum: The purpose of research is to share findings with people. It's important to communicate in ways that are widespread with people who can benefit from the research results.

(Continued on page 2)



Vivek Goel,
president and CEO

(Continued from page 1)

Q: Why is a student's experience at OAHPP different than at another organization or academic institution?

Vivek Goel: Being a hub organization, we're in a middle space between an academic institution, a research institute, a government and public-health body, and the health-care system. We are like a teaching hospital for public health, where people are engaged in research and teaching. This makes us unique in Ontario.

Q: Did you have any opportunities similar to our student program when you were a student?

Sonya Corkum: I was a student at the City of Toronto Public Health department for a few months. My job was too focused on one project. It made me realize that it's important to work with other people across an organization. I hope that OAHPP students have exposure to many staff working in different areas.

Q: Looking back on your educational experiences, are there any courses or specializations you wish you had pursued? Why?

Vivek Goel: I was fortunate because I had a chance to pursue a number of things such as medicine, health policy, bio statistics, and so on. I would have liked to have done more work in communications and public relations, and legal, ethical and social issues, too. However, the most important thing to learn for students who are going into public health is how to learn.

Q: Why is knowledge exchange and communications important to OAHPP?

Sonya Corkum: OAHPP is all about knowledge exchange and communications. It's about providing scientific and technical advice to people. It's critical that we learn from what we are doing and that we are doing things in evidence-informed ways. That's the role this portfolio plays by supporting effective methods.

Q: What types of public-health challenges do you anticipate in the next three to five years? Why?

Vivek Goel: The renewal of the public-health workforce is a challenge in Canada and around the world. The nature of public-health work has always been encounter-based, such as a public-health inspector doing an inspection at a restaurant. Instead, their work is shifting to be more about education and community-based approaches.

Sonya Corkum,
vice-president,
Knowledge
Exchange and
Communications



Healthy summer recipes

Yogurt parfait



Makes two servings

When you think of a parfait, you may picture ice cream layered with dessert sauce or candy. Here's a healthier version, which includes yogurt and lots of fruit. Please note: this does not represent one serving of milk and is more than one serving of fruit.

Ingredients

- ✦ 1 cup (250 mL) low-fat vanilla yogurt
- ✦ 1/2 cup (125 mL) unsweetened applesauce
- ✦ 1 cup (250 mL) fresh or frozen unsweetened strawberries, mashed
- ✦ 2 strawberries cut in half, for garnish (optional)

Directions

- 1) Alternate layers of yogurt, applesauce and strawberry mash in individual clear serving dishes.
- 2) Top with strawberry halves.

Nutrients per serving

- ✦ Calories: 164
- ✦ Protein: 6 g
- ✦ Fat: 3 g
 - ✦ Saturated fat: 2 g
 - ✦ Cholesterol: 7 mg
- ✦ Carbohydrates: 32 g
 - ✦ Dietary fibre: 3 g
- ✦ Sodium: 72 mg
- ✦ Potassium: 363 mg

Deborah Hoffnung is a Toronto-based consulting registered dietitian.

Rainbow summer salad



Makes six servings

This salad, which includes Canada's Food Guide's recommendation to eat dark green and orange vegetables, will keep for up to two days, refrigerated. Great for a summer barbecue or potluck or add some grilled chicken for an easy lunch.

Ingredients

- ✦ 2 cups (500 mL) broccoli, chopped
- ✦ 1 cup (250 mL) green pepper, diced
- ✦ 1 cup (250 mL) orange pepper, diced
- ✦ 1 cup (250 mL) mango, diced
- ✦ 1 cup (250 mL) celery, diced
- ✦ 1 cup (250 mL) carrots, diced
- ✦ 1/2 cup (125 mL) cucumber, diced
- ✦ Optional: a handful of unsalted pumpkin seeds

Dressing

- ✦ 1/2 cup (125 mL) mango chutney
- ✦ 3 tbsp (45 mL) olive oil
- ✦ 1 tsp (5 mL) poppy seeds
- ✦ 2 tbsp (30 mL) onion, finely diced
- ✦ pepper to taste

Directions

- 1) In a large bowl, combine all salad ingredients.
- 2) In a small bowl, whisk together the dressing ingredients.
- 3) Toss the dressing with the salad and serve.

Nutritional information per serving (1 1/2 cup/375 mL)

- ✦ Calories: 193
- ✦ Protein: 3 g
- ✦ Fat: 7 g
 - ✦ Saturated fat: 1 g
 - ✦ Dietary cholesterol: 0 mg
- ✦ Carbohydrate: 31 g
 - ✦ Dietary fibre: 4 g
- ✦ Sodium: 395 mg
- ✦ Potassium: 432 mg

Developed by Nadine Day, RD. ©The Heart and Stroke Foundation.

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Word search

A E D P S H E E L A B A S R U R O H V Q D E M K G
 S I U R S V B L C N O T J Y R O C E S A G T B Q F
 C L N I W P U B L I C S X F C E D R A J C S N W E
 B L P Q G C J H Q P P D Y B G C U H B D G C J X N
 L N U B Y Z D E I A B G K L F N S W V R C T I O P
 A E W K H B T U M N O K T G B E N Y X R I N F N V
 B S A S X A U L R L R D O N O I T C E T O R P H E
 O S K H I N K Y O V A C H Q E C N C H R K F S T O
 R N I N F U E I O N T L Z A A S C F T J K R S H Y
 A O B Q P F M R E N N R R M E D U W O C I U S N A
 T F R T S E J O V D T I V D O F M A N T H I L K S
 O T P O D B R D S H E A L J B A U R T S E T C F P
 R E J I M H V I Y O G P R R F Y C K G I A S L O Y
 Y G P E S P O A K Z P U S I S O A S C E L C E Z S
 S E T F B R T B Q L B D R N O T H E E S T S B O Q
 J S Q X B O I E T K X C A G S H P N O O H C T N H
 X T I L L M T T N W H K A T I N F L U E N Z A W C
 W D O Y S O S E U H R P B R D F C I V P H Y C S G
 E P M R B T N S J E T Y C M W U M R P J N K C S D
 S G A E D I H R S W V E S I C R E X E K A H I F C
 A V R N U O D T A N U E L I B U P A K G R L L H E
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 S T P O T N Y D S I L A N A L L Q D R R P J Z K C
 I O O P A N D E M I C V E G E T A B L E S G A X A
 D U S I A K E D I V I N J L O A P D E Y N S R G W

PUBLIC ONTARIO LABORATORY VEGETABLES SHEELA BASRUR HEALTH	PROTECTION DISEASE DIABETES EXERCISE FRUITS EPIDEMIOLOGY	PROMOTION VACCINE SCIENCE ILLNESS PANDEMIC INFLUENZA
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Q: What type of public-health research do you foresee a need for in the next few years?

Sonya Corkum: We need to examine the public-health system — how we are set-up, why changes are slow to come and how to influence policy and practice within the continuum of the overall health-care system. These are important elements to understand.

Q: What would you like the student placement program to look like at OAHPP 10 years from now?

Vivek Goel: I would like us to create a provincewide program supported by a constant flow of students. We would work with students from all institutions in Ontario and they would take part in the variety of programs we offer. Also, it would be great to work throughout the year with students at all levels, such as high school and university students and lifelong learners.

Sonya Corkum: I would like us to have a robust program that has students from many different disciplines, such as engineering and architecture students. I hope our program will be more balanced. We provide learning opportunities for students, but we should also allow employees and leaders to learn from students, too. Maybe I could shadow a student for a day to hear their ideas and better

“Being flexible, nimble and prepared for change is important.”

understand how they see our work.

Q: What qualities are you looking for in the next-generation of public-health practitioners?

Vivek Goel: Being flexible, nimble and prepared for change is important. It’s those generic skills that are critical. As the world changes, jobs will too. The main thing is for students to connect across disciplines, such as someone who has an undergraduate degree in molecular biology and a master’s degree in epidemiology and PhD in communications.

Sonya Corkum: I think people need to have a variety of skills, backgrounds and experiences. Strong communication skills at whatever level are also important so you are able to present, write, report,

influence and communicate ideas.

Q: Is there anything I haven’t asked that you think is particularly important to know?

Vivek Goel: A good research result is something that can be explained very succinctly and simply in three to four sentences. It will allow you to effectively communicate with peers and the public.

Sonya Corkum: Get experience in as many different areas as you can. Learn how the photocopier works; learn how a leadership team works. Also, expose yourself to international health issues. This makes you a much more informed and humble public-health practitioner. You will see things differently. Finally, ask a lot of questions now and forever. You’ll get valuable information from asking questions.

DID YOU KNOW?
 The first public-health laboratory in Ontario opened in 1890 at 172 Yonge St., Toronto, with just one employee.
 Source: *Building on the past: milestones from the history of public health in Ontario*

Abstracts



Sage Stossel – <http://www.sagestossel.com/>

Ryan Walton

Ontario Salmonella enteritidis investigation

University of Toronto, master of public health, second year
Supervisor: Rachel Savage

In Ontario, the number of Salmonella Enteritidis (SE) cases has been increasing since 2005, with the case count so far in 2010 being 70% above the 5-year average. Interestingly, SE cases are being reported in each of the province's 36 health units and represent a variety of phage types (PTs). Investigation of PT8, PT13 and PT13a cases is of particular interest as combined, these PTs account for over 57% of all SE cases in 2010. While consumption of raw eggs and undercooked chicken are the primary vehicles in many SE outbreaks, a variety of food sources have been implicated in the past, including other meats, nuts, vegetables, fruit, and dairy products. As such, a joint investigation has been initiated by the Ontario Agency for Health Protection and Promotion and the Ontario Ministry of Health and Long-Term Care to identify risk factors for SE infection through centralized case interviews. A case-control study may follow for a more in-depth analysis of hypotheses generated through this investigation.

Carolyn Doyle

Assessing the potential impact of publicly funded HPV vaccination and cervical screening on cervical cancer-related health equity in Ontario

University of Toronto, public policy, second year
Supervisor: Heather Manson and Shelley Deeks

Purpose: To examine the potential impact of school-based HPV vaccination and cervical screening on cervical cancer-related health equity in Ontario.

Method: Using published and grey literature, participation rates in school-based immunization and cervical cancer screening were analyzed, as well as acquisition of cervical cancer, according to various social determinants of health indicators.

Results: Cervical cancer incidence is highest among socially disadvantaged women. Marginalized subpopulations participate in cervical screening less frequently. School-based immunization programs can enhance equity by providing access to primary prevention for low-income, Aboriginal, non-Caucasian and geographic-remote individuals. Ogilvie et al (2010) reveal lower HPV vaccine coverage among higher educated British Columbians, a group that tends to participate in screening. Published literature reveals different populations may access immunization and screening.

Key messages: School-based immunization programs have the potential to enhance coverage of cervical cancer prevention among

the socially disadvantaged, leading to higher than anticipated decreases in cervical cancer incidence.



Carolyn Doyle

Horoscopes



Leo: July 23 – Aug. 23

First things first: plan something special for you — an overdue facial or massage could do the trick. Communicating will become easier, allowing you to ask someone for something that you haven't been able to approach them about before. Also, someone has been riding hard in your self-esteem zone — do something physical and take advantage of your Leo pride to ensure you stay afloat.

Aquarius: Jan. 20 – Feb. 18

Your spiritual journey intensifies around the time you become closer with a family member. Give yourself the gift of a relaxing weekend at home and do whatever pleases you. If yoga isn't your thing, don't overdo other exercises because a strain or sprain is more likely now than ever. Don't give up on that special someone because they have been really busy lately.

Pisces: Feb. 19 – March 19

Don't stress too much because your plans are likely to get thrown out of whack. Getting to the gym will take second place to everyone else and their drama unless you make sure you put yourself first at least a few times a week. Keep on track with your life. Let the signs of stress inspire a weekend getaway with someone you can relax around.

Aries: March 20 – April 20

Responsibility is on your plate this month and you are going to handle it extremely well. This is a great month to change your workout and try new classes or hire a personal trainer. Just don't overdo the exercise or you'll end up stiff, sore and sitting on the sidelines! Then again, someone with relationship potential should be showing up any day, so don't shy away from new places.

Taurus: April 21 – May 21

Even though your plans fell through to be healthy at the beginning of the month, this is the best time for a second chance. The hardest part of this is avoiding friends who love to eat, drink and be merry. Things don't seem to be working between you and your interest, but don't give up. They are interested, just second guessing themselves. Remember, actions speak louder than words.

Gemini: May 22 – June 21

Bike riding, walking and jogging are so much easier since the weather has warmed up — so quit being lazy and hop to it! You will find yourself spending cash on a new-found love for shopping. Knowing your competitive Gemini nature, you must have the best of the best! Don't be so hard on yourself when old problems float to the surface. Instead, take advantage of upcoming summer flings.

Cancer: June 22 – July 22

Splurging money on redecorating isn't a bad thing. Your living space needs a makeover. The colours aren't working, making you crave bad foods. But

don't fret! These remodelling projects will be fun because you find a friend to help. The fun part: they're looking more promising than just a friend.

Virgo: Aug. 21 – Sept. 23

It's all about friends this month — keeping the true ones and weeding out the bad ones. You need committed friends to keep your exercise schedule on track. Write your thoughts in a journal. In a couple months, you will find current events very amusing. You are also having difficulty keeping track of what day it is, so be careful not to miss the important date at the end of the month.

Libra: Sept. 24 – Oct. 23

Last month was insane, meaning it is time to relax at a day spa. This month may be just as bad because something serious is going to interrupt your daily workout routine. You need to stay focused and find an alternative to your normal activities. Do something special for yourself as a reminder of how great you are. A possible partner will soon come along and tell you that themselves.

Scorpio: Oct. 24 – Nov. 22

Tune in to your inner voice through meditation or quiet time to impact your subconscious and keep your mind healthy. A relationship that's been teetering on the edge will soon be decided by avoiding the chatterbox. Your social life will get a boost and make certain friendships stronger. Try to stay away from calorie-happy snacks to keep this happy feeling going.

Sagittarius: Nov. 23 – Dec. 21

Quiet time is in serious need. About 15-30 minutes a day will help improve your sleep. You're not feeling so hot these past few weeks because there's something on your mind that you can't talk to anyone about. Don't worry, the weather is going to pick up and change everyone's mood, making the situation a little lighter for you.

Capricorn: Dec. 22 – Jan. 19

Take advantage of your creative mind and create the reality you want through positive thinking, will-power and determination. Dreams are truly possible this month, especially career-wise. But keep an eye out for co-workers with slumpy energy who are trying to bring you down. Don't forget to continue your active lifestyle because everyone is noticing that it's working for you.

Abstracts (cont...)

Vithooshan Vijayakumaran

We are the world: global lineages of tuberculosis come to Ontario

McMaster University, microbiology and biotechnology, fourth year

Supervisor: Frances Jamieson

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. Surveillance activities, such as genotyping, are used to distinguish disease caused by recent transmission from disease due to reactivation of old infections. Genotyping can also provide insight into the origin of tuberculosis in Ontario. This project makes use of molecular techniques to identify specific lineages of *M. tuberculosis* within the province. In addition to common strains of the Beijing and Manila lineages, comparing our data to global databases has revealed that there are over 100 genotypes in Ontario that have never been reported elsewhere. The diversity of strains is consistent with the demographics of our multicultural population. Analysis of these strains may reveal lineage-specific associations with pathogen virulence and disease presentation. As such, this work may contribute to more effective, lineage-specific treatment of tuberculosis in Ontario.

Ron Mackenzie

Developing a high-throughput method to multi-locus sequence type (MLST) invasive *S. pneumoniae* isolates

University of Toronto, laboratory medicine and pathobiology, third year

Supervisor: Dylan Pillai

Streptococcus pneumoniae is a gram-positive bacterium commonly implicated in childhood infections and pneumonia. In 2004, a heptavalent *S. pneumoniae* vaccine (PCV7) targeting seven particular serotypes of *S. pneumoniae* (4, 6B, 9V, 14, 18C, 19F, 23F) was made available for children in Ontario under the age of five, and successfully curtailed the high number of infections caused by this bacterium. However, many countries, including Canada, have reported infections by vaccine escape recombinants (Pillai et. al. 2009). While serotyping patient isolates provides useful information, MLST provides additional genetic information, but is very laborious. In this study we have developed an automated, robotic method for performing MLST in a high-throughput method. By performing automated 96-well plate DNA extraction, PCR, and sequencing via the Biomek NX^P (Beckman Coulter) robotic platform, we can perform MLST on hundreds of *S. pneumoniae* isolates from culture in a rapid fashion.

Michael Schwandt

Burden of illness: mental health and addictions in Ontario

University of Toronto, community medicine residency, fourth year

Supervisor: Dylan Pillai

Mental health is a significant health concern, with mental illness and addictions contributing to morbidity, mortality, health care costs and indirect costs to society in Ontario. It is estimated that one in five Canadians experiences mental illness during their lifetime. Accurate description of the burden of mental illness is required for the appropriate allocation of resources, both for treatment programs and for evidence-based health promotion strategies.

In cooperation with the Institute for Clinical Evaluative Sciences, OAHPP is assessing the burden of mental illness in Ontario. Potential data sources include the Canadian Community Health Survey (Statistics Canada), Discharge Abstract Database (Canadian Institute for Health Information), Ontario Student Drug Use and Health Survey and OHIP billing data.

This will be the first-known comprehensive evaluation of the burden of mental illness in Ontario, and will have a valuable role in program planning and policy development.

“It is estimated that one in five Canadians experiences mental illness during their lifetime.”

Yasmin Khan

Epidemiology in the setting of natural disasters: a review and novel synthesis of the literature

University of Toronto, master of public health, final year

Supervisor: Ian Johnson and Brian Schwartz

Purpose: The objective of this study was to review the literature on epidemiological responses for populations experiencing sudden-impact natural disasters and synthesize the results.

Method: A systematic approach was utilized for the literature review. Two databases were searched in addition to relevant reviews, secondary references and grey literature. Search results were reviewed by title and abstract, by two independent reviewers for inclusion in the review. A critical appraisal tool was developed to assess the methodological quality of the included studies. The results of the search were summarized

into a database organized by disaster type, disaster phase, and severity of impact. Input of articles into the database was validated for 20% of studies, by two independent reviewers.

Results: 105 articles were selected for inclusion with good agreement. Critical appraisal of an initial 20% of articles found methodological quality poor. For each disaster event for which a study had been included, an overall impact rating comprised of human, physical, and critical infrastructure impact factors was assigned (marginal, serious, critical, and catastrophic). A database was developed based on overall impact rating

and subdivided by disaster type and phase of disaster (impact, emergency, and rehabilitation phases). The majority of studies were found to be within catastrophic impact for hurricane disasters.

Conclusions: Systematic review of the literature on epidemiological studies for natural disasters reveals generally poor methodology. Given the nature of emergencies, the synthesized database of studies by disaster type and impact could provide a resource for local or provincial public health during a time of crisis.

Andrew Pinto

Helping communities understand the health risks posed by environmental contamination

University of Toronto, community medicine residency program, fourth year

Supervisor: Ray Copes

There is growing public awareness of the negative health impact of hazardous substances in the environment. A number of Canadian communities have experienced the contamination of their water, soil and air, often related to industrial activities. Public health has an important role in assisting members of these communities in understanding the risk posed by such incidents.

The Ontario Agency for Health Protection and Promotion was asked to assist a public health unit in addressing the contamination of a residential neighborhood with trichloroethylene. This industrial solvent is carcinogenic and was found to be present in high levels in homes in this community. Residents were very concerned that they were not being listened to, and had begun to

organize their own response to the perceived health effects of the contamination.

This case study will review best practices in risk assessment and risk communication. The key lesson learned in this case is the need to engage the public from the start.

Liane Macdonald

Human papillomavirus (HPV) vaccination coverage among females eligible for Ontario's school-based HPV vaccination program

University of Toronto, community medicine residency, fifth year

Supervisor: Shelley Deeks

Purpose: As a part of the provincial human papillomavirus (HPV) vaccine program evaluation, publicly funded HPV vaccination coverage among eligible Grade 8 females will be assessed. Secondary aims include determining the incremental impact of extended eligibility and identifying factors in the health unit, school board and school levels associated with variations in coverage.

Methods: HPV vaccination coverage will initially be assessed by year and dose, using routinely collected data from MOHLTC's HPV vaccine reimbursement database. A gap analysis will be conducted and if additional data is required, an electronic survey will be developed and validated for immunization program managers at each of Ontario's 36 PHUs. Appropriate statistical tests

will be selected to identify potential group-level determinants of HPV vaccination coverage.

Results: To be determined.

Key message: Assessing HPV vaccination coverage among eligible females is essential to evaluating the impact of Ontario's school-based HPV vaccination program.

Abstracts (cont...)



Eric Wagar (above),
David Ryding (right)

David Ryding and Eric Wagar Rural well water contamination and human health: an investigation in Eastern Ontario

Queen's University, master of public health, second year (Ryding)
St. Lawrence College, biotechnology, third year (Wagar)
Supervisor: Anna Majury

The purpose of this study is to determine: (1) the originating source and level of bacterial contamination in private drinking water wells in Eastern Ontario, (2) the extent that precipitation and land use patterns are associated with this contamination, (3) the degree that clustered impacts on humans can be attributed to contamination, and (4) policy-relevant socioeconomic implications concerning areas with contaminated wells.

This project will spatially map and analyze positive coliform samples from domestic wells using the fecal indicator organism *Escherichia coli*. Microbial source tracking of *Bacteriodes fragilis* using Real-Time Multiplex PCR will be utilized to determine the host source (human or bovine) and level of contamination. Land use analysis will be used to detect likely causes of contamination. Health implications stemming from consumption of contaminated well water will also be studied.

The components of this study area are designed to improve environmental policy relating to ground source water protection across Canada.



Jessica Leah Food safety surveillance and monitoring systems: overlaps, gaps and lessons for improvement

University of Toronto, community health and epidemiology, third year
Supervisor: Ray Copes

Purpose: To examine the monitoring and surveillance practices of food and food-borne illnesses in five jurisdictions of interest: United States, United Kingdom, European Union, Australia, and New Zealand.

Method: An evaluation tool was developed using literature and expert consultations. Representatives from each jurisdiction were then approached for assessment. Attempts were made to identify the most knowledgeable respondent within one jurisdiction to ensure the most accurate and detailed information was collected.

Results: A variety of food and food-borne illness monitoring and surveillance practices were identified across the jurisdictions of interest. A comparison of jurisdictions on different dimensions of the evaluation were documented and areas of 'better practices' were determined.

Key messages: Evaluating food and food-borne monitoring and surveillance practices through an objective assessment process is paramount to enhancing current systems. Only in this manner can the effectiveness of these practices be quantified and their limitations be identified. The results of this review may help guide current Ontario practices.

Akriti Prashar

Legionella pneumophila attachment to lung epithelial cells occurs by the zipper mechanism

University of Toronto, cell and systems biology, first year
Supervisor: Cyril Guyard and Mauricio Terebiznik

Purpose: *Legionella pneumophila* is the pathogen responsible for Legionellosis: a respiratory illness varying in severity from mild flu-like symptoms to life-threatening pneumonia. The process of infection of lung epithelial cells by *L. pneumophila* is poorly portrayed. Our aim is to investigate the mechanisms used by *L. pneumophila* serogroup I (*LpI*) to adhere to epithelial cells and

the signalling pathways activated to initiate bacterial internalization.

Methods and Results: Fluorescence and scanning electron microscopy results show that *LpI* attaches to lung epithelial cells using the 'zipper' mechanism. Use of pharmacological inhibitors demonstrates that this process requires actin polymerization and the actin motor protein myosin II. We have also shown

that the host cell b1 integrin receptors are needed for *LpI* attachment, which activate the focal adhesion signalling pathway.

Conclusions: Our results indicate that b1 integrin receptors mediate *LpI* attachment to lung epithelial cells. This adhesion causes bacterial internalization by the 'zipper' mechanism through the focal adhesion signalling pathway.

Thomas Krahn

Seasonal surveillance of respiratory viruses in Eastern Ontario 2006-2010 and the impact of pandemic H1N1

Queen's University, life sciences, graduate
Supervisor: Anna Majury

Previous studies have used hospitalizations, intensive care units and emergency department (ED) visits as predictors of seasonal influenza incidence as the best measure of true prevalence, despite the lack of evidence correlating these predictors with laboratory confirmation. We collected laboratory-confirmed cases of winter respiratory viruses (RSV, influenza A/B, HPIV, rhi-

novirus, adenovirus) from the Kingston public health laboratory and compared with ED visits for respiratory syndromes and fever/influenza-like illness (ILI) recorded by local hospitals from 2006-2010. Influenza-related hospitalizations were also compared with laboratory-confirmed cases of influenza A in 2009, during the influenza A H1N1 pandemic. ED visits in Kingston and the

surrounding areas exhibited seasonality, and were significantly correlated with laboratory-confirmed cases of all respiratory viruses, particularly RSV and influenza A/B (PMCC 0.83). Hospitalizations were strongly predictive of influenza prevalence (PMCC 0.97). Our findings support the use of these indicators to track respiratory viral disease in the community.

Krishna Khairnar

Development of molecular diagnostics for various significant diseases, genotyping and drug resistance

University of Toronto, laboratory medicine and pathobiology
Supervisor: Dylan Pillai

While microscopy and/or culture for parasites still remains our standard diagnostic test for routine parasitological examination, patients and diagnostic laboratories would greatly benefit from the implementation of a sensitive high-throughput molecular diagnostic system such as real-time polymerase chain reaction (RT-PCR) assay. It has been developed for the screening of significant parasitic diseases such as malaria, parasitic gastro-intestinal infections, leishmaniasis, and amoebic keratitis, at the Toronto Public Health Laboratory.

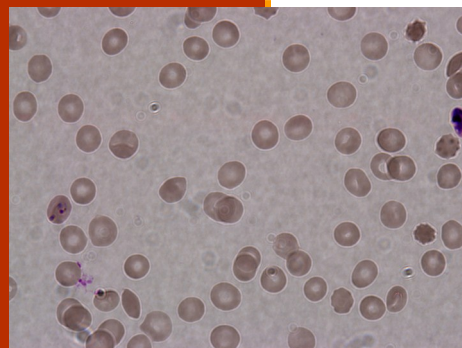
The factors determining whether a person infected with an organism develops a disease are poorly understood. Molecular genotyping by targeting polymorphic genetic loci may aid in the close examination of the population structure of parasites in clinical isolates. We have already demonstrated this by genotyping a hypervirulent *Entamoeba histolytica* strain as a genetically distinct outlier in an outbreak case. This genotyping scheme enabled us to distinguish virulent strains from less virulent strains of *E. histolytica sensu stricto*.

The emergence of drug-resistance among parasites is a serious public health threat. Provided that the genetic basis for the drug resistance is known, genetic markers can be exploited for monitoring the drug resistance pattern in a population. We have developed a rapid screening method for molecular markers of drug resistance in *P. falciparum* malaria that may inform clinicians of the patterns of drug resistance.

Abstracts (cont...)

Minggao (Michael) Liang Of mice and malaria and heat shock

University of Toronto, laboratory medicine and pathobiology, third year
Supervisor: Dylan Pillai



Malaria affects 240 million people annually worldwide. *Plasmodium falciparum* heat shock protein 90 (PfHsp90) is essential for parasite development and plays a key role in the development of antimalarial resistance. Our results show that PfHsp90 specific inhibitors have in vitro 50% inhibitory concentrations (IC₅₀) in the nanomolar range and synergistic activity with known antimalarials. We evaluated these PfHsp90 inhibitors in a malaria mouse model in order to determine efficacy, toxicity, pharmacokinetics, oral bioavailability, and combination therapy formulations. Resistance has evolved rapidly to our current regime of antimalarials, for many of which the mechanisms of resistance and activity are not understood. Our investigations on PfHsp90 inhibitors will not only provide new therapeutic options, but also make previous antimalarials available by circumventing parasite resistance and help provide insight into the mechanisms involved.

Jannice So The role of Lhbp I in biofilm formation in *Legionella pneumophila*

University of Toronto, human biology, fourth year
Supervisor: Cyril Guyard

Legionellosis is predominantly caused by *Legionella pneumophila* serogroup 1 (*Lp1*). To explain the higher incidence of *Lp1* infections compared to other species and serogroups, it has been hypothesized that *Lp1* is fit for survival in environmental and anthropogenic aquatic sites. *Lp1* has not been shown to be transmitted from person-to-person. We have identified a heparin-binding protein of *Lp1* (Lhbp I) involved in binding to extracellular matrix and human lung epithelial cells *in vitro*. Using a static biofilm formation assay and CLSM, a deletion in *lhbp1* was shown to impair biofilm formation of *Lp1*. Complementation assays of the deletion mutant restored biofilm production. Complementation assays using a plasmid construct containing a variant of *lhbp1* lacking the tandem repeats sequence did not show biofilm restoration, suggesting the importance of *lhbp1* and its repeats sequence in *Lp1* surface attachment. Additional variants of *lhbp1* are being tested for their role in *Lp1* biofilm production.

Jianhui Xiong Superbug's secret revealed: giant plasmid confers carbapenem

University of Toronto, clinical microbiology, third year
Supervisor: Paul Roy and David Alexander

Pseudomonas aeruginosa is a common cause of lung infections. The Pae96 strain used in this study is an antibiotic-resistant 'superbug' responsible for an outbreak in a hospital intensive care unit. In this study, whole genome sequencing revealed that, in the Pae96 strain, the antibiotic resistance genes are carried on a giant plasmid. This is important because plasmids are mobile elements that can be traded among different types of bacteria and facilitate the further spread of antibiotic resistance. The antibiotic resistance genes were found in an area of the plasmid called an 'integron.' Remarkably, the giant plasmid contained two different kinds of integrons, each encoding resistance to different antibiotics. These findings help us understand the cause of antibiotic resistance and may help us develop tools to improve surveillance and treatment of superbugs.

Dea Shahinas

A repurposing strategy identifies novel synergistic inhibitors of *Plasmodium falciparum* heat shock protein 90 (PfHsp90) with potential to reverse drug resistance

University of Toronto, laboratory medicine and pathobiology, second year
Supervisor: Dylan Pillai

Plasmodium falciparum heat shock protein 90 (PfHsp90) is essential for the development of the parasite and plays an important role in the development of drug resistance due to its interaction with antimalarial resistance factors. Hence, combination therapy with PfHsp90 inhibitors has the potential to circumvent drug resistance due to these inherent interactions of the Hsp90 chaperone machinery. We have focused on repurposing FDA approved drugs as competitive inhibitors of PfHsp90 through robotic high throughput screen-

ing and drug lead optimization using a structure-based drug design approach. Our results show that PfHsp90 specific inhibitors show 50% inhibitory concentrations (IC₅₀) in the nanomolar range and demonstrate synergistic activity with existing antimalarials reverse resistance in the resistant strain W2. The current goal is to elucidate the synergistic activity mechanism, evaluate the activity of these drugs in the malaria mouse models and broaden the application of this drug design approach to other parasites.

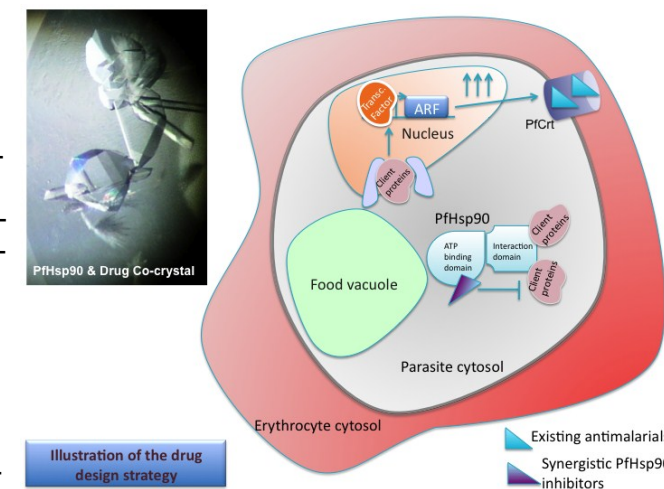


Illustration of the drug design strategy

Laleh Sadeghi Public-health dentistry in Ontario: view from the field

University of Toronto, dental public health, second year
Supervisor: Heather Manson

Purpose: The Canadian Public Health Dentistry's (CPHD) mission is to advocate for the oral health of Canadians through organized community efforts. Continuous input from the field is necessary to make ongoing improvements based on real-time data. To have a better understanding of the current situation, this survey was conducted to col-

lect the opinions of Medical Officers of Health (MOH) in Ontario on oral public health topics.

Method: A 13-item open-ended questionnaire was sent out via email to 36 health units in Ontario (response rate: 50%). The questions were answered by MOHs or by health units' dental managers, but in all cases MOHs should/would

review the final responses.

Key messages: New strategies for manpower (dental public health specialists) planning need to be considered, while obvious inequities in access to oral health in Ontario are stressing the need for further investigations in the areas of legislation, alternative delivery systems and research.

Sarah Collier Focusing attention on health inequities through evidence

University of Toronto, master of public health, second year
Supervisor: Ruth Sanderson

Public health has a responsibility not only to promote health and to prevent disease, but also to reduce health inequities. The legislative objects of the Ontario Agency for Health Protection and Promotion include providing scientific and technical support to the health-care system and the Government of Ontario

in order to protect and promote the health of Ontarians and reduce health inequities. In order to focus attention on health inequities, it is important to provide strong evidence using a valid measurement tool. One concrete approach to assess health inequities is the measurement of deprivation. A variety

of measures of deprivation have been used in Ontario and three of the most relevant measures were explored. Preliminary results using the INSPQ deprivation index are presented. Opportunities for further use in public health are outlined and examples of potential applications are identified.

Abstracts (cont...)

Linda Shan

Characterization of *Listeria monocytogenes* strains for epidemiological investigations

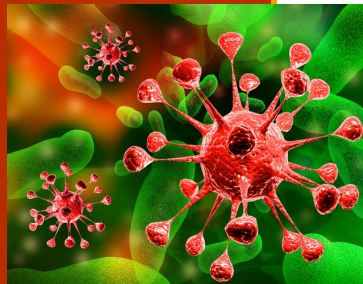
Queen's University, bachelor of science, fourth year

Supervisor: Vanessa Allen

Listeria is food-borne bacteria that can reach a mortality rate of close to 30%. Among 13 different serotypes of *Listeria monocytogenes*, only three are responsible for 98% of human listeriosis. However the frequencies of strains observed in food and in clinical infections are different.

The ability to rapidly differentiate outbreak-causing strains and tracking them to their sources of contamination is important for addressing epidemiological, clinical, and legal issues, as well as developing effective strategies to prevent recalls and human illness. Serotyping is the most popular way to characterize *L. monocytogenes*, but it is limited to few laboratories that have access to specific sera. The current gold standard, Pulsed-Field Gel Electrophoresis (PFGE), is time and labour consuming and difficult to standardize among laboratories.

This study aimed to develop molecular methodologies to identify *L. monocytogenes* strains in a reliable, fast and standardized way. Multiplex PCR based serotyping, Multilocus Sequence Typing (MLST) and Multiple-Locus Variable Number of Tandem Repeat Analysis (MLVA) are employed to study 35 isolates from 20 food samples contaminated with *Listeria* obtained at the Toronto-PHL. Comparisons between all the methods will be performed.



Alyssa Loughborough

Detection of pathogenic nontuberculous mycobacteria in residential showers of the Toronto area

The Michener Institute for Applied Health Sciences, medical laboratory science, second year

Supervisor: Vanessa Allen

Nontuberculosis mycobacteria (NTM) are capable of causing a variety of infections in humans, ranging from skin to pulmonary infections. The NTM isolation prevalence has increased significantly in Ontario. Environmental exposure, especially from water, is thought to be the main route of transmission. This study aimed to develop a methodology to determine the NTM population in residential showerheads with the goal of linking these water sources to clinical cases. Water samples and swabs were taken from six residential showers in the Toronto area. The filters and the swabs were cultured for at least 60 days on 7H10 Middlebrook agar plates. Two additional samples were treated with a decontaminant, Cetyl-Pyridinium-Chloride (CPC), before plating to help decrease the number of fast growing background bacteria. The isolates were identified by 16S rRNA gene sequencing. In untreated samples, environmental isolates were most common [*Brevundimonas* (100%), *Sphingomonas* (50%) sp.]. Only 2 showers (33%) yielded non-pathogenic NTM (*M. mucogenicum*). Interestingly, CPC treatment allowed for the isolation of *M. avium* and *M. goodnae*, two slow growing species reported to infect humans. Protocol modifications are currently being tested to increase the isolation rates of NTM from showers.

Kate Henbest

Application of the molecular typing method MLVA to investigate *Clostridium difficile* strain diversity in specimens from hospitalized patients

University of Ottawa, biology, third year

Supervisor: George Broukhanski

Clostridium difficile (CD) is a main cause of gastrointestinal disease in patients treated with antibiotics. As a part of the Ontario government's legislation on patient safety, PHL-Toronto conducts surveillance of CD outbreaks. Outbreak investigation requires typing of strains to establish connections between cases. Current typing procedure involves testing one colony. However,

this procedure may miss outbreak strains if multiple strains exist in a single specimen.

We investigated this possibility by testing 140 specimens from three hospitals (taking 10 to 24 colonies per specimen) using multilocus variable-number tandem-repeat analysis (MLVA), a highly discriminatory typing technique.

Statistical analysis of our data will assist in deciding if typing a single colony is sufficient in outbreak investigation or if there is a chance of missing an epidemic strain such as NAPI. Strain diversity analysis may also be used to study clinical aspects of CD recurrence or reinfection.

Carly Heung

Reducing health inequities: developing an OAHPP framework for action

University of Waterloo, master of public health, second year

Supervisor: Brian Hyndman

Purpose: To inform the development of OAHPP's role in meeting one of its legislated mandates, Object A, the development of an OAHPP framework for action in reducing health inequities was initiated.

Methods: An environmental scan of most frequently cited international, national and provincial reports addressing health inequity was conducted. The

review focused on examples of work from organizations and government bodies with a public health mandate.

Results: Globally and within Canada, 29 reports, including position statements, frameworks for action, and promising practices, were identified. There was a general consensus around the need to strengthen action in reducing health inequities by addressing the

social determinants of health.

Key messages: The wide range of activities employed by other organizations to guide health equity-related policy and practice indicates that health equity is actionable. Looking at their experiences will help to serve as a starting point in developing an OAHPP framework for action.



Carly Heung

Zahra Abbas and Won Suk (James) Jahng

Development of a molecular test (real-time PCR) for detection of enteroviruses in cerebral spinal fluid (CSF)

University of Toronto, bachelor of science, third year (Abbas)

University of Toronto, life science, graduate (Jahng)

Supervisor: Jonathan Gubbay and Samir N. Patel

Background and objectives: Enteroviruses are the leading cause of viral meningitis worldwide, meaning early detection is critical for patient management. At OAHPP, viral culture is used for detecting enterovirus in CSF; in addition to long turnaround time (10 days), sensitivity is very low compared to PCR. The purpose of this study was to develop and verify a molecular test for enterovirus detection in CSF.

Methods: Different combinations of previously published primers/probes were used to develop a real-time PCR for enterovirus detection. Sensitivity, specificity, reproducibility and limit of detection were assessed. In particular, cross-reactivity with rhinoviruses was evaluated.

Results: The new assay detected all 15 enterovirus serotypes evaluated. The new assay reduced false-positivity by

rhinoviruses from 63% to 13%; there was no cross reactivity with viruses or bacteria causing meningitis.

Conclusions: We have verified a molecular test for effective detection of enterovirus in CSF. This test could be integrated into laboratory operations and provide significant advantages of increased sensitivity and reduced turnaround time.