A G E N D A

MIDDLESEX-LONDON BOARD OF HEALTH

399 RIDOUT STREET NORTH
SIDE ENTRANCE, (RECESSED DOOR)
Board of Health Boardroom

THURSDAY, 7:00 p.m.
2011 March 17

MISSION - MIDDLESEX-LONDON BOARD OF HEALTH

The mission of the Middlesex-London Health Unit is to promote wellness, prevent disease and injury, and protect the public's health through the delivery of public health programs, services and research.

MEMBERS OF THE BOARD OF HEALTH

Ms. Patricia Coderre (Chair)	Ms. Viola Poletes Montgomery (Vice-Chair)
Ms. Denise Brown	Ms. Nancy Poole
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Dr. Francine Lortie-Monette	Mr. Mark Studenny
Ms. Doreen McLinchey	Mr. Joe Swan
Mr. Marcel Meyer	Dr. Graham Pollett (Secretary-Treasurer)

DISCLOSURE OF CONFLICTS OF INTEREST

APPROVAL OF MINUTES

APPROVAL OF AGENDA

SCHEDULE OF APPOINTMENTS

7:10 – 7:20 PM Ms. Bernadette Garrity, Public Health Nurse, re Item #1

7:20 – 7:30 PM Mr. David White, Manager, Environmental Health, re Item #2

ACTION REQUIRED

1) Report No. 024-11 re Move for Two DVD: Promoting Physical Activity During Pregnancy

2) Report No. 025-11 re 2010 Vector-Borne Disease Report: West Nile Virus, Lyme Disease and Eastern Equine Encephalitis Surveillance and Control Activities for 2010

3) Report No. 026-11 re 2011 Budget Update

4) Report No. 027-11 re Violence in Hockey

FOR INFORMATION

5) Report No. 028-11 re Medical Officer of Health Activity Report - March

6) Report No. 029-11 re Healthy Babies Healthy Children Research Project with a Social Worker

7) Report No. 030-11 re Bylaws for Food Premises Inspection Disclosure and Foodhandler Certification – County Update

8) Report No. 031-11 re 2010 Media Summary

9) Report No. 032-11 re Social Media Working Group Update

10) Report No. 033-11 re 2010 Budget – Fourth Quarter Review

11) Report No. 034-11 re Board of Health Performance Assessment

CONFIDENTIAL

OTHER BUSINESS

Next Board of Health Meeting – Thursday, April 14, 2011, 7:00 PM

CORRESPONDENCE RECEIVED

a) Dated 2011 February 18 (Received 2011 February 18) Correspondence from Mr. Daryl Vaillancourt, Chairperson, Board of Health for the North Bay Parry Sound District Health Unit, stating that that Board passed the following resolution:

Be It Resolved, That the Board of Health for the North Bay Parry Sound District Health Unit forward a letter to the Ministry of Transportation advocating for an amendment to Bill 100 such that:

1) Widened paved shoulders extend to a width of 1.2 meters, and

2) Widened paved shoulders are marked with line painting that visually separates the vehicle and cycling lane, and

Furthermore Be It Resolved, That a copy of the letter be forwarded to the Minister of Health Promotion and Sport, the Chief Medical Officer of Health, district members of federal and provincial parliament, Ontario Boards of Health, member municipalities, the Parry Sound Active Transportation Committee, and the Association of Local Public Health Agencies.

b) Dated 2011 February 23 (Received 2011 March 1) Correspondence from Mr. Daryl Vaillancourt, Chairperson, Board of Health for the North Bay Parry Sound District Health Unit, and Dr. Jim Chirico, Medical Officer of Health/Executive Officer, North Bay Parry Sound District Health Unit, to The Honourable Dalton McGuinty, Premier of Ontario, re Price of Eating Well Report urging the government of Ontario to do the following:

1. *Support, in principle, the directions and process proposed by the Social Assistance Review Advisory Council (SARAC) for a comprehensive review of Ontario's income security system, and*

2. *Consult with Northern Ontario health units as key stakeholders in the social service sector, through the process established to review Ontario's income security system, and to complete this review as soon as possible.*

Copies of all correspondence are available for perusal from the Secretary- Treasurer.

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 024-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

Move For Two DVD: Promoting Physical Activity During Pregnancy

Recommendation

It is recommended that Report No. 024-11 re Move for Two DVD: Promoting Physical Activity during Pregnancy be sent to all Ontario Health Units.

Introduction

Pregnancy may be a transformative time in a woman's life in several respects. Out of concern for the health of their developing child, many women are motivated to make healthier dietary and activity choices than may have been typical for them. Appropriate levels of physical activity during pregnancy produce clear and well documented benefits for mother and child. Conversely, there are risks associated with being inactive during pregnancy, including excessive maternal weight gain and higher risk of developing gestational diabetes. As well, there is research evidence that inactivity during pregnancy also affects fetal outcomes. A number of barriers to being physically active during pregnancy have been citied by women, including a lack of time, lack of childcare, lack of transportation to recreation facilities and lack of knowledge about safe ways to be active during pregnancy. To address these opportunities, risks, and barriers; the Family Health Promotion Team undertook the development of a home-use video resource designed to promote appropriate physical activity for women during pregnancy.

Move for Two is the first known evidence-based, prenatal physical activity DVD designed to support women who want to engage in physical activity during pregnancy. It was developed in partnership with Dr. Michelle Mottola, Director, Exercise and Pregnancy Lab, University of Western Ontario (UWO). Each DVD is packaged with a copy of the Physical Activity Readiness Medical Examination for Pregnancy form (PARmed-X) (Appendix A) which is to be completed with a health care provider prior to using the DVD. The objectives of Move for Two include: increased awareness of the benefits of physical activity during pregnancy; increased number of active pregnant women; decreased barriers to physical activity; support for already active women to continue during pregnancy; increased awareness of the risks of over-activity during pregnancy; and improved long-term health outcomes in women and children.

Launch and initial response

The DVD was launched at the January 19, 2011, Prenatal Fair at Western Fair Entertainment Centre. Attendance at the event was higher than expected. This may be attributed to strategic pre-event radio advertising that emphasized the Move for Two launch. Two hundred and forty (240) copies of the DVD were distributed and over 70 people attended a brief presentation by Dr. Mottola and Dr. Anita Cramp (School of Kinesiology, UWO), both of whom were involved in the DVD project. Greetings were sent by the Honourable Deb Matthews, Minister of Health and Long-Term Care, to mark the occasion. The release of the DVD attracted significant media attention. Local media coverage included segments on the 6 p.m. A-Channel News and Rogers Daytime Show and an article in the London Free Press.

Distribution

To date, 2000 copies of the DVD have been distributed throughout Middlesex London and beyond. It is available at no cost to residents of Middlesex-London and available for $5.00 upon request outside of Middlesex-London. Orders have been received from across Canada from British Columbia to Newfoundland. Proceeds from the sale of the DVD outside Middlesex London will ensure that the DVD can be distributed at prenatal fairs and through prenatal classes and community clinics, as well as through select physicians and care providers including Health Unit Nurse Practitioners. Long-term plans include translation of the resource into other languages and exploration of possible cultural and linguistic adaptations of the DVD that reflect the needs of the diverse community. The expert advice portion of the DVD has been available for viewing online at www.youtube.com for approximately one year. However, making the entire contents of the DVD available on-line presents problems as on-line viewers may be tempted to follow the workout segments without first completing the PARmed-X form - a critical step for pregnant women to complete with their healthcare provider. Therefore, staff is investigating the steps that would be necessary to ensure safe and appropriate use such as appropriate caution statements and a clear link to on-line access to the PARmed-X.

Evaluation

A two phase evaluation of the DVD has been planned. During phase one (completed in May 2010), an initial version of the DVD was viewed by pregnant women in a series of focus groups. Feedback regarding the packaging design and the content of the DVD were incorporated into the final version of the DVD. Phase two will be led by faculty in the Department of Kinesiology, UWO (pending ethics approval), and will evaluate the effectiveness of the DVD in increasing pregnant women's level of activity, both with or without a workbook, which is being developed to accompany the DVD.

Conclusion

Move for Two is an example of an innovative, low cost, health promotion resource that can take advantage of the power of social media and information technology. It provides a means of reaching a high proportion of a priority population at a critical life stage during which readiness to change is high, and healthy behaviours may have lasting impact.

This report was prepared by Ms. Bernadette Garrity, Public Health Nurse, and Mr. Jim Madden, Manager, Family Health Promotion Team.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

This report addresses the following requirement(s) of the Ontario Public Health Standards:
Family Health Program Standard: Reproductive Health Requirement 2. The board of health shall work with community partners, using a comprehensive health promotion approach, to influence the development and implementation of health policies and the creation or enhancements of supportive environments to address: health pregnancies. These efforts shall include: b. reviewing, adapting and/or providing behaviour change support resources and programs.

PARmed-X for PREGNANCY

PHYSICAL ACTIVITY READINESS MEDICAL EXAMINATION

PARmed-X for PREGNANCY is a guideline for health screening prior to participation in a prenatal fitness class or other exercise.

Healthy women with uncomplicated pregnancies can integrate physical activity into their daily living and can participate without significant risks either to themselves or to their unborn child. Postulated benefits of such programs include improved aerobic and muscular fitness, promotion of appropriate weight gain, and facilitation of labour. Regular exercise may also help to prevent gestational glucose intolerance and pregnancy-induced hypertension.

The safety of prenatal exercise programs depends on an adequate level of maternal-fetal physiological reserve. PARmed-X for PREGNANCY is a convenient checklist and prescription for use by health care providers to evaluate pregnant patients who want to enter a prenatal fitness program and for ongoing medical surveillance of exercising pregnant patients.

Instructions for use of the 4-page PARmed-X for PREGNANCY are the following:

1. The patient should fill out the section on PATIENT INFORMATION and the PRE-EXERCISE HEALTH CHECKLIST (PART 1, 2, 3, and 4 on p. 1) and give the form to the health care provider monitoring her pregnancy.
2. The health care provider should check the information provided by the patient for accuracy and fill out SECTION C on CONTRAINDICATIONS (p. 2) based on current medical information.
3. If no exercise contraindications exist, the HEALTH EVALUATION FORM (p. 3) should be completed, signed by the health care provider, and given by the patient to her prenatal fitness professional.

In addition to prudent medical care, participation in appropriate types, intensities and amounts of exercise is recommended to increase the likelihood of a beneficial pregnancy outcome. PARmed-X for PREGNANCY provides recommendations for individualized exercise prescription (p. 3) and program safety (p. 4).

NOTE: Sections A and B should be completed by the patient before the appointment with the health care provider.

A PATIENT INFORMATION

NAME _____

ADDRESS _____

TELEPHONE _____ BIRTHDATE _____ HEALTH INSURANCE No. _____

NAME OF PRENATAL FITNESS PROFESSIONAL _____ PRENATAL FITNESS PROFESSIONAL'S PHONE NUMBER _____

B PRE-EXERCISE HEALTH CHECKLIST

PART 1: GENERAL HEALTH STATUS

In the past, have you experienced (check YES or NO):

		YES	NO
1.	Miscarriage in an earlier pregnancy?	❑	❑
2.	Other pregnancy complications?	❑	❑
3.	I have completed a PAR-Q within the last 30 days.	❑	❑

If you answered YES to question 1 or 2, please explain:

_____

Number of previous pregnancies? _____

PART 2: STATUS OF CURRENT PREGNANCY

Due Date: _____

During this pregnancy, have you experienced:

		YES	NO
1.	Marked fatigue?	❑	❑
2.	Bleeding from the vagina ("spotting")?	❑	❑
3.	Unexplained faintness or dizziness?	❑	❑
4.	Unexplained abdominal pain?	❑	❑
5.	Sudden swelling of ankles, hands or face?	❑	❑
6.	Persistent headaches or problems with headaches?	❑	❑
7.	Swelling, pain or redness in the calf of one leg?	❑	❑
8.	Absence of fetal movement after 6th month?	❑	❑
9.	Failure to gain weight after 5th month?	❑	❑

If you answered YES to any of the above questions, please explain:

_____

PART 3: ACTIVITY HABITS DURING THE PAST MONTH

1. List only regular fitness/recreational activities:

_____

_____

INTENSITY	FREQUENCY (times/week) 1-2	2-4	4+	TIME (minutes/day) <20	20-40	40+
Heavy	___	___	___	___	___	___
Medium	___	___	___	___	___	___
Light	___	___	___	___	___	___

2. Does your regular occupation (job/home) activity involve:

	YES	NO
Heavy Lifting?	❑	❑
Frequent walking/stair climbing?	❑	❑
Occasional walking (>once/hr)?	❑	❑
Prolonged standing?	❑	❑
Mainly sitting?	❑	❑
Normal daily activity?	❑	❑

3. Do you currently smoke tobacco?* ❑ YES ❑ NO
4. Do you consume alcohol?* ❑ YES ❑ NO

PART 4: PHYSICAL ACTIVITY INTENTIONS

What physical activity do you intend to do?

_____

Is this a change from what you currently do? ❑ YES ❑ NO

***NOTE: PREGNANT WOMEN ARE STRONGLY ADVISED NOT TO SMOKE OR CONSUME ALCOHOL DURING PREGNANCY AND DURING LACTATION.**

Supported by: Health Canada Santé Canada

PARmed-X for PREGNANCY

PHYSICAL ACTIVITY READINESS MEDICAL EXAMINATION

C CONTRAINDICATIONS TO EXERCISE: to be completed by your health care provider

Absolute Contraindications

Does the patient have:

	YES	NO
1. Ruptured membranes, premature labour?	❑	❑
2. Persistent second or third trimester bleeding/placenta previa?	❑	❑
3. Pregnancy-induced hypertension or pre-eclampsia?	❑	❑
4. Incompetent cervix?	❑	❑
5. Evidence of intrauterine growth restriction?	❑	❑
6. High-order pregnancy (e.g., triplets)?	❑	❑
7. Uncontrolled Type I diabetes, hypertension or thyroid disease, other serious cardiovascular, respiratory or systemic disorder?	❑	❑

Relative Contraindications

Does the patient have:

	YES	NO
1. History of spontaneous abortion or premature labour in previous pregnancies?	❑	❑
2. Mild/moderate cardiovascular or respiratory disease (e.g., chronic hypertension, asthma)?	❑	❑
3. Anemia or iron deficiency? (Hb < 100 g/L)?	❑	❑
4. Malnutrition or eating disorder (anorexia, bulimia)?	❑	❑
5. Twin pregnancy after 28th week?	❑	❑
6. Other significant medical condition?	❑	❑

Please specify: _____

NOTE: Risk may exceed benefits of regular physical activity. The decision to be physically active or not should be made with qualified medical advice.

PHYSICAL ACTIVITY RECOMMENDATION: ❑ Recommended/Approved ❑ Contraindicated

Prescription for Aerobic Activity

RATE OF PROGRESSION: The best time to progress is during the second trimester since risks and discomforts of pregnancy are lowest at that time. Aerobic exercise should be increased gradually during the second trimester from a minimum of 15 minutes per session, 3 times per week (at the appropriate target heart rate or RPE to a maximum of approximately 30 minutes per session, 4 times per week (at the appropriate target heart rate or RPE).

WARM-UP/COOL-DOWN: Aerobic activity should be preceded by a brief (10-15 min.) warm-up and followed by a short (10-15 min.) cool-down. Low intensity calesthenics, stretching and relaxation exercises should be included in the warm-up/cool-down.

F	I	T	T
FREQUENCY	**INTENSITY**	**TIME**	**TYPE**
Begin at 3 times per week and progress to four times per week	Exercise within an appropriate RPE range and/or target heart rate zone	Attempt 15 minutes, even if it means reducing the intensity. Rest intervals may be helpful	Non weight-bearing or low-impact endurance exercise using large muscle groups (e.g., walking, stationary cycling, swimming, aquatic exercises, low impact aerobics)

"TALK TEST" - A final check to avoid overexertion is to use the "talk test". The exercise intensity is excessive if you cannot carry on a verbal conversation while exercising.

PRESCRIPTION/MONITORING OF INTENSITY: The best way to prescribe and monitor exercise is by combining the heart rate and rating of perceived exertion (RPE) methods.

TARGET HEART RATE ZONES

The heart rate zones shown below are appropriate for most pregnant women. Work during the lower end of the HR range at the start of a new exercise program and in late pregnancy.

Age	Heart Rate Range
< 20	140-155
20-29	135-150
30-39	130-145

RATING OF PERCEIVED EXERTION (RPE)

Check the accuracy of your heart rate target zone by comparing it to the scale below. A range of about 12-14 (somewhat hard) is appropriate for most pregnant women.

6	
7	Very, very light
8	
9	Somewhat light
10	
11	Fairly light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Very, very hard
20	

The original PARmed-X for PREGNANCY was developed by L.A. Wolfe, Ph.D., Queen's University. The muscular conditioning component was developed by M.F. Mottola, Ph.D., University of Western Ontario. The document has been revised based on advice from an Expert Advisory Committee of the Canadian Society for Exercise Physiology chaired by Dr. N. Gledhill, with additonal input from Drs. Wolfe and Mottola, and Gregory A.L. Davies, M.D.,FRCS(C) Department of Obstetrics and Gynaecology, Queen's University, 2002.

Disponible en français sous le titre «Examination medicale sur l'aptitude à l'activité physique pour les femmes enceintes (X-AAP pour les femmes enceintes)»

Additional copies of the PARmed-X for PREGNANCY, the PARmed-X and/or the PAR-Q can be downloaded from: http://www.csep.ca/forms.asp.
For more information contact the:

Canadian Society for Exercise Physiology
185 Somerset St. West, Suite 202, Ottawa, Ontario CANADA K2P 0J2
tel.: 1-877-651-3755 FAX (613) 234-3565 www.csep.ca

PARmed-X for PREGNANCY

PHYSICAL ACTIVITY READINESS MEDICAL EXAMINATION

Prescription for Muscular Conditioning

It is important to condition all major muscle groups during both prenatal and postnatal periods.

WARM-UPS & COOL DOWN:
Range of Motion: neck, shoulder girdle, back, arms, hips, knees, ankles, etc.

Static Stretching: all major muscle groups

(DO NOT OVER STRETCH!)

EXAMPLES OF MUSCULAR STRENGTHENING EXERCISES

CATEGORY	PURPOSE	EXAMPLE
Upper back	Promotion of good posture	Shoulder shrugs, shoulder blade pinch
Lower back	Promotion of good posture	Modified standing opposite leg & arm lifts
Abdomen	Promotion of good posture, prevent low-back pain, prevent diastasis recti, strengthen muscles of labour	Abdominal tightening, abdominal curl-ups, head raises lying on side or standing position
Pelvic floor ("Kegels")	Promotion of good bladder control, prevention of urinary incontinence	"Wave", "elevator"
Upper body	Improve muscular support for breasts	Shoulder rotations, modified push-ups against a wall
Buttocks, lower limbs	Facilitation of weight-bearing, prevention of varicose veins	Buttocks squeeze,standing leg lifts, heel raises

PRECAUTIONS FOR MUSCULAR CONDITIONING DURING PREGNANCY

VARIABLE	EFFECTS OF PREGNANCY	EXERCISE MODIFICATIONS
Body Position	• in the supine position (lying on the back), the enlarged uterus may either decrease the flow of blood returning from the lower half of the body as it presses on a major vein (inferior vena cava) or it may decrease flow to a major artery (abdominal aorta)	• past 4 months of gestation, exercises normally done in the supine position should be altered • such exercises should be done side lying or standing
Joint Laxity	• ligaments become relaxed due to increasing hormone levels • joints may be prone to injury	• avoid rapid changes in direction and bouncing during exercises • stretching should be performed with controlled movements
Abdominal Muscles	• presence of a rippling (bulging) of connective tissue along the midline of the pregnant abdomen (diastasis recti) may be seen during abdominal exercise	• abdominal exercises are not recommended if diastasis recti develops
Posture	• increasing weight of enlarged breasts and uterus may cause a forward shift in the centre of gravity and may increase the arch in the lower back • this may also cause shoulders to slump forward	• emphasis on correct posture and neutral pelvic alignment. Neutral pelvic alignment is found by bending the knees, feet shoulder width apart, and aligning the pelvis between accentuated lordosis and the posterior pelvic tilt position.
Precautions for Resistance Exercise	• emphasis must be placed on continuous breathing throughout exercise • exhale on exertion, inhale on relaxation using high repetitions and low weights • Valsalva Manoevre (holding breath while working against a resistance) causes a change in blood pressure and therefore should be avoided • avoid exercise in supine position past 4 months gestation	

PARmed-X for Pregnancy - Health Evaluation Form

(to be completed by patient and given to the prenatal fitness professional after obtaining medical clearance to exercise)

I, _____ PLEASE PRINT (patient's name), have discussed my plans to participate in physical activity during my current pregnancy with my health care provider and I have obtained his/her approval to begin participation.

Signed: _____ Date: _____
(patient's signature)

Name of health care provider: _____

Address: _____

_____

Telephone: _____

HEALTH CARE PROVIDER'S COMMENTS:

_____

_____

_____

_____
(health care provider's signature)

Advice for Active Living During Pregnancy

Pregnancy is a time when women can make beneficial changes in their health habits to protect and promote the healthy development of their unborn babies. These changes include adopting improved eating habits, abstinence from smoking and alcohol intake, and participating in regular moderate physical activity. Since all of these changes can be carried over into the postnatal period and beyond, pregnancy is a very good time to adopt healthy lifestyle habits that are permanent by integrating physical activity with enjoyable healthy eating and a positive self and body image.

Active Living:

- see your doctor before increasing your activity level during pregnancy
- exercise regularly but don't overexert
- exercise with a pregnant friend or join a prenatal exercise program
- follow FITT principles modified for pregnant women
- know safety considerations for exercise in pregnancy

Healthy Eating:

- the need for calories is higher (about 300 more per day) than before pregnancy
- follow Canada's Food Guide to Healthy Eating and choose healthy foods from the following groups: whole grain or enriched bread or cereal, fruits and vegetables, milk and milk products, meat, fish, poultry and alternatives
- drink 6-8 glasses of fluid, including water, each day
- salt intake should not be restricted
- limit caffeine intake i.e., coffee, tea, chocolate, and cola drinks
- dieting to lose weight is not recommended during pregnancy

Positive Self and Body Image:

- remember that it is normal to gain weight during pregnancy
- accept that your body shape will change during pregnancy
- enjoy your pregnancy as a unique and meaningful experience

For more detailed information and advice about pre- and postnatal exercise, you may wish to obtain a copy of a booklet entitled *Active Living During Pregnancy: Physical Activity Guidelines for Mother and Baby* © 1999. Available from the Canadian Society for Exercise Physiology, 185 Somerset St. West, Suite 202, Ottawa, Ontario Canada K2P 0J2 Tel. 1-877-651-3755 Fax: (613) 234-3565 Email: info@csep.ca (online: www.csep.ca). Cost: $11.95

For more detailed information about the safety of exercise in pregnancy you may wish to obtain a copy of the Clinical Practice Guidelines of the Society of Obstetricians and Gynaecologists of Canada and Canadian Society for Exercise Physiology entitled *Exercise in Pregnancy and Postpartum* © 2003. Available from the Society of Obstetricians and Gynaecologists of Canada online at www.sogc.org

For more detailed information about pregnancy and childbirth you may wish to obtain a copy of *Healthy Beginnings: Your Handbook for Pregnancy and Birth* © 1998. Available from the Society of Obstetricians and Gynaecologists of Canada at 1-877-519-7999 (also available online at www.sogc.org) Cost $12.95.

For more detailed information on healthy eating during pregnancy, you may wish to obtain a copy of *Nutrition for a Healthy Pregnancy: National Guidelines for the Childbearing Years* © 1999. Available from Health Canada, Minister of Public Works and Government Services, Ottawa, Ontario Canada (also available online at www.hc-sc.gc.ca).

SAFETY CONSIDERATIONS

- Avoid exercise in warm/humid environments, especially during the 1st trimester
- Avoid isometric exercise or straining while holding your breath
- Maintain adequate nutrition and hydration — drink liquids before and after exercise
- Avoid exercise while lying on your back past the 4th month of pregnancy
- Avoid activities which involve physical contact or danger of falling
- Know your limits — pregnancy is not a good time to train for athletic competition
- Know the reasons to stop exercise and consult a qualified health care provider immediately if they occur

REASONS TO STOP EXERCISE AND CONSULT YOUR HEALTH CARE PROVIDER

- Excessive shortness of breath
- Chest pain
- Painful uterine contractions (more than 6-8 per hour)
- Vaginal bleeding
- Any "gush" of fluid from vagina (suggesting premature rupture of the membranes)
- Dizziness or faintness

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 025-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

2010 Vector-Borne Disease Report: West Nile Virus, Lyme Disease and Eastern Equine Encephalitis Surveillance and Control Activities for 2010

Recommendation

It is recommended that Report No. 025-11 re 2010 Vector-Borne Disease Report: West Nile Virus, Lyme Disease and Eastern Equine Encephalitis Surveillance and Control Activities for 2010 be forwarded to the City of London Council, Middlesex County Council and Middlesex Municipal Councils.

2010 Vector-Borne Disease Program

The Health Unit's 2010 Vector-Borne Disease (VBD) Program was focused on delivering a comprehensive VBD program, monitoring for all vector-borne diseases of significance in Ontario, including West Nile Virus (WNV), Lyme Disease (LD) and Eastern Equine Encephalitis (EEE). The surveillance and control program was comprised of larval mosquito surveillance and identification, larviciding, adult mosquito trapping, dead bird collection, human surveillance, source reduction, public education, responding to public inquiries, tick surveillance and research into alternative treatment methods. The final Vector-Borne Disease Report is attached as Appendix A and outlines surveillance and control activities for the 2010 season. Listed below are some highlights from the report:

Human Health

In 2010, the Health Unit had no reported human cases of WNV. At the provincial level, there was one (1) confirmed case of WNV.

Staff submitted 43 ticks for testing this season: two were identified as blacklegged ticks, *Ixodes scapularis*, and one of the blacklegged ticks was positive for *B. burgdorferi* (the causative agent for LD). Three residents of Middlesex-London contracted LD from travel outside of the area. In Ontario, there were 63 confirmed LD cases.

No cases of EEE were reported in Middlesex-London.

Mosquito Identification, Control and Viral Testing

In 2010, the VBD Team collected approximately 71, 889 mosquitoes by conducting weekly trapping at various locations throughout the City of London and Middlesex County. Cosray Laboratories identified 20,942 adult mosquitoes and performed 944 viral tests for WNV and EEE. Ninety-two percent (92%) of the adult mosquitoes identified were vectors, i.e., capable of carrying the virus (only 8% were non-vector). There were two WNV-positive pools identified in Middlesex-London. In Ontario, 56 positive mosquito pools were identified during the 2010 season, an increase from the 14 positive pools in 2009. There were no EEE-positive mosquito pools but trapping did show that approximately 48% of all mosquitoes identified in terrestrial traps this season were potential EEE vectors. This is an increase from only 26% in 2009. Province-wide there were two EEE-positive mosquito pools identified; one in the North Bay Parry Sound District and the other in the Simcoe-Muskoka District that also confirmed two equine cases of EEE. The VBD Team performed 827 treatments at 227 standing water sites. Approximately 13.31 hectares of water in Middlesex-London were treated using biological larvicides and 33,000 catch basins were treated in 3 evenly spaced rounds throughout the season to ensure optimal control during the most crucial times of mosquito amplification. An additional 925 non-roadside catch basins located in rear yards of residential properties [85]; catch basins located in municipal green-spaces [260]; and catch basins located on sites such as government buildings, social housing units, and long-term care facilities [580] were treated.

Dead Bird Testing

Dead bird reports to staff began in early April 2010. Seventy-one (71) dead bird reports were made in Middlesex-London, an increase of approximately 10% from 2009. Of the 71 sightings, 13 birds were tested in the Health Unit lab. Five (5) crows tested positive for WNV in the Strathroy laboratory, and the results were confirmed by the Canadian Cooperative Wildlife Health Centre.

Public Education and Promotion
Public education remained an important component of the VBD Program. Staff participated in several community events, distributed promotional and educational resources and received frequent press coverage by the local media. Reduce and Repel brochures were distributed to physicians' offices, garden centres and municipalities throughout Middlesex-London. These brochures contained basic information about WNV, preventing mosquito breeding and protecting against mosquito bites. The Lyme Disease brochure was also distributed to increase awareness and educate the public about how to protect against tick bites and exposure in endemic areas.

Planning for 2011
The VBD Program will continue to utilize an Integrated Pest Management approach to reduce the risk of WNV, LD and EEE to humans. Public education remains important. The Canadian Centre for Mosquito Management will continue to be the mosquito control service provider, and Cosray Laboratories will remain the adult mosquito identification and viral testing service provider. The hiring of seasonal staff will be finalized by the end of March.

Conclusion
The identification of two WNV positive mosquito pools and five WNV positive birds in Middlesex-London indicates that there continues to be a risk of exposure to WNV in Middlesex-London. The positive EEE and LD activity throughout the province also provides evidence that these vector-borne diseases are in the bird, mosquito and tick populations, increasing the risk of human infection. In 2011, the VBD team will strive to mitigate the risk of these diseases by eliminating larval mosquito habitats and by implementing strategies to reduce the amplification of vector-borne diseases.

This report was prepared by Mr. David White, Manager, Environmental Health, and Mr. Jeremy Hogeveen, Coordinator, Vector-Borne Disease Program.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

This report addresses the following requirements of the Ontario Public Health Standards:
Section 7(c)(i) of the *Infectious Diseases Protocol* requiring the Board of Health to develop an integrated vector-borne management plan which shall be comprised of vector surveillance.
Section 8 of the *Health Hazard Prevention and Management Standard* requiring the Board of Health to develop a local vector-borne management strategy based on surveillance data and emerging trends in accordance with the Infectious Diseases Protocol, 2009.

Vector-Borne Disease Report

West Nile Virus, Lyme Disease and Eastern Equine Encephalitis Surveillance and Control Activities for 2010

December 2010

BUREAU DE SANTÉ DE MIDDLESEX-LONDON HEALTH UNIT

Vector-Borne Disease Report

West Nile Virus, Lyme Disease and Eastern Equine Encephalitis Surveillance and Control Activities for 2010

December 2010

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Cite reference as: Middlesex-London Health Unit (2010).
Vector-Borne Disease Report: West Nile Virus, Lyme Disease and Eastern Equine Encephalitis Surveillance and Control Activities for 2010. London, Ontario: Middlesex-London Health Unit.

Acknowledgements

This Vector-Borne Disease report would not have been possible without the efforts and dedication of the Middlesex-London Health Unit (MLHU) 2010 Vector-Borne Disease (VBD) Team. Jeremy Hogeveen, Elizabeth Milne, Hugo Ortiz-Saavedra, Jim Reffle and David White edited this report, with contributions from Michele Brown, Brian Campbell, Kaitlyn Moor, Eleanor Paget, Amy Pavletic, Erica Pearson, Becky Pope and Natalie Viljevac.

The VBD Team would like to thank the VBD Stakeholders group, the City of London, including John Parsons, Jay Stanford and David Leckie, and the municipalities of Middlesex County, including Steve Evans. Special thanks to Berta Krichker and Shawna Milanovic for their Storm Water Management expertise and Tony Van Rossum and his summer staff for their larval surveillance of the City of London sewage plants. Additional thanks to Pud Hunter from the Ministry of Natural Resources and Geoff Cutten from the Ministry of Environment.

Thank-you to Dr. Graham Pollett, Dr. Bryna Warshawsky, Cathie Walker, John Millson and Melody Couvillon for their support and to Dan Flaherty and Trudy Sweetzir in Communications for their hard work and assistance throughout the 2010 season. Thanks to the Public Health Inspectors of the Middlesex-London Health Unit for their continued support and assistance. Thanks to Bernie Lueske for his assistance with data and spatial analysis, and thanks to staff from Information Technology as well. The VBD Team wishes to express gratitude to Paul and Ann Unrau at Cosray Laboratories, Randy Gadawski, Michael Alperyn, Gary Hazelton and the Canadian Centre for Mosquito Management staff for their efforts to ensure the continued success of the program. The MLHU would also like to recognize the assistance of Dr. Mark Neldor, Dr. Curtis Russell, Stacey Baker, Nina Jain-Sheehan, Lisa Fortuna from the Prevention and Control Section, Enteric, Zoonotic and Vector-Borne Diseases, of the Ministry of Health and Long-Term Care.

The work of the VBD Team would not have been made possible without the financial support of our funding partners, the City of London, Middlesex County, and the Province of Ontario, as well as the continued support of the Middlesex-London Board of Health.

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Executive Summary

This season the Middlesex-London Health Unit's (MLHU) Vector-Borne Disease (VBD) Program was focused on facilitating a comprehensive VBD program, monitoring for all vector-borne diseases of significance in Ontario, including West Nile Virus (WNV), Lyme Disease (LD) and Eastern Equine Encephalitis (EEE).

West Nile Virus is an arbovirus from the family Flaviviridae, and is transmitted to humans through the bite of an infected mosquito. The transmission cycle begins when mosquitoes bite an infected bird and then transmit WNV through a bird-mosquito-bird cycle, with mosquitoes playing the role of "primary vector" for the virus. Infected humans can develop symptoms anywhere from three to 15 days after being bitten; however, most people (80%) do not acquire enough of the virus in their bloodstream to make them ill. Twenty percent (20%) of those bitten will develop mild symptoms known as West Nile Fever. Severe cases will develop West Nile Encephalitis, a serious neurological condition causing acute inflammation of the brain which may cause tremors, disorientation, loss of consciousness, muscle weakness and/or paralysis. Approximately 3% to 15% of people with encephalitic symptoms will die from the infection.

Lyme Disease—caused by the *Borrelia burgdorferi* bacteria—is the most common tick-borne illness in North America, transmitted to humans through the bite of an infected *Ixodes scapularis*, commonly known as the blacklegged or deer tick. Middlesex-London is not an endemic region for this tick species; however, since blacklegged ticks often feed on migratory birds, they can easily be transported throughout the province. This year, the MLHU saw an increased number of tick submissions from the public and performed tick dragging based on these concerns, to determine the prevalence of LD-carrying ticks in Middlesex-London. In total, 43 ticks were submitted to the MLHU this season, two tick submissions were blacklegged ticks acquired outside of Middlesex-London, one of which tested positive for *Borrelia burgdorferi*. The LD-positive tick was acquired in Turkey Point, Ontario. This season there were also three confirmed human cases of Lyme Disease reported in Middlesex-London. Two cases were acquired from travel outside of Canada and one case was acquired from travel to eastern Ontario. In 2010, Lyme Disease also became a nationally reportable disease, which means that all medical professionals in Canada must now report confirmed cases of LD to the Public Health Agency of Canada.

Eastern Equine Encephalitis is an arbovirus in the *Alphavirus* genus, from the family Togaviridae and is transmitted through the bite of an infected mosquito. EEE circulates through a bird-mosquito-bird transmission cycle, with different mosquito species playing the role of "primary vector" within avian, animal and human populations. Although the incidence of EEE in Canada has historically been low, the 2009 and 2010 VBD surveillance seasons marked a significant spike in EEE activity, when more than one Province reported EEE for the first time. In 2009, Ontario, Quebec, and Nova Scotia reported positive EEE activity. This trend continued into 2010 as those same three provinces reported EEE activity once again. In Ontario, there were two EEE-positive mosquito pools and two equine cases confirmed this season. The presence of EEE vector species in Middlesex-London indicates that continued monitoring of adult vector species is necessary to identify the prevalence of these vectors and reduce the risk of EEE to local populations. Since many mosquito vectors which have the potential to carry and transmit WNV also have the potential to transmit EEE, the MLHU's VBD control program must continue to identify and control these species of concern. The VBD Team's field activities which include mosquito identification, control and viral testing of vector specimens, remains an important part of the program, reducing the number of EEE vectors within Middlesex-London.

Dead bird surveillance is used as an early indicator of local West Nile Virus activity. The MLHU continued to receive public reports of dead birds and performed preliminary testing for WNV through the use of RAMP technology in the Strathroy laboratory this season. In total, 13 dead bird submissions were tested for WNV, and five crows were confirmed positive for WNV. Maintaining the dead bird surveillance program allows the MLHU to provide advanced warning to residents regarding the presence of WNV in the community. This season, two of the WNV-positive crows allowed the MLHU to confirm the presence of WNV in North London. The crows were confirmed as being WNV-positive one week prior to an adult mosquito trap that was also found positive in the same area.

The surveillance and identification of mosquito larvae is also an important part of the MLHU's control strategy, as it prompts the treatment of sites containing WNV and/or EEE-vector species. Throughout the 2010 season the VBD Team identified 17,087 larvae, of which approximately 76% were vector species. The VBD Program also monitored OviPools, a process which involved the identification of mosquito eggs and larvae from gravid female mosquitoes to understand the ideal time of year and habitat conditions required for mosquito breeding.

The adult mosquito surveillance program offers valuable information to the MLHU, providing a greater understanding of disease transmission, population densities, species variation, and mosquito habitat preferences

Adult surveillance involves the use of terrestrial and canopy traps, through which the VBD Team collects, identifies and performs viral testing on adult mosquitoes with the assistance of Cosray Laboratories. This season, adult mosquito trapping within the City of London identified two WNV-positive mosquito pools. These positive pools were confirmed following the identification of two WNV-positive crows located within the same geographic area of London.

With the increasing number of LD-carrying tick populations, EEE-positive pools within Ontario and WNV activity within Middlesex-London this season, the MLHU has focused its attention on the human surveillance of these diseases. The objective of human surveillance is to understand the epidemiology of vector-borne diseases within human populations. West Nile Virus, LD, and the encephalitic symptoms caused by EEE are classified as both *Reportable Diseases* and *Communicable Diseases* under the *Health Protection and Promotion Act*. The number of reported cases of WNV related illness remained low at the local, provincial, and national levels once again this season. Within Middlesex-London, no positive human WNV or EEE cases were reported, however three LD-positive human cases were reported from residents who had acquired the disease from travel outside of Middlesex-London.

The control of vector mosquito populations is an important component of the VBD Program, reducing vector mosquito populations while remaining economically and environmentally sound. This season, the MLHU hired a new service provider, The Canadian Centre for Mosquito Management Inc. (CCMM), to assist with mosquito control in catch basins and standing water locations throughout Middlesex County. The MLHU and CCMM engaged in a coordinated effort to employ an Integrated Pest Management (IPM) approach; a decision-making process that includes planning, identification, monitoring, control and evaluation of the pest management strategy. The MLHU's control program is unique because mosquito specimens must be identified as vectors prior to treatment. This season, 827 treatments were performed at 227 sites monitored by the MLHU and CCMM. Treatment of municipal catch basins also remained part of the MLHU's control strategy once again this year. Approximately 35,000 catch basins were treated three times over the course of the season.

Surveillance of Middlesex-London's 12 Environmentally Sensitive Areas (ESAs) was performed once again this year. These areas were monitored from April 29, 2010 to October 7, 2010, and were visited a total of 282 times, an increase of 7% over the number of visits made in 2009. Westminster Ponds Zone 2 and Sunningdale Road Pond were the most frequently treated ESAs, with 13 treatments performed, and 12 treatments performed, respectively. Two VBD staff members were assigned to monitor and treat the ESAs for the duration of the season, covering roughly 300 hectares of land. Once again this season, 10 of the 12 sites designated as ESAs required treatment.

This season, the MLHU began a new research initiative and monitored weather trends in order to better understand the habitat preferences, generational longevity and climate-influenced development of mosquito larvae in Middlesex-London. The MLHU's Catch Basin Study monitored and identified mosquito larvae from eight catch basins in order to understand the composition of mosquito larvae in these structures and the generations of various species throughout the course of a season.

Once again, public education remained a vital component to the MLHU's Vector-Borne Disease Program. The MLHU distributed Lyme Disease brochures, attended several community events and developed a series of television and print advertisements to remind the public to wear insect repellents in an effort to prevent tick and mosquito bites. The VBD Stakeholders meeting was also held in June of this year, presenting findings from the 2009 season and outlining field initiatives for the upcoming 2010 season. The Stakeholders meeting was well received by all of its participants.

In an effort to draw conclusions from larval and adult mosquito surveillance data, the MLHU conducted a retrospective review of mosquito identifications from 2005 to 2010. This review summarized the most frequently identified species in both larval and adult stages. In total, 55 different species have been identified in the past six seasons, with vector species representing 77.4% of all larvae and adult mosquitoes identified.

The objectives of the VBD Program are to educate the public, reduce standing water, decrease larval mosquito habitats and ultimately eliminate the transmission and amplification of vector-borne diseases to humans. In an effort to maintain the goals of this program, the MLHU must continue to partner with local municipalities and city officials in order to develop effective source reduction strategies. The MLHU must also continue to participate in community events to educate the public on eliminating standing water and preventing tick and mosquito bites.

Chapter 1: West Nile Virus

1.1 Introduction

West Nile Virus (WNV) originated in the Ugandan province of West Nile in 1937. Since its introduction, outbreaks have occurred worldwide. The first WNV activity in North America was reported from New York City in 1999. West Nile activity in Canada was first reported in 2001. The first human cases in Ontario and, more specifically, Middlesex-London occurred in 2002, when 394 positive human infections were recorded across the province. Since the initial outbreak of WNV in Ontario, Health Units have established and maintained mosquito surveillance and control programs in order to monitor vector mosquito populations (**Appendix A**) and prevent the amplification of WNV to humans.

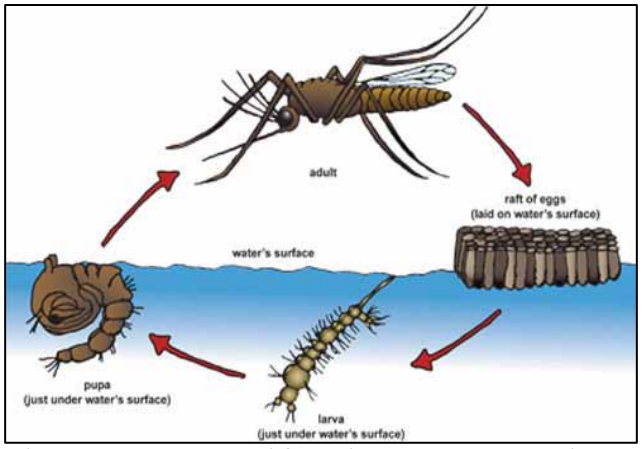

Figure 1-1: Mosquito life cycle. (Sacramento-Yolo Mosquito and Vector Control District, 2010)

1.2 Mosquito Life Cycle

There are four stages in a mosquito's life cycle: egg, larva, pupa and adult [**Figure 1-1**]. Females are the only mosquitoes that bite, as they require a blood meal to nourish their eggs. Most female mosquitoes do not live long after laying eggs; however, in some species, ovulation may be repeated several times before death. Female mosquitoes can lay as few as one or as many as several hundred eggs at a time. Some species lay eggs individually, and others lay multiple eggs that group together as a "raft". It can take as little as two days for the eggs to hatch and for larval and pupal stages to ensue, provided an ideal habitat is maintained. Combined, larval and pupal stages can last anywhere from four to 14 days; increased temperatures accelerate the progression from 1st instar larva to pupa. When adult mosquitoes emerge, they immediately seek refuge in dense vegetation. Mating usually occurs within the first few days of this adult stage. The length of a mosquito's life generally depends on temperature and the species' characteristics. For example, many species differ in their preferred blood source, habitat, ability to carry disease, and over-wintering strategies.

1.3 Transmission of West Nile Virus

West Nile Virus is an arbovirus from the family Flaviviridae. The transmission cycle begins when mosquitoes bite an infected bird and then transmit the virus through a bird-mosquito-bird cycle, with mosquitoes playing the role of "primary vector" for infection. This cycle of transmission is called "amplification". Transmission begins in early spring months and by mid-summer an influx of infected birds and mosquitoes can result from this cycle of amplification.

The over-wintering of certain mosquito species plays a large role in the amplification of WNV, as these species can jump-start a cycle of transmission. The cycle begins when mosquitoes emerge in early spring and begin to feed on birds. These species that feed on birds and mammals have the ability to transmit the virus to humans [**Figure 1-2**]. Birds are considered to be the "reservoir" hosts for WNV, while humans (and other mammals) can become incidental end hosts within the viral transmission cycle. (MOHLTC, 2003)

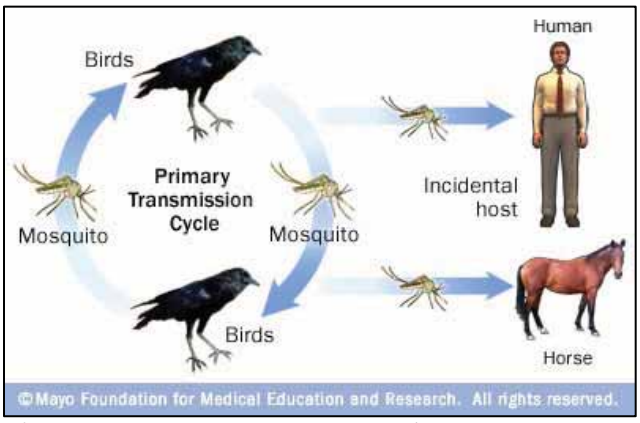

Figure 1-2: WNV transmission cycle.

1.4 Signs and Symptoms

Analysis of WNV has shown that humans will develop symptoms of the illness three to 15 days after being bitten by an infected mosquito. In North America, studies have shown that when bitten, most

people (80%) do not acquire enough of the virus in their bloodstream to make them ill. Twenty percent (20%) of those bitten will develop mild symptoms known as West Nile Fever, consisting of general symptoms of fever, headache, muscle aches, nausea, fatigue, rash and/or swollen glands. In some instances, those infected with WNV will develop encephalitis, a serious neurological condition causing acute inflammation of the brain. Severe encephalitis can cause tremors, disorientation, loss of consciousness, muscle weakness and/or paralysis. (MOHLTC, 2006)

Severe symptoms of encephalitis caused by WNV have been found to occur most frequently in adults over 50 and in those with chronic health issues due to a weakened immune system. Three (3%) to 15% of people with encephalitic symptoms will die from the infection. Studies indicate that those who survive often continue to experience long-term side effects of: fatigue, memory problems, muscle weakness, difficultly walking and/or depression. (MLHU, 2002)

1.5 West Nile Virus Related Activities in Middlesex- London

The Middlesex London Health Unit's (MLHU) Vector-Borne Disease (VBD) Program uses an Integrated Pest Management (IPM) approach to monitor larval and adult mosquito populations and decrease the threat of vector-borne illnesses to humans.

In order to reduce and repel mosquito populations, the VBD Program emphasises:

- Public education
- Adult mosquito trapping and viral testing
- Dead bird surveillance and WNV testing
- Regular surveillance of standing water and identification of mosquito larva
- Control of vector mosquito larvae
- Surveillance mapping of adult mosquito trap locations and larval dipping sites

Although WNV is the prevailing vector-borne disease of concern in Middlesex-London, the MLHU continues to monitor for other diseases that could affect local populations in future seasons.

Figure 1-3: The MLHU's 2010 VBD Team.

1.6 Vector-Borne Disease Program

The VBD Team [**Figure 1-3**] has actively monitored sites throughout Middlesex-London since 2002. This season, the Canadian Centre for Mosquito Management (CCMM) was contracted as the MLHU's licensed mosquito control partner. CCMM assisted the MLHU with treating catch basins and standing water throughout Middlesex-London.

Both CCMM staff and the MLHU's VBD Team obtained a Mosquito/Biting Fly Exterminator's licence prior to applying larvicide products. In preparation for the 2010 surveillance and control season, the team participated in a series of training sessions provided by CCMM and an Ontario Pesticide Specialist from the University of Guelph. VBD staff training consisted of larval dipping and treatment demonstrations, combined with practical examinations to test the team's ability to understand the safe handling and application of biological pesticides. The VBD Team was also trained to use GPS mapping units so that standing water sites throughout Middlesex-London could be located effectively.

Chapter 2: Lyme Disease

2.1 Introduction

Lyme Disease (LD) is caused by the *Borrelia burgdorferi* bacteria, and has the ability to seriously affect both humans and animals. Lyme Disease is the most common tick-borne illness in North America, transmitted to humans through the bite of an infected tick. The vector species for transmitting LD is the *Ixodes scapularis*, commonly known as the blacklegged or deer tick. This species can also carry pathogens from other tick-borne diseases such as ehrlichiosis and babesiosis. Established blacklegged tick populations are most often found along the shores of Lake Erie, Lake Ontario and the St. Lawrence River, coinciding with migratory bird flight routes. Endemic locations with blacklegged ticks include Long Point, Turkey Point, Wainfleet Bog, Rondeau Provincial Park, Point Pelee National Park, Prince Edward Point National Wildlife Area and the St. Lawrence Islands National Park in the Thousand Islands region of eastern Ontario. It is difficult to establish precise boundaries of tick populations since the species continues to expand into neighbouring areas.

Since blacklegged ticks often feed on migratory birds, deer and other animals, they can easily be transported throughout the province. British Columbia, Manitoba and Nova Scotia have also reported LD activity in local tick populations. In the United States, LD-carrying ticks have been identified along the Atlantic seaboard and in Ohio, Minnesota and Washington. (MOHLTC, 2010)

2.2 Lyme Disease in Humans

Lyme Disease is transmitted to humans after an infected tick feeds on its host for at least 24 hours. It takes this period of time for the bacteria to transfer from the tick's salivary glands into the bloodstream of the host. Due to this delay, rapid detection and removal of ticks is essential in preventing LD.

Tick bites occur most often in the summer months, when ticks are in their nymphal stage (Stage 2). Ticks are most aggressive in this second stage of development and are small enough to go unnoticed therefore increasing the chances of completing a blood meal and transferring the LD-carrying bacteria to a host [**Figure 2-1**]. (MOHLTC, 2009)

Monitoring tick populations throughout Middlesex-London assists the Middlesex-London Health Unit (MLHU) in developing effective screening systems and educational campaigns, which may prevent the public from contracting Lyme Disease.

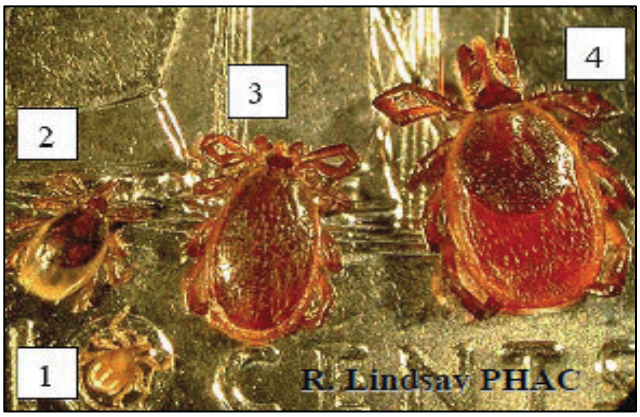

Figure 2-1: Life stages of the blacklegged tick**.**

2.3 Symptoms and Treatment

Symptoms of LD usually occur within one to two weeks of infection; however, signs of the illness can occur as soon as three days or as late as one month after a tick bite. Early warning signs of LD include a "bull's eye" rash which circulates out from the centre of the bite [**Figure 2-2**], and general symptoms of fever, headache, muscle aches, joint pain and/or fatigue. Most cases of LD can be successfully treated with antibiotics; however, if left untreated, LD can seriously affect the joints, heart and nervous system, resulting in chronic health problems. (MOHLTC, 2009)

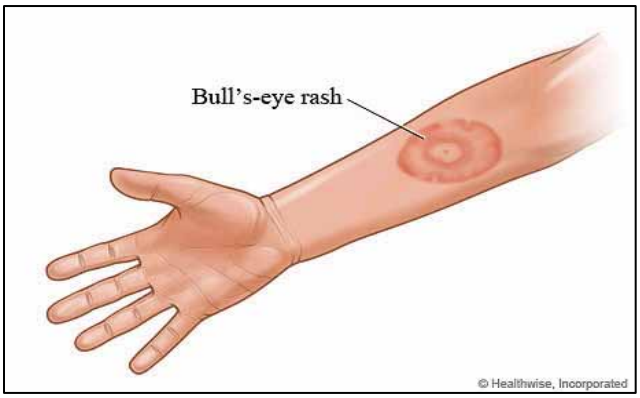

Figure 2-2: "Bull's-eye" rash circulating from tick bite.

2.4 Incidence of Lyme Disease

The most common tick-borne infection in the Northern hemisphere, Lyme Disease (LD) was first recorded in Canada in 1979, by a biologist who had been working in Long Point, Ontario; a known hot spot for blacklegged ticks. Although 1979 may be the first documented case of LD in Ontario, it is difficult

to establish a history of the disease since many early cases of LD have not been well documented in Canada. Lyme Disease has become important in recent years as provinces are seeing human cases and blacklegged ticks in higher numbers each season. Canada has reported approximately 150 cases in the last two years; roughly half of which have been travel-related cases. (Artsob, 2010)

Due to the recent incidence of cases along America's eastern seaboard, and an increasing number of blacklegged tick populations being observed across Canada, Lyme Disease is becoming an illness of increasing importance to local health units (Artsob, 2010). In response to these trends, as of 2010, Lyme Disease became a nationally reportable disease in Canada, which means that all medical professionals must report cases of LD to the Public Health Agency of Canada. Considering the number of endemic areas in Ontario and the influx of blacklegged tick populations in bordering regions, scientists believe that human LD cases will only worsen in coming years due to the influence of climate change and in effect, the migration patterns of birds. So far, the monitoring of LD cases and blacklegged ticks in Ontario has been effective in detecting the prevalence of LD. In order to reduce the risk of infection to humans, health units must continue to educate the public in order to protect against tick bites and understand the symptoms of LD following exposure to tick bites. (PHAC, 2010)

Province-wide, the incidence of LD increased from 53 confirmed cases in 2009 to 63 confirmed human cases in 2010. This season, Toronto reported the highest incidence of Lyme Disease with a total of 15 confirmed cases. Leeds, Grenville and Lanark District reported eight cases of LD and the City of Ottawa reported seven cases. The following Ontario public health units reported the remaining number of LD confirmed cases this season: Hastings and Prince Edward Counties (4), Niagara Region (4), Eastern Ontario (3), Halton Region (3), Simcoe Muskoka District (3), Durham Region (2), Kingston, Frontenac, Lennox & Addington (2), Peel Region (2), Renfrew County (2), Middlesex-London (3), Grey-Bruce (1), Haldimand-Norfolk (1), North Bay Parry Sound (1), Northwestern (1), and Windsor-Essex County (1). (MOHLTC, 2010)

2.5 Lyme Disease in Middlesex-London

The inclusion of LD to the Vector-Borne Disease Program in 2009 led to passive tick surveillance to determine the incidence of LD-carrying ticks in Middlesex-London. The MLHU also relies on public tick submissions to determine the presence of LD vectors within the community.

Figure 2-3: VBD staff member dragging for ticks in Westminster Ponds.

Figure 2-4: VBD staff member and Dr. Curtis Russell of the MOHLTC checking for ticks.

All submissions are identified in the MLHU's Strathroy laboratory, sent to the local public health laboratory in London for species confirmation and then to the National Microbiology Laboratory to determine if *Borrelia burgdorferi* is present in the tick sample. If a blacklegged tick is submitted and/or identified follow-up tick dragging is performed in the area of concern [**Figure 2-3** and **2-4**]. This season, the VBD team performed tick dragging seven times at five different locations throughout Middlesex-London. Two of these five locations were areas where residents had observed a high number of dog ticks.

In 2010, a total of 43 ticks were submitted to MLHU for testing. This is an increase from only 17 ticks submitted in 2009. Submissions were made from April 14, 2010 to August 23, 2010. Two of the submissions were identified as blacklegged ticks, *Ixodes scapularis*, and one of the blacklegged ticks was positive for *B. burgdorferi*.

Both ticks were acquired outside of Middlesex-London. The blacklegged tick testing negative for *B. burgdorferi* was acquired from New Hampshire and the tick testing positive was acquired from Turkey Point, a known endemic area for blacklegged tick populations.

This season, there were three confirmed human cases of Lyme Disease reported in Middlesex-London; all cases were travel-related. One of the cases was exposed to travel outside of Canada (Poland), one confirmed case was exposed to travel outside of Middlesex-London, but within Ontario (Prince Edward Point Park, near Picton, Ontario) and the other case was exposed from travel to the state of New Hampshire.

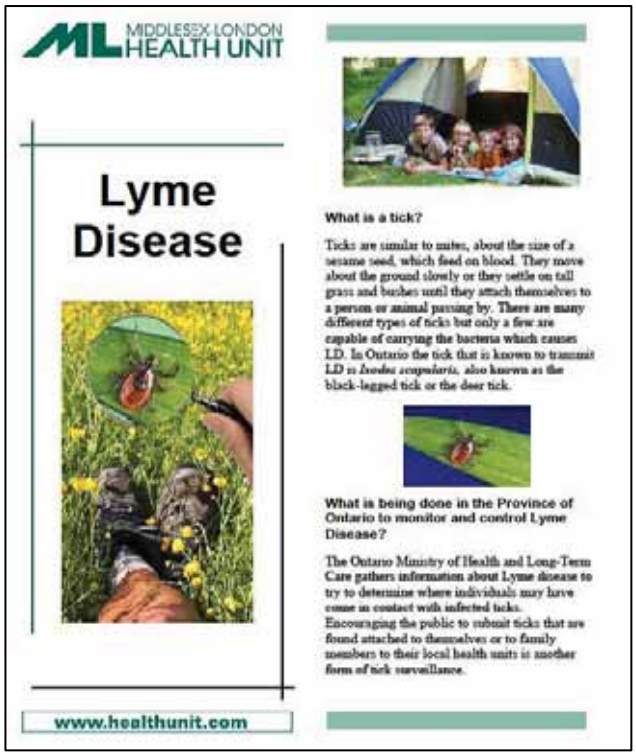

Figure 2-5: The MLHU's LD brochure.

2.6 Conclusions and Recommendations

In 2010, the VBD Team continued passive surveillance based on public submissions of ticks to the health unit and by dragging in areas in where a high number of ticks were observed. Within Middlesex-London, there were no LD vectors identified and no laboratory-confirmed human cases of Lyme Disease. Three residents of Middlesex-London contracted LD from travel outside the area. It is imperative that the MLHU continue to monitor for blacklegged ticks in order to educate and inform the public of the regional incidence of tick populations and LD-vectors.

Based on results of tick surveillance in 2010, the following recommendations have been made:

Although the incidence of LD-carrying ticks in Middlesex-London remains low, neighbouring regions of the province have been identified as endemic areas for blacklegged tick populations. Ticks are parasites that can migrate by way of host movement; therefore, birds, deer, and other potential hosts may carry ticks to neighbouring communities. If blacklegged ticks were to become endemic to Middlesex-London, the MLHU would take an active approach to monitoring for tick populations by means of regular tick surveillance including sample collection, species identification and LD testing.

This year, the MLHU created a Lyme Disease television commercial that ran on Rogers TV throughout the surveillance season. The VBD Team also developed an advertisement that is featured in the City of London's 2010 and 2011 garbage collection calendar, reminding residents to protect themselves with repellant while travelling to endemic areas during known biting seasons. With these advertisements, the MLHU hopes to protect the public against tick bites and encourage more people to call the health unit and submit ticks when they are found on humans.

The MLHU observed an increased number of tick submissions from 2009 to 2010. The MLHU hopes to increase the number of tick submissions in 2011 through greater public education. In 2010, the VBD Team distributed over 1500 Lyme Disease brochures [**Figure 2-5**], educating the public on endemic areas and encouraging submissions to the health unit. The MLHU should continue to develop informative material for the public in order to reduce their risk of tick bites when travelling to endemic areas.

Chapter 3: Eastern Equine Encephalitis

3.1 Introduction

Isolated in Canada for the first time in 1938, Eastern Equine Encephalitis (EEE) has a long history in both Quebec and Ontario, however in 2009, EEE was detected in Nova Scotia for the first time. This season saw similar trends, as EEE activity was once again identified in all three provinces. (AMCA, 2010)

Eastern Equine Encephalitis is classified as an alphavirus from the family Togaviridae. Eastern Equine Encephalitis most often circulates through a bird-mosquito-bird cycle of transmission, with *Culiseta melanura* as the primary vector for amplification within avian populations. *Coquillettidia perturbans* and species of the genus *Aedes* have been identified as the primary mosquito vectors for the transmission of EEE to animals and humans. *Ochlerotatus sollicitans, Anopholes crucians, Culex restuans,* and *Culex salinarius* have also been identified as vectors for EEE. All of these species have been continually identified throughout Middlesex-London. It is currently unknown how EEE overwinters in host species through the winter; it may endure in birds, mosquitoes or other mammals until it can once again emerge during temperate spring seasons. (CCWHC, 2000; Goddard, 2007)

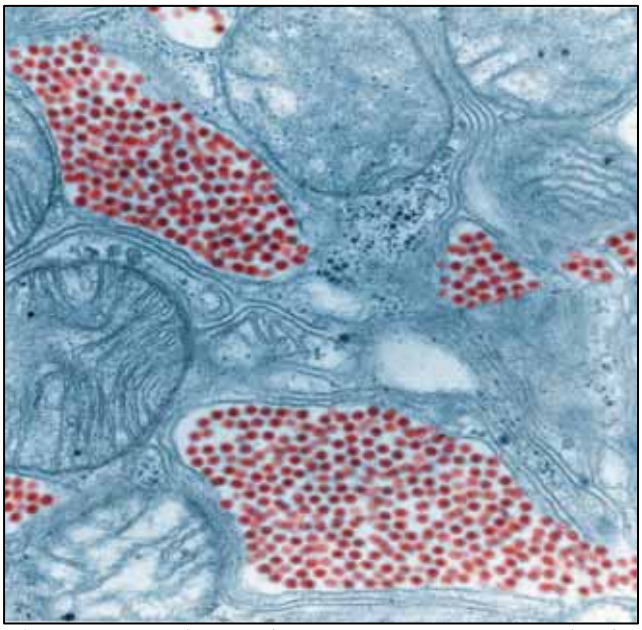

Figure 3-1: Colourized transmission micrograph of a salivary gland extracted from a mosquito infected with EEE virus (virus colourized in red). (PHIL, 2010)

3.2 Eastern Equine Encephalitis in Humans

In the past, EEE has predominately affected equine populations; however the presence of EEE-positive mosquito pools in recent years has increased the likelihood of human infection in Ontario. Human infection often involves severe symptoms of encephalitis including fever, headache and myalgia. Encephalitis occurs two to ten days from the onset of initial symptoms. Approximately five percent (5%) of humans who acquire EEE will develop severe symptoms of encephalitis, characterized by the abrupt onset of systemic illness. Signs and symptoms in encephalitic patients include fever, headache, irritability, restlessness, drowsiness, anorexia, vomiting, diarrhea, cyanosis, convulsions, and coma. There is a 70% to 90% mortality rate for those who develop encephalitic symptoms (AMCA, 2010, CDC, 2010).

Approximately one third (33%) of all people who acquire EEE will die from the disease. Of those who recover, many are left with disabling and progressive mental and physical side effects, which can include anything from minimal brain dysfunction to severe intellectual impairment, personality disorders, seizures, paralysis, and cranial nerve dysfunction. (CDC, 2010)

There are currently no anti-viral medications available to humans who become infected with EEE; however a seasonal vaccination for horses is available. In Canada, the incidence of human infection has been low in recent decades; however, within the past two years EEE activity has been confirmed in horses, emus, and several EEE-positive mosquito pools have been found in Ontario, Quebec and Nova Scotia. Several bordering American States have also experienced EEE outbreaks in the past two seasons. (AMCA, 2010)

3.3 Incidence of EEE

Within Middlesex-London there were no EEE-positive mosquito pools; however, adult mosquito trapping identified the presence several EEE-vector species. Of the 20,942 adult mosquitoes identified by Cosray Laboratories in 2010, 48% were vector species for EEE, compared to only 26% in 2009. The EEE-vectors identified in Middlesex-London include: *Cs. melanura, Cq. perturbans, Ae. vexans vexans, Cx. salinarius* and *Cx. restuans*. Cosray also performed viral testing for EEE on *Cs. melanura* collected from Middlesex-London. The results of these four viral tests for EEE were negative.

Province-wide, one EEE-positive mosquito pool was identified within the region serviced by the North Bay Parry Sound District Health Unit. Within the region serviced by the Simcoe-Muskoka District Health Unit, there was one EEE-positive mosquito pool and two confirmed equine cases of EEE. At a national level, Nova Scotia reported EEE-positive equine cases for the second straight season and Quebec has also reported increased EEE activity. (MOHLTC, 2010, AMCA, 2010)

In the past several years, the United States (U.S) has reported an increase in EEE cases as well. In 2010, Michigan reported three human cases and 130 equine cases, the highest numbers in that state in 30 years. Ohio reported four EEE-positive veterinary cases and New York State reported one human case, 66 EEE-positive mosquito pools and ten EEE-positive veterinary cases. (MOHLTC, 2010; USGS, 2010; AMCA, 2010)

Eastern Equine Encephalitis activity has been increasing in the U.S since 2000. From 1963 to 2009, the U.S has reported 40 outbreaks of EEE. An 'outbreak' is issued in the U.S when greater than six EEE-positive cases are identified in one calendar year. The years 2000 to 2006 were all outbreak years in the U.S and this number continues to increase into 2010. This season marked an outbreak year for the State of Michigan, which not only saw an increase in the number of EEE cases, but also an increase in the severity of its equine cases, as a majority resulted in death. Other areas reporting increased EEE activity also include Massachusetts, New York and Pennsylvania. (Mutebi, 2010, MOHLTC, 2010)

3.4 Conclusions and Recommendations

Since many mosquito vectors which have the potential to carry and transmit WNV also have the potential to transmit EEE, the MLHU's VBD control program must continue to identify and control these species of concern. Regular mosquito identification and viral testing remains an important aspect in controlling the number of EEE vectors within Middlesex-London. Since the number of EEE vector species has nearly doubled since 2009, it is important that the VBD Program maintain regular surveillance and control of these EEE vectors.

There were no confirmed cases of EEE in humans, or positive mosquito pools or horses within Middlesex-London this year. However, the presence of EEE vector species and increased viral activity south of the border indicates that continued viral testing of adult mosquitoes, in combination with monitoring and control programs, is necessary in order to understand and mitigate the risk of EEE to local populations in future seasons.

Figure 3-2: *Aedes vexans vexans*, EEE and WNV vector. (Babin, 2010)

Although there were no human cases of EEE reported in Ontario this year, the report of a single human case may signify that an outbreak is developing (ODH, 2009). Positive equine cases and positive mosquito pools throughout the 2010 season reveal that the virus is present in the province; therefore, the risk of human infection is possible. This information, coupled with the fact that the prognosis for those infected with EEE is poor due to the virulence of the disease, emphasises the importance of continued surveillance and control of EEE vector species.

It is important that the MLHU maintain working relationships with health units across the province as well as with local mosquito control organizations in bordering U.S States. Forging partnerships with local mosquito control and health organizations is necessary in order to develop uniform protocols and integrated prevention strategies against EEE.

Chapter 4: Dead Bird Surveillance

4.1 Introduction

Dead bird surveillance is utilised as an early indicator of local West Nile Virus (WNV) activity, allowing targeted risk reduction measures to decrease the transmission of WNV to humans. Despite the reduction in health unit dead bird surveillance, the Middlesex-London Health Unit (MLHU) has continued to receive public reports of dead birds, and has performed preliminary laboratory tests for WNV on a discretionary basis. Dead bird testing is performed in the MLHU's Strathroy laboratory using RAMP technology. When a positive bird was identified in the MLHU lab, specimens were forwarded to the Canadian Cooperative Wildlife Health Centre (CCWHC) for verification.

Table 4-1: Results and WNV infection rates of dead birds reported in Middlesex-London, 2006-2010.

Year	# of Sightings	# Submitted	# of Positive	Infection Rate
2006	318	10	7	70%
2007	274	25	2	8%
2008	107	7	1	14%
2009	64	4	1	25%
2010	71	13	5	38%

4.2 Results

Dead bird observations were reported to the MLHU either online or by phone beginning April 19, 2010. By the end of the 2010 season, a total of 71 dead birds had been observed in Middlesex-London (**Appendix B**). This is a 10% increase in the number of dead birds observed since 2009. Thirteen birds were submitted to the MLHU lab and tested using RAMP technology. A total of five crows tested positive for WNV in the Strathroy laboratory [**Table 4-1**]. The birds were then sent for confirmation and the positive results were verified by CCWHC.

The crows submitted by the MLHU were five of 368 birds submitted to the CCWHC from across Canada for WNV confirmation this year (PHAC, 2010). British Columbia submitted the most birds for testing this season, with 235 submissions, followed by Ontario with a total of 123 submissions, Saskatchewan submitted six, Manitoba submitted two and Quebec also submitted two birds for WNV confirmation. Twenty-one of the birds submitted to the CCWHC tested positive for WNV, 15 of which were from Ontario. (CCWHC, 2010)

Figure 4-1: American Crow. (CCWHC, 2010)

Although Ontario submitted the second largest proportion of dead birds to the CCWHC this season, they were not included in the three Canadian provinces which conducted active dead bird surveillance this season. British Columbia, Prince Edward Island and Nova Scotia actively monitored dead birds, while all other provinces maintained a passive avian surveillance system for the 2010 season. (CCWHC, 2010)

4.3 Discussion

Viral identification and accurate tracking of WNV-host species within a geographical area is often difficult due to the mobility and variability of avian populations. As the results of 2010's viral tests indicate, the overall reduction in dead bird submissions over the past few seasons may not be entirely indicative of the overall risk of WNV in Ontario. This season's trends indicate that WNV is still present within Middlesex-London and that public submissions are an important aspect of tracking and pin-pointing the geographic distribution of viral activity.

Dead bird submissions this season served as important warning signs that WNV was present in North London. Prior to the WNV-positive mosquito pool being identified in the Huron Conservation Area adult mosquito Trap M, two WNV-positive crows were submitted from the nearby locations. Within one week, one WNV-positive mosquito pool and two WNV-positive crows were identified from the same North London neighbourhood. This is significant because the birds served as an early warning that the virus

was present in a specific area of the community, prompting the MLHU to increase its surveillance and control efforts, as well as educating residents through media releases to protect themselves against mosquito bites.

Public education strategies have assisted with the submission and testing of avian specimens to determine the presence of WNV in the community. The MLHU's comprehensive education program has provided the public with contact information for the VBD Team and the Dead Bird Reporting Line. This allows the public to take an active role in the program by reporting dead crows and blue jays that are observed in Middlesex London.

Maintaining aspects of the dead bird surveillance program allows the MLHU to:

- Provide advanced warning to residents regarding the presence of WNV in the community.
- Strengthen knowledge and understanding of WNV trends, both geographical and temporal.
- Increase surveillance and control efforts in areas where WNV activity has been detected.

Increased viral activity in 2010 indicates that an avian surveillance program is still and important way to predict and track WNV within the community.

4.4 Conclusions and Recommendations

Continuing to accept calls, analyse submissions and perform WNV-testing on a discretionary basis can complement the multi-disciplinary approach of the MLHU's Vector-Borne Disease Program.

It is also essential that the MLHU maintain an effective education program to inform residents that dead bird submissions assist in monitoring the prevalence of WNV within the community. Promotional materials highlighting dead bird submission protocol and the VBD Team's contact information for the reporting line are helpful ways to keep the public involved in the MLHU’s efforts to reduce the transmission of West Nile Virus.

Figure 4-2: VBD Laboratory Technician performing a RAMP test for WNV on an American Crow.

Chapter 5: Larval Mosquito Surveillance

5.1 Introduction

The objective of larval surveillance is to monitor the density and species composition of larval mosquito populations present in Middlesex-London. In 2010, larval monitoring remained an important component of the Vector Borne Disease (VBD) Team's mosquito control program, initiating the treatment of sites containing vector mosquito species. The Middlesex-London Health Unit (MLHU) uses data collected from larval surveillance to implement an Integrated Pest Management (IPM) approach to control vector mosquito species. **Figure 5-1** displays Vector-Borne Disease (VBD) team members collecting mosquito larvae.

Figure 5-1: VBD team members collecting mosquito larvae.

5.2 Larval Identification Results

This season, larval monitoring began on March 8, 2010 (week 10). The mean temperature in these short-term pools caused by snowmelt was 3° Celsius. The first larvae collected were *Oc. stimulans*, *Oc. canadensis* and *Oc. excrucians*, found on March 19, 2010 (week 11). On April 30, 2010 (week 17), the first treatment of the season was performed in a woodland pool located in Strathroy. Treatment was initiated following the identification of 25 vector mosquito larvae. Throughout the 2010 season, a total of 17,087 mosquito larvae were identified, representing 21 different species. Vector mosquito species represented a total of 12,955 larvae identified (75.8%), with 4,132 (24.2%) as non-vectors. Week 29 has typically been the week with the highest density of vector mosquito larvae from 2005 to 2009. However, in 2010, week 34 possessed the highest density of vector mosquito larvae, with 77 treatments performed.

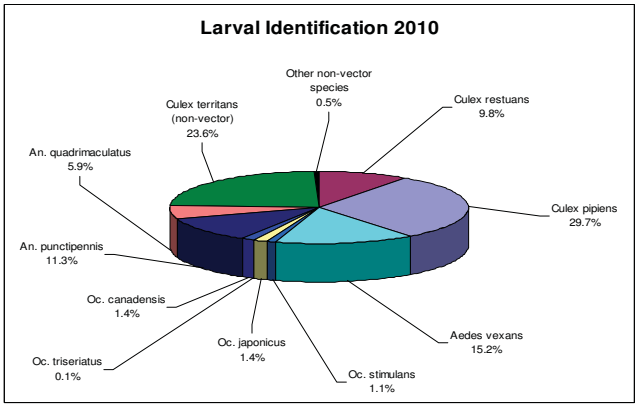

Figure 5-2: Larval Identification of WNV vectors and non-vectors, 2010.

5.3 Vector and Non-Vector Breakdown

Similar to previous years, C*x. pipiens* was the most abundant vector species, representing 29.7% of the total larvae identified. *Aedes vexans* was the second most abundant vector identified at 15.2%, followed by *An. punctipennis* (11.3%), *Cx. restuans* (9.7%) and *An. quadrimaculatus* (5.8%). *Ochlerotatus canadensis* (1.4%), *Oc. japonicus* (1.4%), and *Oc. stimulans* (1.05%) represented the lowest number of vector species. *Culex territans* was once again the most prevalent non-vector species this season, comprising 23.6% of the total larvae identified. **Figure 5-2** displays the composition of larval mosquito species identified in 2010.

5.4 OviPool Surveillance

In 2010, the MLHU continued OviPool monitoring as part of the larval surveillance program. This is a system of trapping and collecting mosquito eggs and larvae. OviPool analysis involves the identification of mosquito eggs and larvae from gravid female mosquitoes. The information obtained allows the MLHU to further understand the ideal time of year and habitat conditions for mosquito proliferation. OviPool surveillance began on June 7, 2010 (week 23). OviPools were set up at eight different sites; two sites located in London, and one site in each of the following communities: Strathroy, Glencoe, Parkhill, Dorchester, Arva, and Kilworth.

In total, 21,602 eggs were observed. Of this total, 20,162 (93%) eggs were *Ochlerotatus* species and 1,440 (7%) were *Culex* species. A total of 6,317 larvae were identified, representing seven different species. *Ochlerotatus japonicus* was the most abundant species representing 75% of all larvae identified, followed by *Culex restuans* (19%). The remaining

species included *Ochlerotatus triseriatus* (3%), *Culex pipiens* (3%), *Culex territans* (0.1%), *Anopheles punctipennis* (0.1%), and *Anopholes quadrimaculatus* (0.02%). **Figure 5-3** displays the composition of larval mosquito species identified in OviPools this season.

5.5 Discussion

Since 2002, the larval surveillance program has shown a significant increase in the variety of species identified throughout Middlesex-London. The variation of species has increased from only seven species represented in 2002, to over 25 different species identified by 2006. In 2010, approximately 21 different species were represented following identification of over 17,000 mosquito larvae. Compared to 2009, this season saw a 29% increase in the number of larvae identified. The number of larvae identified in 2010 is also significantly higher than larvae identified in the past five seasons, (up from 13,270 larvae in 2009; 7,262 larvae in 2008; 8,441 larvae in 2007 and 7,798 larvae in 2006).

Vector Discussion

Ochlerotatus stimulans and *Oc. canadensis* were the first larvae identified this season in mid-March. Although vector mosquito larvae were identified in March this year, larval counts and cooler temperatures in the month of April did not warrant a treatment until April 30, 2010. The most abundant vector mosquito larvae found in Middlesex-London this season were *Aedes vexans* (15.2%) and *Culex pipiens* (14.5%). Although *Culex* species have often been the focal point of larval surveillance and control programs, *Cx. restuans* only represented 9.7% of the total of larvae identified this season, a decrease from number of *Cx. restuans* represented in past five seasons.

Aedes vexans have increased in the past five seasons. *Aedes vexans* proliferate in grassy pools that border wooded areas. Virtually any temporary pools of water can support *Ae. vexans* larvae, however small pools of water in unshaded areas have been found to support the greatest abundance of this species. *Ae. vexans* have also been observed in partially shaded woodland pools and roadside ditches. Due to the abundance of this species, no special collection techniques are required in order to locate the species. In most cases, floodwater habitats will be dominated by this abundant mid-season mosquito. *Aedes vexans* are capable of carrying WNV and are also a secondary vector of Eastern Equine Encephalitis (EEE). Since this species has grown significantly in the past six seasons in Middlesex-London, it is imperative that the MLHU continue to monitor its population growth. (Wood *et al.* 1993)

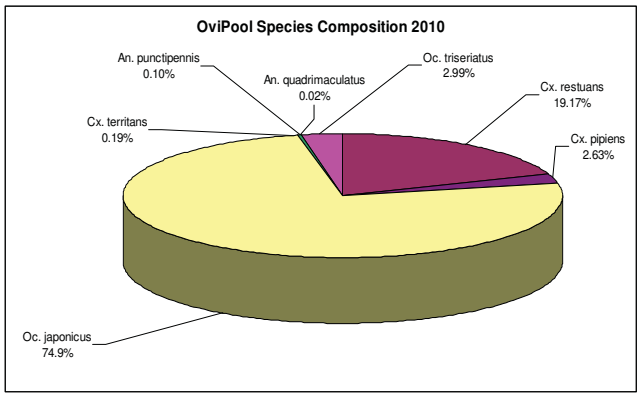

Figure 5-3: OviPool species composition 2010.

Ochlerotatus japonicus, another invasive species, continues to appear in increasing numbers throughout Middlesex-London. In 2010, a total of 4,971 larvae were identified, with the majority observed through OviPool monitoring. These larvae were also observed in various habitats such as field pools, storm water management facilities, ditches, and different artificial containers such as tires and pollution control plants. This season, one adult mosquito-pool composed of *Oc. japonicus*, tested positive for WNV. Special consideration should be given to this vector, as it is a highly competent WNV-vector and has been identified in Ontario in increasing numbers since 2001. The numbers of *Oc. japonicus* have increased significantly in Middlesex-London alone, making it an important WNV-vector to monitor in terms of range and viral activity in future mosquito seasons. (Cosray, 2010)

Culiseta melanura, the primary vector for EEE, was not observed in mosquito larvae collected from Middlesex-London this season. Due to its virus-carrying capabilities and recommendations from the Ministry of Health and Long Term Care, *Cs. melanura* continues to be closely monitored within the county.

The MLHU should also monitor for the presence of *Aedes albopictus* (Asian tiger) within Middlesex London. This is an aggressive mosquito species that has spread through the United States since it was first introduced to North America in 1985. This species has also been detected in States bordering Ontario including Ohio, Pennsylvania and New York. In 2001, two female Asian tiger mosquitoes were collected in the Niagara Region during WNV surveillance. *Aedes albopictus* is a known vector for a variety of diseases including Yellow Fever, Dengue Fever, and numerous types of encephalitis, including LaCrosse encephalitis, EEE, and WNV. The Asian tiger mosquito is currently the most invasive mosquito in the world.

Non-Vector Discussion

Although *Culex territans* are a non-vector in Ontario and Middlesex-London, they have tested positive for WNV in New York State, and therefore may become a species of concern to human health in future surveillance seasons. A total of 4,037 *Cx. territans* (23.6%) were identified in the 2010 season.

5.6 Conclusions and Recommendations

Monitoring mosquitoes in the larval stage is an integral part of the MLHU's VBD Program and has continued to improve since 2002. Vector species continue to dominate larval monitoring sites throughout Middlesex-London. Overall, *Culex pipiens* remained the most abundant vector species identified and *Aedes vexans*, *An. punctipennis, Cx. restuans,* and *An. quadrimaculatus* remain the most prevalent vector species identified throughout the seasons.

Based on larval surveillance and field observations in 2010, the following recommendations have been made:

Continue with earlier larval monitoring. With the increasing number of vector mosquito larvae identified in early spring months, the earlier monitoring of surface water should be continued.

It is recommended that the MLHU continue to use OviPools to track the generation periods of vector mosquito species. OviPools are an effective tool used to analyze mosquito population dynamics, as well as larval development areas conducive to specific species.

The MLHU should also consider the use of a new model of OviPool called the "Ovi-Tire". This is a device that would be used to evaluate the presence of Asian tiger mosquitoes, *Aedes albopictus*. The "Ovi-Tire" would assist in collecting and identifying the Asian tiger mosquito. The trap would consist of a regular vehicle tire, cut in half and tied at both ends with a wire forming a ring. The device would be hung on a tree one meter from the ground. Two OviPools and one Ovi-Tire would be in the same tree located in shaded areas protected from direct sunlight and from rain. About two liters of tap water would be required inside the tire in order to attract the mosquitoes to lay their eggs. This device would ultimately assist the MLHU in identifying the presence of the Asian tiger mosquito.

Chapter 6: Adult Mosquito Surveillance

6.1 Introduction

In order to carry out a well-rounded program, it is essential that the Vector-Borne Disease (VBD) Team monitor and trap adult mosquitoes to determine viral activity within the community, as well as understand disease transmission, study population densities and determine species variation and mosquito biting preferences within Middlesex-London. The information gathered from adult trapping allows the Middlesex-London Health Unit (MLHU) to asses the risk of vector-borne diseases and identify areas that require greater surveillance and control. Through the use of terrestrial and canopy traps, the MLHU performs adult trapping, identification and research with the assistance of Cosray Laboratories (Cosray).

6.2 Adult Mosquito Surveillance Activities in Middlesex-London

Trapping of adult mosquitoes began on June 2, 2010 and concluded on October 6, 2010. Fourteen terrestrial traps were set up and used to collect adult mosquitoes on a weekly basis at a total of 14 locations throughout Middlesex-London (**Appendix C**). These locations were chosen based on the geography, habitat and previous years' viral activities. Eight canopy traps were also distributed across Middlesex-London to study the variation and biting preferences of adult mosquitoes at different elevations.

In 2010, mosquito trapping followed the MLHU's standard procedures; collecting adult mosquitoes with battery-operated miniature light traps baited with carbon dioxide [**Figure 6-1**]. The weekly collection of mosquitoes began with the assembly of traps on Tuesday afternoons (traps set at four to six feet for terrestrial and 13 to 20 feet for canopy). The traps operated for the duration of one night (15 to 20 hours in total) and samples were collected the following morning, packaged and sent by courier to Cosray Laboratories for identification and viral testing. Weekly submissions from the MLHU for a total of 19 weeks allowed Cosray to identify and test vector mosquito species of concern. Following the testing, Cosray informed the MLHU of viral test and species identification results.

Figure 6-1: VBD Team member setting up Trap H, located in Parkhill.

This year, Cosray performed 944 viral tests for WNV on samples submitted by the MLHU. The most frequently tested species were *Culex pipiens/restuans*, *Aedes vexans vexans*[1] and *Ochlerotatus trivittatus*. Four specimens of *Culiseta melanura* were also collected and tested negative when subjected to Cosray's standardized test for Eastern Equine Encephalitis (EEE).

Two WNV-positive mosquito pools were identified by Cosray Labs this season. The first positive came from a terrestrial trap and was composed of *Ochlerotatus japonicus*, a relatively new species introduced to Ontario and a highly competent WNV-vector. Specimens of this mosquito appeared in much higher numbers this year in Middlesex-London compared to 2009, especially during a heat-wave in early July. The second positive pool came from a canopy trap and was composed of *Cx. pipiens/restuans*. These specimens were also collected in greater numbers this year, both on the ground and in the canopy. (Cosray, 2010) Viral testing and the vector status of each species is determined by the Ministry of Health and Long Term Care (MOHLTC) WNV-Testing Order of Preference. This Order rates species that are considered to be 'high-risk' vectors in Ontario by their ability to carry and transmit infection. The mosquitoes recognised as primary vectors, as outlined by the MOHLTC WNV-Testing Order of Preference are *Cx. pipiens/restuans, Cx. salinarius, Oc. japonicus and Ae. vexans vexans.*

[1] Note that Cosray Laboratories is able to identify mosquitoes to the sub-species level (e.g. *Aedes vexans vexans*); however, in subsequent chapters, species are identified by the MLHU to the species level (e.g. *Aedes vexans*). Therefore, the results described in this chapter may be further classified into subspecies since adult mosquito data was attained from Cosray.

6.3 Terrestrial Trap Surveillance

Of the 66,432 mosquitoes collected in 2010, Cosray identified 20,942 mosquitoes representing 28 different species. Ninety-two percent (92%) of the adult mosquitoes identified were vectors, and only 8% were non-vector. This is a significant increase from 2009, as only 20,857 mosquitoes were collected, and 14,431 mosquitoes were identified. This is an increase of approximately 68% more adult mosquito specimens collected in 2010 [**Table 6-1**].

The most abundant vector species this year were *Ae. vexans vexans* (44%) and *Oc. trivittatus* (24%). These are the same species that were most prevalent in 2009; however the number of these species represented in 2010 increased considerably. The number of *Oc. trivittatus* identified increased by 31% and *Ae. vexans vexans* increased by 62% *from* 2009 to 2010. An increased number of EEE-vector species was also observed this year. Approximately 48% of all mosquitoes identified in terrestrial traps this season were EEE vectors. This is an increase from only 26% in 2009.

Of the two WNV-positive mosquito pools identified in Middlesex-London in 2010, one pool of *Oc. japonicus*, collected from terrestrial Trap M, tested positive for WNV. The specimens were collected in London on August, 11, 2010 (week 32). In Ontario, 56 WNV-positive mosquito pools were identified this season. This is an increase from the 14 WNV-positive pools observed in 2009.

The greatest number of adult mosquitoes was collected from Trap H, located in Parkhill. Trap H collected a total of 36,133 mosquitoes. Cosray Laboratories identified 2,525 of these specimens; 66% representing vector species and 34% representing non-vectors. This location yielded the highest adult mosquito activity, contributing to 54% of the total number of adult mosquitoes collected in 2010. Interestingly, although Trap H yielded the greatest number of adult mosquitoes collected this season, it did not accumulate the greatest number of vector specimens, in comparison to other trap locations. For example, the second most populated trap, Trap F, located in London at the Upper Thames Conservation Area, yielded a total of 5,732 adult mosquitoes, of which 2,354 were identified representing 99% vector species and 1% non-vector species. In the third most populated trap, Trap M, located in London at the Huron Conservation Area, 5,535 adult mosquito specimens were collected and one WNV-positive mosquito pool was detected. Of the 1,789 mosquitoes identified in this trap, 96% were vectors and 4% were non-vectors. In comparing the number of vector species identified in the second and third most populated adult mosquito traps, it is evident that although Trap H yielded the greatest number of adult mosquitoes, it did not pose the greatest concern to human health, in comparison to other trap locations which collected a much higher percentage of vector specimens, and ultimately posed a greater threat to viral transmission and human health. **Table 6-2** represents a summary of the vector species identified from terrestrial traps in 2008, 2009 and 2010.

Table 6-1: Vector versus non-vector species collected from terrestrial traps 2008-2010

Total	Number Identified (2010)	Percent	Number Identified (2009)	Percent	Number Identified (2008)	Percent
Vector	19298	92%	13320	90%	15513	94%
Non-vector	1644	8%	1111	10%	934	6%
Total	**20942**	**100%**	**14431**	**100%**	**16447**	**100%**

Table 6-2: Vector species composition in terrestrial traps

Vector	Number Identified (Terrestrial)	Percent	Number Identified (Canopy)	Percent
Culex pipiens/restuans	1284	7%	481	14%
Aedes vexans vexans	8423	44%	728	21.1%
An. punctipennis	703	4%	62	2%
Cq. perturbans	1644	8.5%	766	22.3%
Culex salinarius	1	0.00%	-	-
Oc. stimulans	680	3.5%	39	1%
Oc. triseriatus	600	3%	51	1.5%
Oc. trivittatus	4718	24%	1116	32.4%
An. quadrimaculatus	239	1.2%	46	1.3%
Oc. canadensis	348	1.8%	103	3%
Oc. japonicus	656	3%	45	1.3%
Culiseta melanura	1	0.00%	3	0.1%
Oc. cantator	1	0.00%	-	-
Total	**19298**	**100%**	**3440**	**100%**

6.4 Canopy Trap Surveillance

Canopy trap surveillance is unique to the MLHU, as it is the only Health Unit in Ontario which integrates these traps as part of the adult mosquito surveillance program. The MLHU continued its canopy trap surveillance for the 2010 season, analysing the species composition and biting preferences of mosquitoes at various heights across the county. Samples were collected from eight canopy locations, which resulted in the collection of 5,457 mosquitoes, representing 21 different species. This is a significant increase from the 1,244 mosquitoes collected in 2009. Cosray Laboratories identified 4,358 mosquitoes from canopy traps this season, 79% of which were vector species.

Ochlerotatus trivittatus (32.4%) was the most abundant vector species identified in canopy traps, followed by *Coquillettidia perturbans* (22.3%), *Ae. vexans vexans* (21.1%) and *Culex pipiens/restuans* (14%), one pool of which tested positive for WNV in 2010. This indicates that certain vector mosquito species can be found at greater heights; a habitat well suited for amplifying WNV and/or EEE within avian populations. For example, *Cq. perturbans* and *Ae. vexans vexans* species, remained a dominant vector in canopy samples this season, which is significant because these species have been identified as primary vectors for amplifying EEE, therefore their presence in canopies identifies the increased possibility of transmitting EEE within avian populations.

Similar to the terrestrial Trap H, Canopy Trap 10 (Can 10), also located in Parkhill, yielded the greatest number of adult mosquitoes. Although Can 10 accumulated the most mosquito specimens this season, only 52% were identified as vector species. Compared to Can 2, the second most populated trap, which identified 98.5% of its specimens as vectors, and Can 7, the third most populated trap which identified 93% of its mosquitoes as vectors, Can 10 yielded one of the lowest counts of vector specimens in comparison to other trap locations.

6.5 Terrestrial Traps versus Canopy Traps

Results from 2010 indicate that both terrestrial and canopy traps identified similar quantities of vector species. Referencing **Table 6-3**, results indicate that *Ae. vexans vexans* and *Oc. trivittatus* were among the most abundant vectors in terrestrial and canopy traps this season. *Aedes vexans vexans* were the most abundant in terrestrial traps, and the third most abundant in canopy traps, and *Oc. trivitattus* was the most abundant in canopy traps and the second most abundant in terrestrial traps. This is a significant finding to observe similar species in both terrestrial and canopy conditions, as it contributes to the amplification of vector-borne diseases when species display a range of habitat and biting preferences. **Table 6-3** outlines the vector species identified in terrestrial and canopy traps in 2010. Overall, 25,300 adult mosquitoes were identified from both terrestrial and canopy traps this season. Of this total, 90.1% were vector species, capable of transmitting WNV and/or EEE.

Table 6-3: Vector species identified in 2010.

Vector	Number Identified (2010)	Percent	Number Identified (2009)	Percent	Number Identified (2008)	Percent
Culex pipiens/restuans	1284	7%	1137	9%	1254	8%
Aedes vexans vexans	8423	44%	3193	24%	2758	18%
An. punctipennis	703	4%	732	6%	476	3%
Cq. perturbans	1644	8.5%	557	4%	446	3%
Culex salinarius	1	0.00%	1	0.00%	1	0.00%
Oc. stimulans	680	3.5%	2152	16%	2196	14%
Oc. triseriatus	600	3%	258	2%	191	1%
Oc. trivittatus	4718	24%	3258	24%	7264	47%
An. quadrimaculatus	239	1.2%	121	1%	160	1%
An. walkeri	-	-	5	0.04%	-	-
Oc. canadensis	348	1.8%	1351	10%	472	3%
Oc. japonicus	656	3%	549	4%	294	2%
Culiseta melanura	1	0.00%	6	0.05%	1	0.00%
Oc. cantator	1	0.00%	-	-	-	-
Total	**19298**	**100%**	**13320**	**100%**	**15513**	**100%**

6.6 Conclusions and Recommendations

Adult Mosquito Surveillance Conclusions:

Adult mosquito surveillance yielded significant results this season as an influx of nearly 50,000 mosquitoes were collected from terrestrial and canopy traps. Heavy rainfall in early June and hot, humid conditions in July and August contributed to extending the life cycle of this season's mosquito populations. Adult mosquito surveillance provided a greater understanding of species variation and mosquito biting preference. Adult surveillance was also helpful in identifying viral activity within the community this season as adult mosquito testing identified two WNV-positive mosquito pools.

It is known that virus replication in mosquitoes increases with warmer temperatures, therefore the changes in weather observed this season accounted for the greater number of vector mosquitoes and viral activity in Middlesex-London. A warm, wet spring and increased mosquito breeding contributed to the increased vector mosquito presence in Middlesex-London this season. (Cosray, 2010)

Based on the data gathered from adult surveillance this season, the following conclusions have been made:

In 2010 an overall increase in mosquito activity was observed with a total of 71, 889 adult mosquitoes captured an increase of nearly 50,000 mosquitoes (68%) since 2009. This fluctuation in mosquito population density can be attributed to environmental factors, such as increased precipitation in the spring, which jumpstarted populations of invasive floodwater species, ultimately increasing the generational capacity of these species for the remainder of the season.

The jumpstarting of floodwater species allowed for a significant increase in the number of *Oc. trivittatus* and *Ae. vexans vexans* to be identified in both terrestrial and canopy traps. Nearly ten times the number of *Oc. trivittatus* were identified in the canopy this year (32.4%), compared to only 14% in 2009. More than double the amount of *Ae. vexans vexans* were identified in terrestrial traps this season, (44%), compared to only 24% in 2009. *Aedes vexans* also increased in canopies as well this year, from 18% in 2009, to 21.1% in 2010.

Vector populations of *Oc. japonicus* increased once again for the fifth straight season. Since their discovery, this species has been found in larger numbers and over a wider range in Southern Ontario. The number of *Oc. japonicus* collected this year in Middlesex-London increased by 20% on the ground and more than three times the amount were found in the canopy compared to 2009. One of the MLHU's positive pools was also composed of *Oc. japonicus* specimens, marking it as an important WNV-vector to monitor in terms of range and viral activity for future mosquito seasons. (Cosray, 2010)

There were no mosquito pools testing positive for EEE this year, however four specimens of *Culiseta melanura* were collected and tested negative for the virus.

Canopy Trap Conclusions:

This season once again saw an increase in the number of *Cx. pipiens/restuans* identified in canopy traps. In 2009, *Cx. pipiens/restuans* were the most numerous canopy species, comprising 36% of all canopy vectors trapped, however this season the vectors only comprised 14% of the total, but were still seen in greater numbers. Although *Cx. pipiens/restuans* were not the most abundant vector identified in canopy traps this season, their population still saw a 24.5% increase from 2009 to 2010. Data from previous years also confirms the dominance of *Culex* species in canopies throughout past seasons.

Representing the most predominant vector species in canopy traps this season were *Oc. trivittatus* (32.4%), *Cq. peturbans* (22.3%) and *Ae. vexans vexans* (21.1%). This is a notable change from the influx of *Culex* species which have previously been identified as the most abundant vector in canopy traps. Maximum temperatures in the month of July combined with an influx of floodwater species in June and July can account for the decrease in the dominance of *Cx. pipiens/restuans*. (Cosray, 2010)

Although the dominance of *Cx. pipiens/restuans* was lower this season in canopy traps, a pool of *Cx. pipiens/restuans* did test positive for WNV, indicating that although this vector was not the most abundant in canopies, they are still a highly competent vector, not to be overlooked in future surveillance seasons.

Continuing to collect and identify adult mosquitoes at varying heights is important in order to determine the frequency of vectors, their habitat ranges and how they may affect local human populations. The MLHU should continue to collect adult mosquitoes from areas that demonstrate high numbers of vector species which may pose a potential threat to human health in future surveillance seasons.

Chapter 7: Human Surveillance of Vector-Borne Diseases

7.1 Introduction

This season, the VBD Team continued to monitor tick and mosquito populations in an effort to reduce the potential risk of vector-borne diseases associated with mosquito and tick bites in Middlesex-London.

7.2 Objective of Human Surveillance

The objective of human surveillance is to understand the epidemiology of vector-borne diseases within the human population. The collection of epidemiological data, which includes the incidence, prevalence, source and cause of the infectious disease, assists in determining biological and environmental risk factors for acquiring the infection.

West Nile Virus, Lyme Disease, and the encephalitic symptoms caused by Eastern Equine Encephalitis are classified as *Reportable Diseases* and *Communicable Diseases* under the *Health Protection and Promotion Act*. Physicians are required to report suspected, probable, and confirmed cases to the local Medical Officer of Health, who then must report probable and confirmed human cases to the Infectious Diseases Branch of the Ontario Ministry of Health and Long-Term Care. (MOHLTC, 2010)

7.3 Human Surveillance of West Nile Virus

Using incidence data from mosquito, bird and human surveillance, risk assessments of local WNV trends can be used to develop comprehensive control efforts and awareness campaigns to protect human health from emerging vector-borne diseases in the community.

Human surveillance of reportable diseases such as WNV allows the MLHU to continually develop and update mitigation strategies to help aid in the reduction of vector-borne diseases. As WNV continues to pose a threat to residents, it is essential to track the cases on a year-to-year basis to understand the changing dynamics of WNV infection.

Background

The Public Health Agency of Canada's (PHAC) WNV case definition is used by healthcare providers to diagnose WNV in human populations. Case definitions are continually updated to reflect additional information concerning the signs and symptoms of the disease. West Nile Virus Infections are classified into three infection types: West Nile Virus Neurological Syndrome (WNNS), West Nile Virus Non-Neurological Syndrome (WN Non-NS), and West Nile Virus Asymptomatic Infection (WNAI). WNNS and WN Non-NS cases may be classified as suspect, probable, or confirmed, and WNAI cases as probable or confirmed.

Both clinical symptoms and laboratory findings based on blood work must be interpreted in order to reach a diagnosis, and specific criteria must be met in order to classify a case as suspect, probable, or confirmed. The clinical and laboratory criteria for diagnosis of WNV and case classification criteria based on the Ministry of Health and Long Term Care's (MOHLTC) *Infectious Disease Protocol, 2009* case definitions are outlined in **Appendix D**.

Methods

In the event of a human WNV diagnosis in Middlesex-London, the MLHU has infectious disease staff members who institute an investigation. Preliminary actions include the notification of the MOHLTC through the Integrated Public Health and Information System (iPHIS). A comprehensive assessment of the case's travel history, recent blood donation/transfusion history, symptoms, and results is conducted. Results of each investigation are forwarded to the MOHLTC where they once again review the blood donation history of the patient. Canadian Blood Services is also notified of human, mosquito, bird, and sometimes equine surveillance, which provide a more complete picture of the presence of WNV in a community.

Results

The number of reported cases of WNV-related illness remained low at the national and provincial levels for the second year in a row. This season, the MLHU did not report any probable or confirmed cases of WNV in humans. In 2009, Middlesex-London reported one probable case of WNNS whose illness was acquired locally.

In Ontario, the 2010 WNV human surveillance report identified one human case from the Durham Region Health Department. The national outcome for the 2010 season yielded a total of five confirmed WNV cases (PHAC, 2010). Four of these cases; Saskatchewan (2), Alberta (1) and British Columbia (1) were classified as West Nile Virus Non-Neurological Syndrome (WN Non-NS) and the case identified in Ontario was classified as West Nile Virus Neurological Syndrome (WNNS). The 2008, 2009 and 2010 seasons reveal a decline in the incidence of West-Nile Virus infections from 2007, which was the worst year for Canada with 2200 confirmed human cases.

The national outcome of human WNV cases in the USA yielded a more significant outcome in 2010. In total, 981 WNV human cases were reported by the CDC, with 41 deaths resulting from these cases. Most significant are the number of WNV human infections acquired in the states bordering Ontario. Michigan had 29 human cases and three deaths, Pennsylvania had 30 human cases, Ohio had five human cases and New York had 127 human cases and three deaths. These WNV human infections in areas just south of our border pose a significant concern for the MLHU, as the confirmation of WNV human cases indicates that viral activity is active in these regions, and can therefore be extended into Ontario at any time though travel and tourism, the migration of avian specimens, and/or though the displacement of mosquito vectors in artificial and shipping containers moving in and out of the country. (CDC, 2010)

Discussion

The epidemiology and risk assessment of WNV transmission in Ontario is facilitated through the evaluation of human trends. Although the number of reported WNV clinical cases has decreased across the country over the past three years, the risk of obtaining a WNV infection still exists. Many WNV infections go undetected, as 80% of cases are asymptomatic and 20% of cases result in flu-like symptoms. With less than 1% of those infected experiencing life-threatening symptoms, the number of clinically diagnosed infections of WNV may often go unreported.

This season WNV monitoring and surveillance indicated that the virus was present in the community, with the identification of two WNV-positive mosquito pools and the detection of West Nile Virus in five dead crows. The recognition of viral activity within the community is indicative of the need for continual monitoring and control of larval and adult mosquito species, reducing the associated risks for human WNV transmission.

Conclusions and Recommendations

Clinically diagnosed cases should not act as a trigger for mosquito control programs, as human infection typically occurs towards the end of a season once the virus has already amplified within avian and mosquito populations. Human surveillance is, however, important for understanding the epidemiology and clinical course of infection of the virus. A combination of human, mosquito, bird, and equine surveillance provides a thorough understanding of the presence of WNV in a community, serving to support the use of personal protection, public education campaigns, and additional control measures.

7.4 Human Surveillance of Lyme Disease

Background

Lyme Disease is caused by the bacterium *Borrelia burgdorferi,* transmitted through the bite of the *Ixodes scapularis* species, commonly known as the blacklegged or deer tick. LD can have serious symptoms; however, it is a bacterial infection, therefore, it may be treated by anti-biotics. Symptoms become increasingly worse if an infection remains undiagnosed and/or untreated.

The 3 Stages of a Lyme Disease Infection:

Not every person infected with LD experiences symptoms at each stage, and patients typically only experience the latter stages of infection if it remains untreated.

Stage 1: A circular, or "Bulls-Eye", rash called an *erythema migrans* (EM) is indicative of the initial infection. This occurs in approximately 70-80% of cases 3 days to 1 month after infection at the site of the bite. Flu-like symptoms may also be experienced.

Stage 2: This stage may last up to several months and include: central and peripheral nervous system disorders, multiple skin rashes, arthritis and arthritic symptoms, heart palpitations, and extreme fatigue and general weakness.

Stage 3: This stage may last several months to years, and include chronic arthritis and neurological symptoms or adverse fetal affects in pregnant women.

In order to diagnose Lyme Disease, a health care practitioner must first evaluate a patient's clinical symptoms and risk of exposure to infected ticks. A blood test may be ordered by a practitioner in order to detect the presence of antibodies for *Borrelia burgdorferi* by means of two IgM/IgG ELISA tests performed simultaneously.

(PHAC, 2006)

Results

There were 43 tick submissions from the public to the MLHU in 2010; two of these submissions were identified as *Ixodes scapularis*, known vector species for the LD causing bacterium, both of which were acquired outside of Middlesex-London. One of the blacklegged ticks was acquired in New Hampshire and the other was acquired in Turkey Point, Ontario.

This season there were three confirmed human Lyme Disease cases in Middlesex-London, all of which were travel related. One case was exposed from travel to Poland, one case was exposed from travel to Prince

Edward Point Park near Picton, Ontario, and one case was exposed to travel to the state of New Hampshire. Province-wide a total of 63 positive human LD cases was reported. (MOHLTC, 2010)

Discussion

Although Middlesex-London is not an area in which blacklegged tick populations are endemic, there are endemic areas within 100km of the region in Norfolk County and Windsor-Essex County. Therefore, it is essential that the MLHU continue to implement public education strategies that inform the public of preventative measures and recognizable symptoms in order to prevent and detect early signs of LD. Although the risk of acquiring Lyme Disease remains low in Middlesex-London, it is evident that one can acquire LD from an infected tick anywhere in Canada. This is because ticks can travel from region to region on migratory birds or mammals.

This season Lyme Disease became a nationally reportable disease. This means that all health care providers must now report confirmed cases of LD to the Public Health Agency of Canada (PHAC) through their provincial public health system. Now that LD is reportable, it gives the provinces and territories the ability to monitor and track cases and understand the epidemiology of the disease and its origins across the country.

7.5 Human Surveillance of Eastern Equine Encephalitis

Background

Eastern Equine Encephalitis is a viral infection that causes high mortality rates in humans; approximately 5% of EEE infections advance to include severe encephalitic symptoms and 70% to 90% of those who develop severe encephalitis die from the disease. Those who survive typically experience progressive mental and physical disabilities. (CDC, 2010)

Eastern Equine Encephalitis is a mosquito-borne disease that can be transmitted to humans through the *Coquillettidia perturbans, Culex salinarius* and *Aedes vexans vexans* species. *Culiseta melanura* have been identified as the mosquito vectors amplifying EEE within avian populations. Despite the identification of several EEE vector species, no mosquitoes tested positive for the virus, and there were no reported cases of EEE in horses or humans within the Middlesex-London communities this year. The presence of EEE vector species in larval and adult mosquito stages is significant though, and therefore warrants close surveillance in future seasons.The current risk of human infection in Middlesex-London is low, although positive mosquito pools and equine cases were reported in other regions of Ontario and several bordering American states. The presence of EEE in neighbouring regions supports the need for continual surveillance and analysis of vector mosquito populations in Middlesex-London. Public awareness of EEE is becoming increasingly important; the high rate of human mortality among those infected coupled with the confirmed presence of EEE within the province necessitates greater focus on developing and implementing public health strategies to reduce the risk of infection.

The PHAC has not published a nation-wide case definition for the diagnosis of EEE; however, the Centers for Disease Control and Prevention (CDC) in the United States (U.S) has published case definitions for Arboviral Encephalitides caused by any of the following virus agents: Eastern Equine Encephalitis (EEE), Western Equine Encephalitis (WEE), St. Louis encephalitis (SLE) and La Crosse (LAC) encephalitis which are transmitted by mosquitoes.

Discussion

Although there were no human cases of EEE reported in Ontario this year, the report of a single human case may signify that an outbreak is developing (ODH, 2009). Positive equine cases and positive mosquito pools throughout the 2010 season reveal that the virus is present in the province; therefore, the risk of human infection is possible. This information, coupled with the fact that the prognosis for those infected with EEE is poor due to the virulence of the disease, emphasises the importance of continued surveillance of EEE vector species. Public education strategies must be implemented to inform the public of measures to protect against mosquito bites, to eliminate mosquito breeding grounds, and information regarding EEE and its human health implications.

Chapter 8: Mosquito Control

8.1 Introduction

Controlling vector mosquito populations is an important component of West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE) management. The effective control of mosquito populations can help minimise the amplification of vector-borne diseases in nature, and can also help reduce the spread of infection to human populations. Controlling vector mosquito populations before they reach adult and/or biting stages of development has been a key component of the Middlesex-London Health Unit's (MLHU) Vector-Borne Disease Program. The objective of the MLHU's mosquito control program is to reduce vector mosquito populations while remaining economically and environmentally sound. Staff from both the MLHU and the Canadian Centre for Mosquito Management (CCMM) engaged in a coordinated effort to employ an Integrated Pest Management (IPM) approach. IPM is a decision-making process that includes: planning, identification, monitoring, control and evaluation of the pest management strategy (British Columbia Ministry of Agriculture and Lands, 2007). This process ensures that the MLHU is only controlling mosquitoes that have the potential to transmit vector-borne diseases and affect human health.

8.2 Products and Application

Both MLHU and CCMM staff involved in applying pesticides hold either a Pesticide Technician license or an Exterminator license, both of which are provincially regulated by the Ministry of the Environment (MOE) and issued in accordance with the *Pesticides Act* under the Pest Management Regulatory Agency of Canada (PMRA). The MLHU's Vector-Borne Disease Program continued to use larvicides that are applied directly to water; therefore, they are classified as "Restricted" by the Pest Management Regulatory Agency (PMRA) of Canada. The PMRA requires that restricted pesticides be applied by trained and licensed personnel.

Bacillus thuringiensis israelensis (*B.t.i.*) and *Bacillus sphaericus* (*B.s.*)

Bacillus thuringiensis israelensis (*B.t.i.*) and *Bacillus sphaericus* (*B.s.*) are both biologically safe organic pesticides utilised by the MLHU. Both *B.t.i.* and *B.s.* contain bacteria that create a lethal reaction with the alkaline environment in the digestive systems of mosquito larvae. While the modes of action of the two bacteria are similar, *B.t.i.* endures for approximately 48 hours, whereas *B.s.* can remain in a treated body of water for up to seven days.

Figure 8-1: MLHU staff member treating a ditch with VectoBac 200G.

AquaBac® 200G, VectoBac® 200G, and VectoBac® 1200L contain *B.t.i.* as the active ingredient; alternatively, Vectolex® products contain *B.s.* as the active ingredient. This season the MLHU and CCMM utilized products containing *B.t.i* for the treatment of standing water located in ditches, woodland pools, ponds and storm water management facilities. Although the MLHU chose to use *B.t.i.* this season, the MLHU's permits did allow for the use of *B.s.*, which may be utilised in future surveillance seasons if deemed necessary by the VBD Team and the Service Provider.

Methoprene

Catch basins are primarily treated with Altosid® pellets or briquettes, which are Methoprene products. Methoprene is an insect growth regulator; it works by disrupting the lifecycle of mosquitoes, preventing development beyond the larval stage. Laboratory tests reveal it is slightly toxic to fish, and can be toxic to some freshwater invertebrates; however, when used according to proper label directions, field research has shown low toxicity levels and no permanent adverse effects on non-target populations of amphibians and mammals, including humans (Health Canada, 2010). This season, CCMM utilized Altosid® products to treat vector mosquito populations located in catch basins and sewage lagoons within the City of London's Pollution Control Plants.

Table 8-1: Standing water sites treated 10 or more times throughout the 2010 season.

20 Treatments	Site Name	Component
HULON031	Jack Nash	Ditch
17 Treatments		
HULON030	Beaver Pond	Woodland Pool
HULON061	Pond Mills 1 SWMF	Pond
16 Treatments		
HULON002	Frog pond, Storybook Gardens	Pond
HULON005	Crestwood SWMF-F	SWMF-F
HULON062	Pond Mills SWMF-F	SWMF-F
15 Treatments		
HULON069	Brunswick Ave.	Woodland Pool
14 Treatments		
HULON027	Applegate SWMF-C	SWMF-C
HULON059	South River SWMF-F	SWMF-F
13 Treatments		
HULON012	Longwoods Road Ditch	Ditch
HULON013	Applegate SWMF-C	SWMF-C
HULON050	Killaly 1 SWMF-F	SWMF-F
HULONESA04	Westminster Ponds (Zone 2)	Woodland Pool
12 Treatments		
HULON004	Southwest Optimist Park	Ditch
HULON007	Button Bush Swamp	Woodland Pool
HULON032	Corlon SWMF-F	SWMF-F
HULON037	Sunningdale Road pond	Pond
HUSC011	Thornhead SWMF	SWMF-F
HUTC002	Mill Pond (Dorchester)	Woodland Pool
11 Treatments		
HULON014	Applegate SWMF-F	SWMF-F
HULON018	North Lambeth SWMF-F	SWMF-F
HULON049	Stoney Creek Valley Park	Woodland Pool
10 Treatments		
HULON001	800 Springbank Drive	Pond
HULON017	North Lambeth SWMF-C	SWMF-C
HULON054	Mornington Pond SWMF	SWMF-F
HULONESA05	Westminster Ponds Zone	Woodland Pool
HUSWM008	Dundonald Road (Glencoe)	Ditch

8.3 Standing Water Treatments

This season, 364.6 hectares (ha) of surface water was identified and monitored as potential breeding grounds for vector mosquito populations. These sites were surveyed on a weekly basis and treatments were made when greater than seven vector mosquito larvae were identified. Throughout the 2010 season, 827 treatments were made at 227 of the sites monitored by both the MLHU and CCMM (**Appendix E**). These numbers indicate that 20% of monitoring visits included treatment, and that 63% of sites monitored by the MLHU were treated one or more times. Larvicide was applied to 13.31 ha of standing water located on public property. The scope of surface-water surveillance and control included the municipalities of Adelaide-Metcalfe, London, Lucan Biddulph, Middlesex Centre, Newbury, North Middlesex, Southwest Middlesex, Strathroy-Caradoc and Thames Center. The majority of treatments were made at sites located within the City of London. This can be attributed to the large number of storm water management facilities located within the City. The total area of surface water that required treatment decreased from 2009 by approximately 4.4 ha but the number of treatments increased by 117. This is due to the identification of new standing water sites, specifically an increase in storm water management facilities as London's urban neighbourhoods continue to develop.

Twenty-seven (27) standing water sites were treated ten or more times in 2010 [**Table 8-1**]. This is an increase from only 22 frequently treated sites in 2009. This increase in frequently treated sites also correlates with the overall increase in the total number of treatments and the identification of new sites added to the MLHU's surveillance and treatment schedule.

8.4 Canadian Centre for Mosquito Management Inc., (CCMM) Activities

Mapping

Standing water sites established as part of the mosquito surveillance schedule are mapped using Global Positioning System (GPS) coordinates. These coordinates represent the exact geographic locations of standing water sites. Coordinates are stored in the CCMM database, which is easily accessible to all members of the VBD Team. Standing water sites often exist a considerable distance from roadways or well-established paths; therefore, the specificity of GPS coordinates used to identify sites is helpful to VBD staff who are attempting to locate areas of standing water. This season CCMM assisted with the re-mapping of many sites located throughout Middlesex-London.

This information was helpful for both the MLHU and CCMM staff, allowing team members to easily locate standing water through the direction of GPS coordinates and detailed site descriptions.

Catch Basin Treatments

During the 2010 season, a 3-round approach to municipal catch basin larviciding was conducted at roadside catch basins using Altosid pellets. A calculated approach to catch basin treatments was taken in which the three treatment rounds were spaced out evenly in order to achieve mosquito control at the most crucial times for mosquito amplification throughout the season. Earlier phases of catch basin larviciding were deemed most crucial, as it was believed that a focus on reducing mosquito populations early in the season would slow the amplification of WNV. The last round of treatment was conducted in an effort to reduce the amount of overwintering mosquito populations. Throughout the 2010 season, 64.8 kg of Altosid® pellets and 20 VectoLex® pouches were used to treat roadside catch basins that had outflows into environmentally sensitive areas. In addition, 925 Altosid® XR Briquettes were applied to non-roadside catch-basins, including: catch basins located in rear yards of residential properties [85]; catch basins located in municipal green-spaces [260]; and catch basins located on sites such as government buildings, social housing units, and long-term care facilities [580]. These applications were generally made early in the season and were considerate of the extended period of residual activity associated with the briquette formulation. The 2010 Catch Basin Treatment flyer (**Appendix F**) describes catch basin treatment and includes the colour code used to indicate treatment count this season.

8.5 Pollution Control Plants

Pollution control plants (PCPs) were also regularly surveyed this season. In partnership with the City of London, CCMM gained access to PCP's, enabling them to monitor and treat any standing water located within PCPs, following larval identifications by MLHU staff in Strathroy. In total, seven PCPs were monitored and 30 treatments were made at these sites. CCMM staff applied 9.57 kg of Altosid Granules to 0.96 hectares of sewage lagoon located within PCPs this season.

8.6 Source Reduction

While the treatment of standing water with larvicide is effective at temporarily reducing larval mosquito populations, the elimination of standing water through source reduction has greater efficacy, as it results in permanent pest control.

The removal of standing water eliminates suitable environments for mosquitoes to lay eggs; therefore, their lifecycle is halted, and further proliferation is prevented. The removal of standing water sites requires collaboration between the MLHU and local municipalities. Weldon Park located in Arva required constant surveillance and control efforts in past years but following remediation in the spring of 2010, the amount of vector larvae and treatments decreased significantly. Continued collaboration with city and municipal partners is crucial in order to continue to reduce larval mosquito breeding habitats throughout Middlesex-London.

8.7 Adulticiding

Adulticiding is a method of control that reduces the adult mosquito population through the application of insecticides. The MLHU did not necessitate adulticiding as a component of the 2010 VBD control program this year. In the event that WNV and/or EEE posed significant risk to human health, and current control measures were not adequately preventing amplification of the virus, Dr. Graham Pollett, the Medical Officer of Health for Middlesex-London, would determine whether adulticiding was a necessary course of action for the MLHU to take. This decision would be based on the results of a local risk assessment.

A local risk assessment takes into account: monitoring data; the presence of WNV and or EEE in humans, birds and adult mosquitoes; and the efficacy of control methods already in place. (MOE, 2009)

The application of adulticides usually occurs between dusk and dawn, at which time mosquitoes are more active and honey bees are less active. The MOE requires that residents of neighbourhoods scheduled to undergo insecticide treatment receive notification 48 hours to seven days before application through a minimum of two media outlets. (MOE, 2009)

8.8 Conclusions and Recommendations

In order to improve the efficiency of the MLHU's mosquito control program, the following recommendations should be considered:

The MLHU's mosquito control program reduces the number of vector mosquito larvae on publicly-owned property in Middlesex-London. In 2010, the MLHU observed an increase in the number of treatments performed in comparison to 2009. The total area of surface water that required treatment was less than 2009, however, this season did require more treatments at more locations than previous years.

This increase in the amount of surface water locations that required control signifies the continuing need for a mosquito control program in Middlesex-London, as surface waters may not necessarily need to increase in order to see greater vector mosquito populations.

The MLHU recommends the permanent removal of standing water sites through source reduction, because it has the greatest efficacy, resulting in permanent pest control. In the event that a site cannot be permanently remediated, the MLHU will continue to monitor it and control vector mosquito populations.

The MLHU should continue the recording of pre- and post-treatment larval counts and collection of environmental data. The MLHU's current control program incorporates the recording of larval count and environmental data both pre- and post-treatment. This data allows for the evaluation of larvicide efficacy and the determination of trends related to the level of vegetation and organic matter. Without this data, the MLHU would be unable to evaluate the success of larvicide after treatments, the role that the environment plays on larval count and treatment efficacy, and changes in the environment following the use of larvicide.

Field training for both CCMM and MLHU employees should be consistent in order to increase the uniformity among the sampling, treatment, and surveillance skills of all those affiliated with the VBD Program. Due to the current monitoring process, and high level of employee independence, there is room for potential discrepancies due to differences in personal judgment. Consistent training among all seasonal employees will help to lessen these differences.

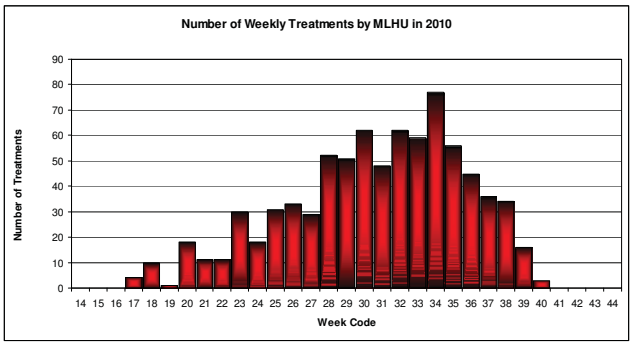

Figure 8-2: Number of treatments made by the MLHU.

The MLHU should continue to monitor surface waters from week 17 to week 40. As demonstrated by **Figure 8-2**, the current monitoring schedule includes the weeks of greatest larval presence. Therefore, the MLHU should maintain its current monitoring schedule, keeping control programs in place for the duration of these weeks, or until future surveillance data indicates otherwise.

Chapter 9: Storm Water Management Facilities

9.1 Introduction

Storm Water Management Facilities (SWMFs) are temporary retention ponds that house water during the final stages of storm water management. The process of managing storm water aims to direct urban rainfall and surface water runoff into a receiving body of water. This process helps to trap sediments, retain pollutants, and prevent erosion and downstream flooding when heavy precipitation overwhelms an urban area. SWMFs have the potential to become an ideal habitat for mosquito larvae, as they hold the water for a long period of time to induce further settling before release into a sewer system or a receiving body of water. Emergent vegetation found along the banks of SWMFs provides shelter from wind and predators, further protecting larvae throughout the stages of the mosquito life cycle.

In 2010, three new locations were added to the SWMF monitoring schedule. These new locations were South Wenige 2, Evans Blvd., and Adelaide North. South Wenige 1, Ilderton and Fanshawe Ridge North SWMFs were decommissioned and no longer monitored in 2010 due to new development in the area.

Each SWMF may be comprised of several components such as a forebay, cell, channel and/or plunge pool, therefore multiple sites can be present at each SWMF location. During the 2010 season, a total of 68 sites were visited at 39 different locations. A complete list of the SWMFs and their associated components that were surveyed during the 2010 season has been included in **Appendix G**.

Figure 9-1: VBD staff dipping for larvae at a SWMF.

Figure 9-2: Repton SWMF Outfall.

9.2 Results

Overall, 68 sites were monitored 1,486 times over a period of 21 weeks. During this time, 53 of these sites were considered productive, and 20,645 larvae were collected from these locations. This count is significantly higher than the 11,075 larvae observed in 2009. In total, 78% of all SWMFs bred larvae at least once over the course of the season, with 49% of sites requiring treatment five or more times.

This season, nine different species were recognised from 6,666 larvae identified in the Strathroy laboratory. Six of these nine species recognised in SWMFs were vector species. This species breakdown is outlined in **Figure 9-3**. The number of larvae identified in 2010 is 83% higher than the 3,641 larvae identified in 2009. Also, in 2009, only seven different species were identified in SWMFs.

This season, as in previous years, there were no more than three distinct species found at any SWMF site on any given visit, with the exception of one surveillance visit in week 33, when four distinct species of larvae were collected from the Jack Nash Forebay.

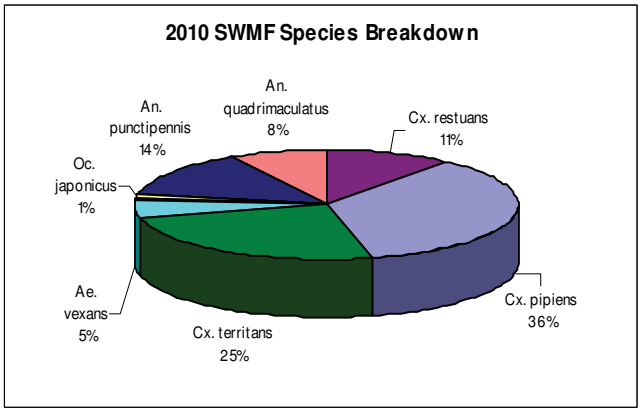

Figure 9-3: 2010 SWMF species identification breakdown.

Similar to previous years, the predominant species found in SWMFs were of the *Culex* genus. Throughout 2010, *Culex pipiens* were the most prevalent, and accounted for 36% of all species identified. *Culex territans*, the only non-vector species identified in SWMFs this season, accounted for 25% of all larvae identified.

Culex pipiens and *Culex restuans*, both established vectors of the West Nile Virus, accounted for 36% and 11%, respectively, of larvae identified from SWMFs. *Cx. territans*, the only non-vector identified in SWMFs this season decreased from 40% in 2009 to 25% in 2010. Similar to 2009, larvae belonging to the *Anopheles* genus were the second most prevalent, with *An. punctipennis* accounting for 14% and *An. quadrimaculatus* accounting for 8% of all larvae identified.

Seventy-five percent (75%) of all larvae identified were vector species, and 25% were non-vectors. The number of vector species observed in 2010 is higher than last season's vector species count, as only 60% of larvae were vectors in 2009. This increased percentage of vector species may be attributed to the overall increase in larval mosquito identifications from 2009 to 2010 (83%).

9.3 Treatments

Over the course of 21 weeks, SWMFs were treated 366 times, covering an area of 7.2 hectares. This was an increase from 215 treatments in 2009 and 183 treatments conducted in 2008. **Table 9-1** lists the sites that were treated five or more times. This season, Jack Nash was the most frequently treated SWMF requiring 20 treatments. Pond Mills was the second most frequently treated SWMF in 2010, coinciding with similar results from the 2009 and 2008 seasons, with over ten treatments performed in each component for the past three seasons.

VectoBac 200G® was the main larvicide used at SWMFs this season; with 71 kg used at an application rate of 9.8 kg/ha. This application rate is classified as 'high', and was chosen based on findings of higher larval counts and high levels of organic matter in the water. The number of treatments performed on the individual SWMFs was dependent on the number of larvae found, the temperature, and precipitation levels. The number of treatments steadily increased following the start of monitoring and treatment in early May. The highest number of treatments took place from weeks 32 to 35 (August 8th to August 28th).

The number of sites treated five or more times increased significantly this season from 17 frequently treated sites in 2009 to 28 frequently treated sites in 2010. In 2009, 17 SWMFs were treated five or more times and six sites were treated over ten times. In 2010, 28 sites were treated five or more times and 14 sites were treated over ten times. This is an increase from both 2008 and 2009 seasons, coinciding with the hot, humid weather and increased number of vector mosquito larvae observed this season.

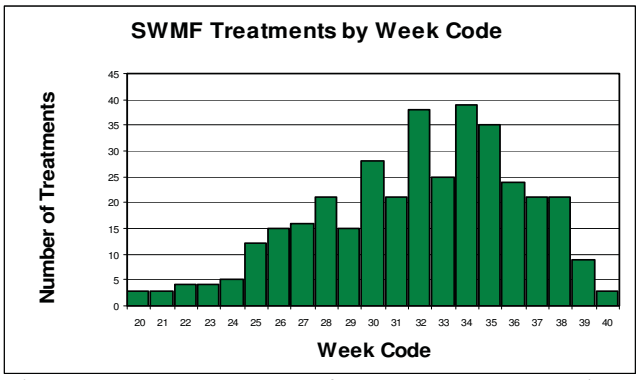

Figure 9-4: Frequency of treatments per week at SWMFs.

9.4 Discussion

Analysis of data from 2008 to 2010 reveals a correlation between the number of monitoring visits to SWMFs and the number of treatments made at SWMFs during any given season. While 2009 saw a 17% increase in treatments from 2008, there was also a 20% increase in the number of monitoring visits. A similar trend occurred in 2010, with a 71% increase in treatments and a 15% increase in monitoring visits. The significant increase in treatments can be attributed to the hot, humid temperatures experienced this season, combined with the naturalisation of SWMFs which bred significantly higher amounts of larvae than previous years, resulting in a higher number of vector mosquito larvae identified this season. Naturalisation is a maturation process that SWMFs go through as they develop vegetation along the water's edge. As a SWMF

becomes naturalised, it increases the viable habitat for mosquito larvae, often supporting a diverse range of species, and ultimately raising the likelihood of vector mosquito proliferation.

9.5 Conclusions and Recommendations

SWMFs should remain the primary area of focus for surveillance due to their natural capacity to favour mosquito larval growth. The monitoring of these sites is integral in the MLHU's effort to effectively control the breeding grounds for vector mosquitoes.

Following the analysis of surveillance and treatment activities at SWMFs in 2010, the following recommendations have been made:

The MLHU should continue to monitor and evaluate the maturity of Storm Water Management Facilities. In 2010, 39% of all larvae identified were found in SWMFs. As urbanized areas of Middlesex-London continue to expand, the number of SWMFs created through residential development will increase. In combination with hot, humid weather, the naturalisation of SWMFs will increase as the site matures.

The 2010 season demonstrated the increased production of vector mosquito larvae at SWMFs that had previously been rated as non-naturalised or semi-naturalised in past seasons. The maturity of these SWMFs created a more favourable habitat for larval mosquito production, as these sites had historically seen a lower number of mosquito larvae, coinciding with a classification of 'non-naturalised' or semi-naturalised'. As these sites matured, vegetation and organic content flourished, ultimately supporting increased larval production and accounting for the influx in larval identifications and treatments for the 2010 season.

The 2010 season also demonstrated that it is possible for existing SWMFs in areas undergoing expansion to be decommissioned, resulting in the redirection of water to a newly constructed SWMF. For example, in 2009, Forest Hill SWMF (approximately 2250m^2) was drained, filled, graded, and placed for sale for residential development, while a much larger SWMF was constructed nearby. This also occurred with the decommissioning of the South Wenige 1 SWMF at the end of the 2009 season and the construction of the South Wenige 2 SWMF in 2010 just across the street from the original South Wenige 1 location. While surveillance did not commence at this newly-constructed SWMF until June of 2010, it will continue to be monitored as the site matures to an ideal larval habitat.

The MLHU should maintain community partnership to resolve SWMF issues. Continued correspondence regarding new and decommissioned Storm Water Management Facilities is necessary in order to reduce and eliminate vector mosquito populations. Partnership with the City of London and local municipalities helps to ensure that the VBD Team is informed of new and decommissioned SWMFs, ultimately maintaining a thorough control program and more effectively monitoring vector mosquito populations.

Table 9-1: SWMFs treated five or more times.

Site Name	Component	Number of Treatments
Jack Nash	Forebay	20
Pond Mills	Channel	17
Pond Mills	Forebay	16
Crestwood	Forebay	16
Hunt Club	Cell	14
South River	Forebay	14
Applegate	Cell	13
Killaly 1	Forebay	13
Corlon	Forebay	12
Thornhead	Forebay	12
Applegate	Forebay	11
North Lambeth	Forebay	11
North Lambeth	Cell	10
Mornington	Forebay	10
White Oak	Forebay	9
Hunt Club	Forebay	9
Hamilton Road	Cell	8
Ilderton - Meredith Drive	Forebay	8
Commissioner's Road	Cell	7
Upland Hills	Forebay	7
Pinecourt	Forebay	7
Sam's Club	Cell	7
Mornington	Cell	6
Duncairn	Cell	6
South Wenige 2	Cell	5
Talbot Village	Forebay	5
Sam's Club	Forebay	5
White Oak	Cell	5

Chapter 10: Environmentally Sensitive Areas

10.1 Introduction

Characterised by their unique ecology, Environmentally Sensitive Areas (ESAs) contain a diversity of natural landscapes which are home to endangered plants, significant wildlife species and also a variety of forests and wetlands. This year, the Middlesex-London Health Unit (MLHU) continued to monitor these sites for vector mosquito larvae contained in ESAs. Environmentally Sensitive Areas located in Middlesex-London are predominantly found near urban, heavily populated areas that are frequently used for recreation during spring and summer seasons. As a result, continued surveillance and treatment of peripheral pools within the ESAs is essential in order to gather data, preserve vulnerable ecosystems, and reduce the risk of contracting mosquito-borne diseases.

10.2 Methods

In addition to larval surveillance and control procedures, which require the identification of vector mosquito larvae prior to treatment, ESAs also necessitate special permits from the Ministry of the Environment (MOE). Mapping of Middlesex-London's existing ESAs was initially performed in 2006. Following an extensive re-inspection of Westminster Ponds and Sifton Bog in 2009, previously concealed ponds were revealed, which remained part of the monitoring schedule for 2010. Due to the large volume of standing water to be monitored at these sites, two Vector-Borne Disease (VBD) staff were assigned to map the ESA boundaries and maintain larval surveillance and control for the duration of the 2010 season.

10.3 ESA Treatments

Treatments were performed in ESA's when surveillance and identification revealed moderate to high levels of vector mosquito larvae. A 'moderate to high' rating would require at least seven vector mosquito larvae to be identified in a sample in order to treat. Treatments of these pools occurred within 24 to 48 hours of larval identification. Monitoring of non-mosquito species also occurred before and after each treatment in order to observe any non-target mortalities which may have resulted from pesticide use. **Table 10-1** summarizes the number of treatments that occurred at each site designated as 'environmentally sensitive' throughout the 2010 season.

Figure 10-1: VBD staff dipping for larvae in Westminster Ponds ESA.

10.4 Species Composition

A total of 10,792 mosquito larvae were collected during ESA surveillance in 2010, and 2,110 larvae were identified in the Strathroy and London laboratories. *Culex territans* (43%) was the most abundant non-vector species identified within ESAs in 2010. *Aedes vexans* (15%), *Culex restuans* (12%), *Culex pipiens* (12%) and *Anopheles punctipennis* (8%) comprised the largest percentage of vector species found in ESAs this season.

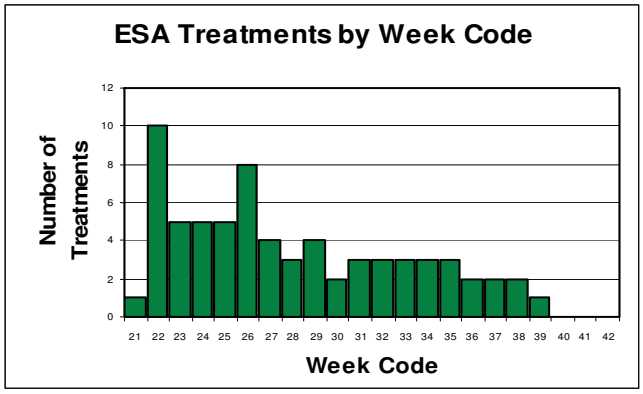

Figure 10-2: ESA treatment summary by week.

Table 10-1: ESA site descriptions and treatment count by zone.

Name	Description	Subsection	Treatments 2010	Treatments 2009	Treatments 2008	First Treatment	Last Treatment
Kilworth Pond	Near banks of Thames River just west of London. Varying size throughout the season.	N/A	6	8	9	May 20	August 19
Kilworth Treehouse	Low-lying area in woods along Thames River west of London. Floods early in the spring but dries up midseason.	N/A	0	1	0	N/A	N/A
Mill Pond, Strathroy	Swampy woodland pools near river. Remains wet throughout the season. Mainly the peripheral areas require treatment.	N/A	3	0	1	August 5	August 24
Sunningdale Pond	Shallow pond and marshy area. Dries up at various points throughout the season.	N/A	12	0	1	June 24	September 30
Sifton Bog	Canada's most southerly acidic bog. Consists of the bog wetlands as well as peripheral pools. MOE permits allow treatment of solely the peripheral pools, not the bog itself.	Zone 1	1	8	5	June 18	N/A
		Zone 2	7	11	5	June 4	July 15
Victoria St., Strathroy	Combination of several ponds, a marsh and a large woodlot that may fill with water following precipitation.	N/A	0	3	0	N/A	N/A
Westminster Ponds	250 Hectares of significant wetlands. The largest protected area in London, a combination of swamp and bog habitats.	Zone 1	5	8	3	June 4	July 30
		Zone 2	13	7	3	June 4	September 23
		Zone 3	10	8	1	June 11	August 31
		Zone 4	7	6	8	June 4	July 30
		Zone 5	2	4	2	June 4	July 23

10.5 Provincially Significant Wetlands

Westminster Ponds Overview

Westminster Ponds is the largest ESA located in London, spanning over 250 hectares of significant wetlands. Hot, humid conditions this season increased the breeding of vector mosquito larvae, thus triggering treatment in all five zones within Westminster Ponds. Treatments increased by 12% in 2010 and three of the five zones were treated more frequently than in 2008 and 2009 seasons. **Figure 10-3** demonstrates the composition of species which prompted treatments in the Westminster zones this season.

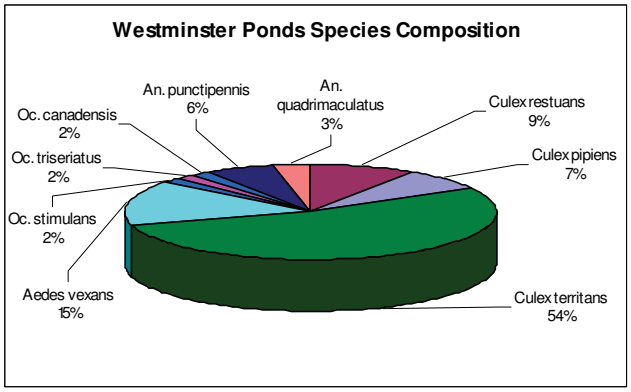

Figure 10-3: Westminster species composition.

Sifton Bog Overview

Compared to 2009, Sifton Bog experienced a considerable decline in the amount of standing water, contributing to the decreased larval count observed this season. In 2009, Sifton Bog was one of the most frequently treated ESAs due to its ability to retain water in peripheral pools for most of the season. The 40-hectare site is known to accumulate large amounts of standing water following rainfall and snow-melt since its original formation was the result of colonised glaciation. This season, drier than normal conditions caused many of the bog's peripheral pools to dry up, producing significantly fewer vector mosquito larvae, and a decreased number of treatments for the 2010 season. **Figure 10-4** illustrates the species composition that was observed at Sifton Bog this season.

10.6 Results and Discussion

Between April 29, 2010 and October 7, 2010, ESAs were visited a total of 282 times, an increase of 7% in the number of visits made to ESAs since 2009. These visits included a combination of regular larval surveillance and control as well as pre- and post-treatment dips.

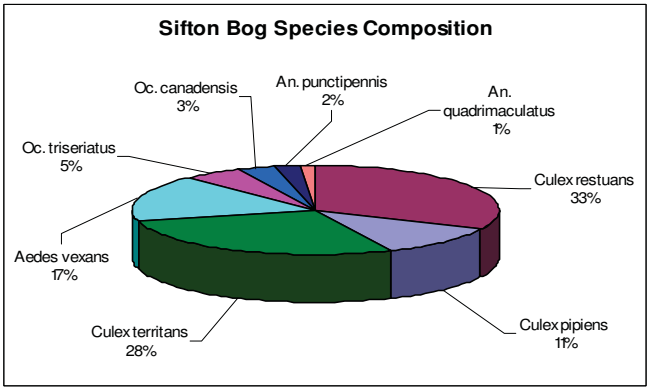

Figure 10-4: Sifton Bog species composition.

In 2010, 10 of 12 sites designated as ESAs required treatment and seven of 12 sites were treated five times or more (**Appendix H**). Westminster Ponds Zone 2 was the most frequently treated ESA (13 treatments), followed by Sunningdale Road Pond (12 treatments) and Westminster Ponds Zone 3 (10 treatments). In 2009, Sifton Bog Zone 2 was the most frequently treated ESA (11 treatments), followed closely by Sifton Bog Zone 1 and Westminster Zones 1 and 3, each with a total of eight treatments.

10.7 Conclusions and Recommendations

Environmentally Sensitive Areas play a crucial role in the proliferation of vector mosquitoes within the Middlesex-London area. These areas are ideal mosquito breeding grounds that are not only within close proximity to high risk populations, but are also located in areas where previous dead bird testing and adult mosquito surveillance has demonstrated the presence of West Nile viral activity.

Standing water pools within the ESAs varied in size throughout the season. Although Middlesex-London did experience a decrease in precipitation this season, the water that remained became concentrated, rich in leaf litter and organic content, thus creating an ideal breeding ground for vector mosquito larvae.

The results obtained from surveillance and control activities within ESAs have lead to the following recommendations:

Continue ongoing surveillance and treatment of ESAs. Since ESAs possess the ideal habitat for larval mosquito breeding, it is essential to continue surveillance and treatment within these areas in order to reduce the threat of transmission and amplification of known vector-borne diseases.

Chapter 11: Complaints, Comments, Concerns

11.1 Introduction

The Middlesex London Health Unit (MLHU) continued monitoring, recording and responding to all complaints, comments and concerns (CCC's) received from the public in 2010. All inquiries were handled by the VBD field technician and triaged to team members according to the location and degree of concern. In the event of a complaint, appropriate actions were taken to resolve and eliminate the site of concern. Complaints were received by phone, email or in person, and following a dialogue, the concern was documented in the MLHU's complaints database. In some cases, the assistance of local and municipal governments was required to aid the MLHU in resolving issues on public and/or private property.

11.2 Results

In 2010, the VBD Team received and responded to a total of 165 complaints (including dead bird and tick reporting). The number of CCC's reported in 2010 was significantly higher than the total of concerns received in 2009 [**Figure 11-1**]. An increase of 94 complaints from 2009 to 2010 indicates that the MLHU's public education campaigns and promotional brochures have been effective in encouraging residents to call and report any WNV or tick-related concerns.

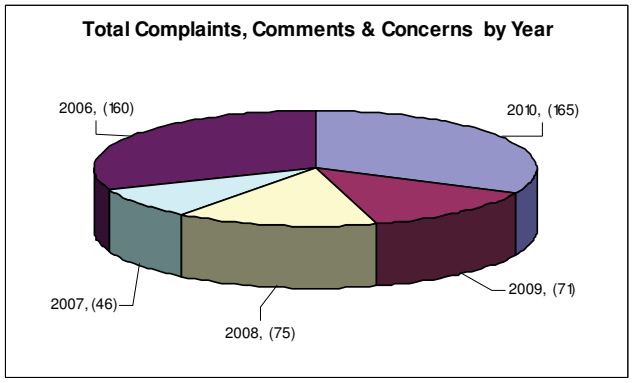

Figure 11-1: Total number of Complaints, Comments and Concerns by year.

11.3 Overview of Complaints

Dead bird reporting represented the greatest number of concerns, comprising 43% of all CCC's for the 2010 season. This was significant to the MLHU's CCC intake, as it identified five WNV-positive birds, which aided the public in being notified of the presence of WNV in the community.

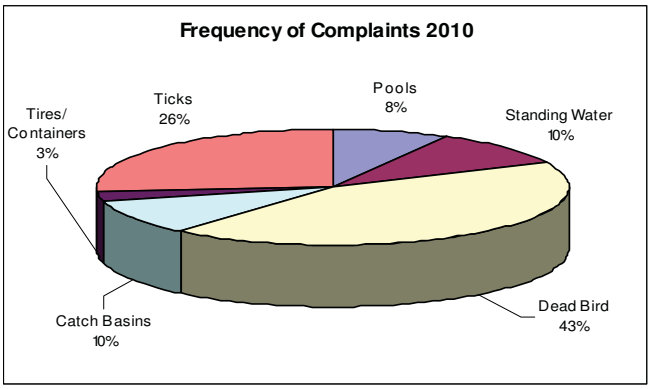

Figure 11-2: Frequency of complaints in 2010.

In 2009, standing water complaints represented the greatest concern comprising 54% of all CCCs. This season saw a significant decrease in the number of standing water concerns, from 54% in 2009 to 10% of all CCC's in 2010 [**Figure 11-2**]. This decrease can be attributed to the lower levels of precipitation in July and August, reducing the amount of water collecting on properties and in artificial containers. Such a significant decrease can also be credited to the MLHU's public education efforts, encouraging the public to reduce areas of standing water in and around the home in order to eliminate mosquito breeding and repel mosquito bites. Additionally, the increase in the number of tick submissions from 2009 to 2010 can be attributed to the efforts of the MLHU to inform the public of Lyme Disease (LD) and how to prevent and/or report tick bites to the health unit.

It is important to note that the number of catch basin concerns also increased from 2009 to 2010, by an increase of 54%. This number has increased each season since 2007 and can be attributed to two main factors. First, the MLHU hired a new service provider in 2010, The Canadian Centre for Mosquito Management Inc. (CCMM), who performed all catch basin treatments for the 2010 season. The MLHU naturally received an increased number of inquiries regarding the presence of a new service provider, as the public had been accustomed to a different service provider attending to their backyard catch basin in years previous. Second, the increase may be due to the growing awareness of the catch basin treatment program, which is discussed by local media at the beginning of each VBD season. Bringing awareness to the treatment of private catch basins has increased the call base since many residents are interested in having previously untreated catch basins added to the MLHU's catch basin surveillance schedule.

11.4 Discussion

The 2010 season represented an increase in the number of dead bird and tick-related concerns. An increase in this complaint type is significant because both areas require the submission of specimens and allow the MLHU to identify areas of viral activity and/or establish the presence of vector species in Middlesex-London. Another new trend observed in 2010 was the decrease in standing water related concerns. Due to less precipitation this season, the MLHU saw fewer concerns related to stagnant water on properties, in pools and other containers this season. An overall decrease in this area of public concern also supports the MLHU's belief that an enhanced education campaign can be effective in encouraging homeowners to identify and reduce possible areas for mosquito breeding in and around the home.

In 2008 and 2009, a substantial amount of rainfall accounted for the majority of complaints being related to standing water and swimming pool concerns. Increased precipitation, combined with cooler temperatures allowed water to collect and remain stagnant, therefore low-lying areas, artificial containers and pool covers remained an ideal breeding ground for mosquitoes. Differing from the past two seasons, 2010 saw lower levels of precipitation, combined with hot, humid temperatures, altering the nature of complaints this season. Hot, humid temperatures fostered greater viral production, as indicated by the presence of WNV-positive birds and mosquito pools this season, which in turn altered the type of complaints the MLHU received. With less standing water observed, and warmer temperatures experienced, the length of mosquito breeding was extended, therefore increasing the number of dead birds and ticks observed.

The MLHU also distributed a letter to various homeowners and neighbourhoods outlining what one can do with their unopened and unmaintained pools. This letter outlined the risks and dangers associated with stagnant water and provided homeowners with solutions and suggestions for eliminating possible mosquito breeding sites. These letters were distributed at the request of anonymous residents who had observed a high number of unopened pools in their neighbourhood. These letters were particularly significant in one London community; following the distribution of approximately 75 unopened pool letters and Reduce and Repel WNV brochures, many residents opened their swimming pools and/or eliminated the water. Residents also utilised control products (Mosquito Dunks®) in unopened pools. The goal of this letter was to educate homeowners on eliminating standing water in swimming pools and to encourage homeowners to initiate pool maintenance before water has the chance to collect, reducing vector mosquito larvae and pool complaints in the future.

Although source reduction and/or the opening and maintenance of a pool is the most effective method of mosquito control, the MLHU also found a new product to be effective in eliminating vector mosquito larvae this season. Mosquito Dunks® were a product that assisted the MLHU in resolving many standing water and unopened pool concerns this season, as a last resort. When a homeowner was unable to drain a pool and/or a pool cover, Mosquito Dunks® were recommended to eliminate the vector mosquito concern.

Mosquito Dunks® contain the biological larvicide, *Bacillus thuringiensis israelensis* (*B.t.i.*), which is the same ingredient found in the products used by the MLHU for seasonal mosquito larval control. This product eliminates mosquito larvae by applying one 'dunk' to the water. One 'dunk' lasts about one month; therefore with the purchase of one package, the homeowner is provided with six 'dunks', which would certainly last for the duration of the VBD season. In 2009, there were no commercial products available for residents to purchase at local stores to control mosquito larvae. The MLHU emphasised natural practices to eliminate standing water and mosquito breeding, such as changing water in bird baths every few days, drilling holes in outdoor toys and containers and circulating or pumping water in backyard ponds and pool covers. Due to the difficulty of monitoring the status of these practices, the MLHU could not verify if homeowners maintained these practices beyond the initial and follow-up visits of the complaint. The use of Mosquito Dunks® eased this process of eliminating larval mosquito breeding at complaint sites, as it provided a straightforward solution to eliminate mosquito larvae for approximately one month. Overall, Mosquito Dunks® were an important product used by the MLHU as a last resort to resolve several pool-related concerns this season.

11.5 Distribution of Complaints

The VBD Team's public education campaign encourages local residents to identify and report standing water concerns regarding mosquito breeding in order to better protect human health from vector-borne diseases. Upon review of (**Appendix I**), the VBD Team analysed the geographic distribution of complaints (excluding dead birds) and discovered that public concerns were evenly distributed throughout the City of London. This even distribution also suggests that the MLHU has done a thorough job educating the public and providing contact information for reporting. Public reporting of standing water concerns this year also helped the MLHU to identify and add four new sites to its surveillance schedule.

11.6 Community Partnership

The MLHU maintained a strong relationship with the City of London this season as the VBD Team worked closely with the Property Standards Department on several occasions to alleviate standing water issues. Upon the investigation of standing water concerns, if the MLHU identified any possible health and safety concerns not relating to vector-borne diseases, the information was forwarded to Property Standards. **Figure 11-3** illustrates one property that required the assistance of the Property Standards Division in order to resolve all aspects of concern and human health risk. The MLHU also collaborated with municipal and city officials to consult on the presence of vector mosquito populations at several sites of public concern this year. The VBD Coordinator and Laboratory Technician partnered with the MOE to conduct larval mosquito surveillance at areas of standing surface water at both the Pottersburg PCB site and the Orgaworld Waste Management site. The VBD Team also partnered with the Municipality of North Middlesex to conduct additional monitoring of adult and larval mosquito populations in Parkhill. Due to the large number of concerns, the VBD Team developed additional education materials and recommendations for homeowners for a course of action in order to reduce the vector mosquito populations. Collaboration with North Middlesex is still ongoing as residents of Parkhill still have many concerns regarding the high number of adult mosquitoes each year. The VBD Team will remain in contact with Parkhill and other municipalities in order to inform them of the number of vector mosquito species observed in the area and of the number of treatments performed in order to control those species that pose a threat to human health.

Following the MLHU's assistance with these vector-borne disease consultations and after participating in, and contributing to the success of several community events throughout Middlesex-London, the VBD Team received many thanks from local community partners. From London, Erin Latam of Southwestern Ontario's Make-A-Wish Foundation writes that they "...sincerely appreciate [the MLHU's] continued support", and Parkhill's Cardboard Boat Race Committee commented that the MLHU's, "community spirit and promotion of health play an important role in the success of this annual event!" [**Figure 11-4**]

The MLHU strives to collaborate with all community partners in order to better develop public education strategies and ultimately manage the transmission of vector-borne diseases throughout Middlesex-London. This season's regional activities and community collaborations are a great example of the VBD Team's dedication to health promotion, public education and commitment to the communities of Middlesex-London.

Figure 11-3: A private property with numerous health and safety concerns that the MLHU forwarded to property standards this season.

Figure 11-4: VBD staff member at Parkhill's Cardboard Boat Races.

11.7 Conclusions and Recommendations

Proven to be a valuable aspect of the VBD Program, the MLHU should continue to support and promote all public education and public awareness efforts put forward to protect against West Nile Virus, Eastern Equine Encephalitis and Lyme Disease. Continuing to educate the public on issues regarding vector-borne diseases is an important step in reducing the overall risk posed to residents in the Middlesex-London area. The MLHU should continue to forge stronger relationships with its partners, including local municipal governments and developers. Working closely with these groups may help to alleviate some of the time required to address complaints or reduce the number of complaints altogether.

Chapter 12: Weather Trends and Research Studies

12.1 Introduction

The Vector-Borne Disease (VBD) Team has established an annual review of weather trends and research activities in order to better understand the habitat preferences, generational longevity and the influence that climate has on the development of mosquito larvae.

12.2 2010 Weather Trends in Middlesex-London

This season the Middlesex-London Health Unit (MLHU) reported two West Nile Virus (WNV) positive mosquito pools, following three years of viral inactivity. Similarly, the province of Ontario also saw a dramatic increase in the number of WNV-positive mosquito pools represented from only 14 positive pools in 2009 to 56 positive pools in 2010. Since temperature and precipitation can have a great effect on mosquito abundance and viral replication, it is important to consider this summer's weather as a factor in this increased viral activity. Additionally, an increased number of mosquito breeding habitats can be supported by certain weather conditions, such as precipitation and humidity, creating ideal ecological environments for the proliferation of larval mosquito populations. (Cosray, 2010)

The relationship between weather and mosquito abundance can also be explained through the Accumulated Degree Day (ADD) model. External temperature plays a key role in the development rate of many organisms, including viruses. In the case of WNV, a certain amount of heat and time are required before the viral titre in an infected mosquito is high enough for human infection risk. The combination of time and temperature needed for an organism's development is expressed in units called degree days. The amount of heat required to raise the viral infectivity rate is taken as temperature measured above the threshold of 18 degrees Celsius. Degree Days are those with the mean temperature above 18 degrees Celsius. The ADD observed this summer in Middlesex-London was the highest in five years (three times higher than in 2009). This ADD model accounts for the stimulated viral replication and the MLHU's first positive mosquito pools since 2006. Ultimately, ADD can help explain the greater number of weather-sensitive and weather-accelerated mosquito populations observed this year. (Cosray, 2010)

12.3 Weather Trends and West Nile Virus

Meteorological monitoring is important in the study of vector-borne diseases, as many types of weather conditions can give way to outbreaks of mosquito related diseases. For example, after the outbreak of WNV in 1999, everyone was concerned with hot, dry climates and began to monitor these types of weather conditions to prepare for future outbreaks. Many were concerned that if similar environmental conditions were presented in subsequent seasons, another similar situation to that of 1999 would result once again. (Mutebi, 2010)

Traditionally hot, humid weather has been known to favour WNV viral production. Following the outbreak of WNV in 1999, meteorological data has been studied in detail in order to better predict and prepare for future outbreaks of vector-borne diseases. This season, with a decline in precipitation and extreme heat waves throughout July and August, the MLHU observed increased viral activity. West Nile Virus-positive mosquito pools and birds can be attributed to the warmer temperatures which amplified the spread of viral transmission throughout the City of London.

12.4 Weather Trends and Eastern Equine Encephalitis

As Eastern Equine Encephalitis (EEE) activity increases across North America, many have begun to monitor the environmental conditions that have been associated with this emerging vector-borne disease. (AMCA, 2010)

Rainfall has been highly associated with EEE, as significant correlations have been drawn between the occurrence of EEE-positive human cases and the excess of rainfall present at the time of these infections. EEE was associated with rainfall when more than 20 centimetres above average precipitation was observed for two years in Massachusetts, correlating with the outbreak of three human cases. (Mutebi, 2010)

It is imperative that the MLHU monitor and study weather trends in order to better predict the patterns and viral trends for future seasons. Although the MLHU did not experience above-average precipitation this season, a season that presents itself with greater rainfall may in turn increase the EEE-viral activity present in Middlesex-London.

12.5 Weather Trends and Larval Surveillance

This season larval monitoring began on March 8, 2010 (week 10). The average temperature in these short-term pools caused by snowmelt was 3° Celsius. For the past three seasons, the first day of larval monitoring has occurred earlier in March each year, and the temperature of these initial temporary pools has increased by several degrees each year. For example, larval monitoring did not begin until March 9 in 2009, and March 18 in 2008. The average temperature of snowmelt pools has increased by 5% in the past three seasons as well, warmer than average spring temperatures play an important role in larval production. A warmer spring this season, combined with heavy rainfall in early June jumpstarted this season's floodwater species *Ochlerotatus stimulans*, *Oc. canadensis* and *Oc. excrucians*, which were the first species found on March 19, 2010.

Unseasonably warm temperatures also play a significant role in larval proliferation. This season's hot, humid weather accelerated the life cycle of mosquito larvae, accounting for the increased number of larvae identified in 2010. Higher temperatures allow mosquitoes to reach biting age sooner and also speeds the multiplication of the virus (Kramer, 2010). The warmer temperatures that were observed this year exceeded those of the previous seasons, therefore mosquito and other pest populations seemed to be larger and more persistent than previous VBD seasons.

12.6 Weather Trends and Adult Mosquito Surveillance

Weather played a significant role in the results of the MLHU's adult mosquito surveillance this season. Not only did warmer temperatures and increased rainfall in June jump-start populations of *Ae. vexans* and *Oc. trivittatus* in the spring months, but maximum temperatures in the month of July (which were higher this year by more than 6°C) also accounted for an increase in the number of container species such as *Culex pipiens* and *Cx. restuans*. (Cosray, 2010) Additionally, a greater number of vector mosquitoes were observed this year, compared to previous years of adult mosquito surveillance. An early start to the WNV season due to a warm, wet spring and an influx of heat and humidity in July and August accounted for a greater number of vector mosquitoes and viral replication for the MLHU in 2010.

12.7 Weather Trends and Environmentally Sensitive Areas

Compared to 2009, Middlesex-London experienced a decline in precipitation during the hot, humid months of July and August. This affected the larval production in Environmentally Sensitive Areas (ESAs) by speeding the growth mosquitoes and extending the vector surveillance season. Compared to 2009, ESAs were monitored for an additional 4 weeks in 2010. In 2009 ESAs were monitored from May 8 to September 18. In 2010, ESAs were monitored from April 29 to October 7. An increase of 5,995 mosquito larvae were also observed in ESAs this season, compared to 2009. Twenty-five percent (25%) more larvae were identified in the 2010 season than in 2009 and the number of monitoring visits to ESAs in 2010 also increased by seven percent (7%) from 2009. These increases can be attributed to hot, humid temperatures which provided an ideal habitat for accelerated larval growth and viral production.

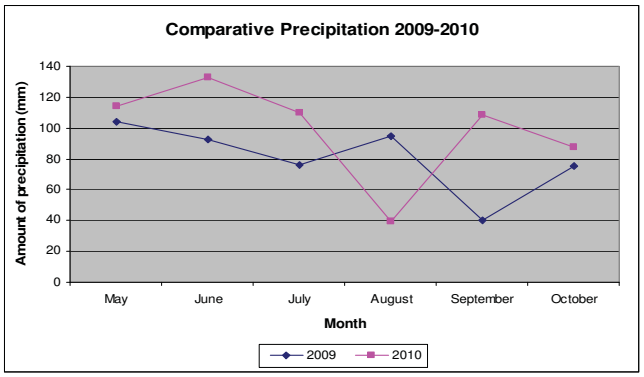

Figure 12-1: Comparison of 2009 and 2010 precipitation levels.

This season's weather trends also played a significant role in the changes observed in Sifton Bog. Although the Bog typically retains water for the duration of the vector surveillance season, due to the significant decrease in precipitation, very little standing water was retained; therefore the majority of breeding grounds, which have typically been quite active in previous seasons, became inactive [**Figure 12-1**]. If Middlesex-London were to see a summer with high levels of precipitation, Sifton Bog may once again retain greater amounts of water, activating mosquito larval growth and viral amplification.

12.8 Weather Trends and Storm Water Management Facilities

Decreased precipitation also played a significant role in the increased number of mosquito larvae observed in Storm Water Management Facilities (SWMFs) this season.

Normally a season with heavy rainfall and high levels of precipitation will flood storm sewers into storm water ponds, flushing larvae out of their habitat. This year, due to decreased rainfall, SWMFs were not flooded as frequently and therefore remained an undisrupted, ideal habitat for mosquito larvae.

12.9 Weather Trends and Seasonal Complaints

Although weather played a small role in affecting the nature of seasonal complaints this year, various climates can play a role in the type of complaints the MLHU receives throughout the course of the surveillance season. For example, standing water complaints often comprise the largest portion of all complaints received by the MLHU each season, however due to decreased levels of precipitation in 2010, standing water was not the most significant public concern this year. In a season that experiences high amounts of rainfall, the MLHU often receives a greater number of standing water concerns and stagnant swimming pool concerns as increased precipitation allows water to collect, becoming an ideal habitat for larval mosquito breeding.

12.10 Weather Trends and Mosquito Control

Weather often plays a significant role in the MLHU's control activities each year. There are several aspects of weather which may affect the MLHU's control program. First, if a season brings warmer temperatures, it can accelerate the life cycle of mosquito larvae, increasing vector mosquito populations and therefore increased treatments to standing water locations; whereas a season with cooler temperatures can extend the life cycle of certain larval mosquito species, therefore necessitating fewer treatments during a cooler season.

Mosquito larvae require certain amounts of precipitation to jump-start their life cycle in spring months and/or maintain their populations throughout summer months and into the fall. Weather also plays a significant role in viral production and hot, humid temperatures not only accelerate larval mosquito growth, but also viral amplification within mosquito and bird populations. As demonstrated by **Figure 12-2**, the increased temperatures in July and August accelerated larval production and ultimately increased the number of treatments performed.

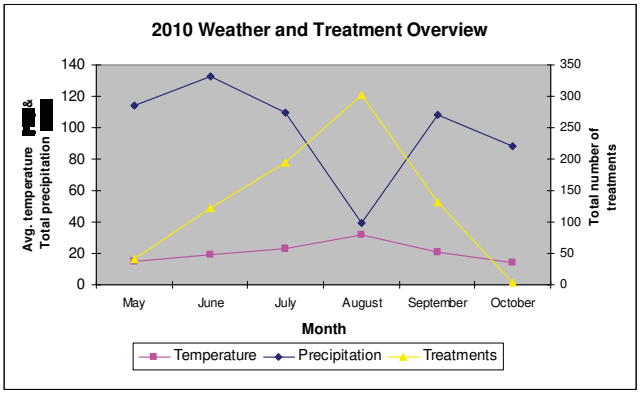

Figure 12-2: Comparison of 2010's temperature, precipitation levels and total number of treatments.

12.11 Weather Trends Conclusion

Due to the variability of weather throughout the seasons and the ability for vector mosquitoes to proliferate in certain environmental conditions, it is important to monitor the weather following each surveillance season in order to understand the conditions necessary for mosquito development and viral production. There are many different climates and conditions that favour larval mosquito production, therefore it is important to understand and review all of the conditions that may foster these ideal larval habitats. In order to better understand the conditions that foster mosquito growth, and prepare for future surveillance seasons, the MLHU must regularly monitor temperatures, precipitation and drought conditions.

12.12 Catch Basin Study

Catch basins are known to be ideal habitats for mosquitoes, especially *Culex pipiens* and *Cx. restuans*, because they provide a source of warm, shallow water, with low oxygen, suitable pH levels and high amounts of organic matter, creating ideal ecological environments for the proliferation of larval mosquito populations.

Since the Middlesex London Health Unit (MLHU) began it's Vector-Borne Disease (VBD) Program, all municipal and private catch basins have been mapped, monitored and treated each season, with the assistance of a contracted service provider. This season, The Canadian Centre for Mosquito Management Inc. (CCMM) assisted the VBD Team with catch basin monitoring. Due to the number of catch basins within the City of London and surrounding areas, service providers have only ever sampled for the presence of mosquito larvae in early spring, in order to initiate the first round of treatments.

Even though the presence of mosquito larvae has been monitored to initiate treatment rounds, there have never been any conclusions drawn from the distribution of specific larval species located in catch basins.

Through this study, the MLHU hopes to identify the species distribution of mosquito larvae in different geographic settings, tracking the generation periods and analyzing the presence of invasive mosquito species within catch basins. The VBD Team will monitor catch basins that are located in different parks possessing different environmental surroundings, in order to identify the composition of larval species and the generations of the various species throughout the seasons. Understanding the larval composition of municipal catch basins will assist in the development of new ideas and techniques for controlling larval mosquito populations in these structures.

12.13 Materials and Methods

For the duration of the 2010 season, eight catch basins located within the City of London were selected for the purpose of this study. All of the catch basins were chosen based on similar organic matter and vegetation levels. These catch basins are located at different parks throughout London and were not treated with biological larvicide; therefore, the chosen locations had a greater chance at having established larval mosquito populations.

The MLHU began monitoring for larvae in catch basins on May 17, 2010 (week 20), when temperatures began to increase; creating a viable habitat for the initial emergence of mosquito larvae. The study continued for the duration of the VBD surveillance season (weeks 21 through 39). Catch basins were monitored bi-weekly until September 27, 2010 (week 39).

Using a standard 350 millilitre (mL) long handled dip sampler [**Figure 12-3**], a total of five dips were conducted from different areas within each catch basin. The mosquito larvae were then counted, and the catch basin was given a low, moderate or high pool rating, depending on the amount of larvae collected from the five dips. A site was rated as "low" if the number of larvae collected was between one and six, "moderate" if between seven and 30 and a site was rated as “high” if the number of larvae collected was 31 or more. A rating of “nil” was assigned if no larvae were collected from the catch basin. All larvae collected were identified to the species level in the Strathroy laboratory.

Table 8-1: Catch basin sites selected for the study.

Address	Park Name	Area
27 Chalet Cr.	Scenic View Park	West
40-47 Quinella Dr.	Rosecliffe Park	Southwest
70 Riverside Dr.	Harris Park	Central
34 Locust Cr.	White Oaks Optimist Pk.	South
42 Danielle Cr.	East Optimist Park	East
1375 Clarke Rd.	Ted Early Sport Complex	Northeast
18 Repton Ave.	Virginia Park	North
1852 Aldersbrook Rd.	Jaycee Park	Northwest

Figure 12-3: VBD staff monitoring mosquito larvae in a catch basin at Rosecliffe Park in London.

12.14 A Retrospective Review

Previous studies done on larval mosquito composition in artificial containers and catch basins have indicated that *Culex restuans* and *Culex pipiens* are the mosquito species primarily found in catch basin structures. In 2003, a study conducted by the MLHU on roadside catch basins in London revealed similar findings. During this study, 4,127 larvae were collected, 74 larvae were identified and only three different species were represented; *Cx. restuans* (55%), *Cx. pipiens* (42%), and *Culex* non-vector species (3%). The MLHU's observations supported similar studies that identified *Cx. pipiens* and *Cx. restuans*, as "well-established" in catch basin environments. The MLHU's study also demonstrated a strong correlation between the level of bio-matter present in catch basins and the number of larvae observed in catch basins. High levels of larvae were observed in catch basins with high levels of bio-matter.

Since the initiation of larval mosquito surveillance in 2002, the MLHU has observed an increasing number invasive mosquito populations, indicating that certain species may survive longer than others, or develop specific generational longevity, enduring longer than

other species throughout a season, or producing several generations per season. Based on previous trends relating to the habitat preferences of certain mosquito species, the MLHU will investigate the possibility of generational dominance in larval mosquito populations through the monitoring, sampling and identification of larval mosquitoes housed in the catch basins identified for study.

12.15 Catch Basin Study Conclusions

Catch basin monitoring began on May 17, 2010. The first larvae were collected on June 21, 2010 (week 25), at a mean temperature of 21.2°C. The first larvae identified were *Cx. pipiens* and *Cx. restuans*. This season, the 8 catch basin sites selected for study were visited nine times and 782 larvae were collected. In total, 494 mosquito larvae were identified, representing five different vector mosquito species. *Culex pipiens* were the most abundant vector species, representing 65.4% of the total larvae identified. *Culex restuans* were the second most abundant vector identified, representing 32%, followed by *An. punctipennis* (1.0%), *Oc. japonicus* (1.0%), and *Aedes vexans* (0.6%) [**Figure 8-2**].

It also is important to note the presence of an organism observed in two catch basins where mosquito larvae were not observed this season. Small crustaceans were observed in each of the catch basins monitored at Rosecliffe Park and at White Oaks Optimistic Park. The small aquatic crustaceans were identified in the Strathroy laboratory as a type of water flea. Approximately 28 of these small crustaceans were found in catch basins throughout the season. The presence of this organism is a significant finding since the crustaceans were only found to be present when there were no mosquito larvae observed; therefore future catch basin studies should include the monitoring and identification of this organism, as it may be a natural predator of mosquito larvae.

The most abundant mosquito species, found in catch basins were *Cx. pipiens* and *Cx. restuans,* coinciding with previous studies and the habitat preferences of species of the genus *Culex.* However, differing from the results of previous studies, where *Cx. restuans* were found to be the most prevalent vector species found in catch basins, *Culex pipiens* represented 65.5% of the total larvae identified. In 2010, *Culex restuans* were the second most dominant vector species accounting for 32% of the total larvae identified. Although the remaining species represented a small percentage of the total larvae identified, it is important to note that for first time the presence of *Ochlerotatus japonicus* was observed in catch basin structures. This invasive species has been observed in other various habitats in the county and its presence has increased since 2006 in both larval and adult mosquito populations.

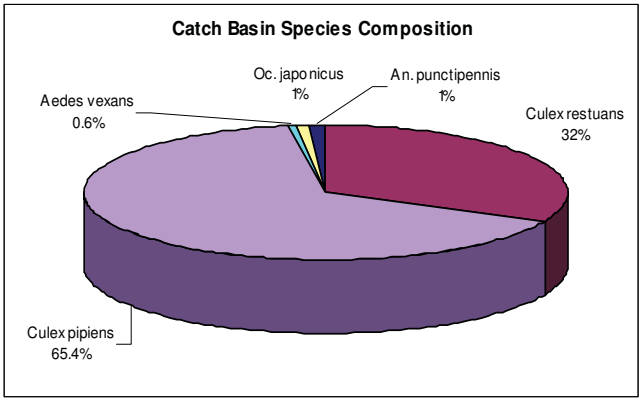

Figure 8-2: Catch basin species composition 2010.

12.16 Weather Trends and Research Studies Final Conclusions

Following the review and analysis of weather trends and research initiatives for the 2010 season, the following conclusions have been made:

This season the weather observed in Middlesex-London was hot and humid, which likely contributed to the increase in mosquito abundance and viral activity. Heavy rainfall and snowmelt this spring also jump-started populations of floodwater species in early June. It is recommended that the MLHU continue to monitor weather trends throughout the season in order to better predict and plan for the next season's surveillance and viral trends.

It is recommended that the MLHU continue monitoring selected catch basins throughout the 2011 season in order to track the generation periods, competition of different vector-mosquito species and analyze the presence of invasive larval mosquito species within these structures. It is also important to monitor the presence of additional organisms in catch basins, as these organisms have the potential to be a natural control agent for mosquito larvae.

Chapter 13: Public Education

13.1 Introduction

This season, the Vector-Borne Disease (VBD) Team continued its multifaceted approach to educating the public on West Nile Virus (WNV), Lyme Disease (LD) and Eastern Equine Encephalitis (EEE). Educational and promotional materials were distributed to stakeholders and the community at local events throughout the season. Advertising, informative brochures and participation in a range of community events were essential elements in the VBD Team's 2010 public education campaign [**Figure 13-1** and **13-2**].

Figure 13-1: WNV advertisement featured on a transit bus in London.

13.2 Printed Resources

To start the 2010 season, Reduce and Repel brochures were distributed to Doctors' offices, garden centres and municipalities throughout London and Middlesex County. 'Reduce and Repel' remained the central message of the brochures, which contained basic information about WNV, preventing mosquito breeding and protecting against mosquito bites. This year, the Lyme Disease brochure was also distributed to increase awareness about LD and educate the public on how to protect against tick bites and exposure in endemic areas.

The Ministry of Health and Long-Term Care (MOHLTC) distributed their Vector Borne Disease Tool Kits to all health units to assist staff in preparing for the 2010 season. The tool kit contained information on WNV, LD and EEE, and their public health implications. The kit also provided helpful details on larval and adult mosquito monitoring and control and various tick surveillance strategies.

This season the VBD Team also developed an Insect Repellent fact sheet to educate the public on how to properly apply repellents with Health Canada's recommended amounts of DEET and also to inform the public of alternative repellents not containing DEET to prevent mosquito and tick bites. This fact sheet was developed based on Health Canada's recommendations and general use information for all personal insect repellents.

Figure 13-2: WNV advertisement featured on a London bus shelter.

13.3 Media

The VBD Team kicked off the 2010 surveillance season with a media release that prompted a series of media interviews that were held at the Health Unit's 50 King Street location. These interviews answered questions and educated the public on how to prevent tick and mosquito bites for the upcoming spring and summer months. The VBD Team also distributed a series of media releases throughout the 2010 season to inform the public of WNV activity, and remind citizens to protect against bites following the identification of WNV-positive birds and mosquito pools within the community. Media releases were intended to educate the public by encouraging people to 'Reduce and Repel' mosquitoes during known breeding seasons. Local media coverage was also beneficial in informing the public of the MLHU's continued efforts to actively monitor and control mosquito larvae throughout Middlesex-London.

13.4 Website

Public inquiries and concerns are easily addressed through the information offered on the MLHU's Vector-Borne Disease webpage. Frequently asked questions regarding WNV, as well as treatment reports, standing water status reports, and final

reports from previous seasons may all be accessed through the MLHU's website. The bright 'Reduce and Repel' logo is featured on the main page, providing the public with a variety of subject headings in order to navigate more easily through the information. The webpage is also an effective tool for the public to report dead crows or blue jays. Forms for dead bird reporting can be easily accessed at http://www.healthunit.com/westnilevirus.

13.5 Community Events

The VBD Team participated in several community events to enhance public education for the 2010 season. In the spring, the VBD Team attended Hike Day at London Public Library and 'Get Into Spring Day' at Novack's outdoor living store in downtown London. Throughout the summer months, the VBD Team set up information booths at Strathroy Turkeyfest [**Figure 13-4**], Parkhill's 150th Anniversary celebration and at Parkhill's Cardboard Boat Races. In September, the VBD Team concluded its public education efforts for 2010 at the Glencoe Fair [**Figure 13-3**]. At these events, the public were given an opportunity to inquire about WNV, LD, EEE and the VBD Program. A display case containing preserved adult mosquitoes, insects commonly confused as mosquitoes and ticks were featured at these events. A breeding chamber containing live mosquito larvae and pupae was also on display. In addition to distributing brochures, promotional material such as frisbees, "skeeter" swatters, temporary tattoos, and pens were distributed to the public. All promotional material featured the 'Reduce and Repel' logo as the VBD Team encouraged the community to reduce standing water and repel tick and mosquito bites.

13.6 Stakeholders

Stakeholders are any group or person who has a vested interest or could potentially be affected by the VBD Program. This year, the Vector-Borne Disease Stakeholders meeting was held on June 14, 2010 in London [**Figure 13-5**]. The VBD staff presented a summary of 2009 findings from field and laboratory activities as well as an overview of what the MLHU's 2010 VBD season would bring. The meeting also featured presentations from Cosray Laboratories, The Canadian Centre for Mosquito Management Inc., the Ministry of the Environment, the Ministry of Health and Long Term Care. In 2010, the MOHLTC also distributed weekly Vector Surveillance Reports to update staff and stakeholders on the provincial status of WNV and EEE surveillance. These reports were helpful in keeping track of viral activity within the province and staying up-to-date with the activities and findings of neighbouring health units.

Figure 13-3: VBD booth at Glencoe Fair.

Figure 13-4: Display booth at Strathroy Turkeyfest

Figure 13-5: Attendees and presenters of the 2010 Stakeholders meeting.

13.7 Professional Development

This season VBD staff members had the opportunity to attend the Michigan Mosquito Control Association's (MMCA) Annual Conference [**Figure 13-6**], as well as the Ministry of Health and Long Term Care's Annual Vector-Borne Disease Wrap-Up Meeting. At these events VBD staff had the chance to liaise with staff from other control programs and health units, sharing research initiatives, new ideas for public education strategies and field surveillance activities.

Figure 13-6: VBD staff at the MMCA's Annual Conference, February 2010.

Also in 2010, the VBD Team participated in the American Mosquito Control Association's Eastern Equine Encephalitis Webinar, on December 2nd. This Webinar was a helpful presentation reviewing the clinical definitions and viral capacities of EEE. The Speaker, Dr. John-Paul Mutebi outlined the history, distribution and activities of EEE-vectors in Canada and the U.S, giving the MLHU further insight into the veracity of the disease and what to expect in future seasons.

13.8 Conclusions and Recommendations

The VBD Program will continue to develop fact sheets to educate the public on the recent occurrence of Eastern Equine Encephalitis viral activity within the province. Since the province has seen an increase in viral activity, the VBD Team will develop educational materials to better inform the community on vector-borne diseases of growing importance in the province. The Ministry of Health and Long Term Care is currently working on an information package for Eastern Equine Encephalitis and hopes to distribute the facts, figures and protocols to health units in 2011.

Based on the analysis and review of the MLHU's public education strategies, the following recommendation has been made:

It is imperative that the MLHU continue to expand its public education campaign and resources to include the most recent information on emerging vector-borne diseases within the community in order to reduce any threat to human populations in future seasons.

Chapter 14: Larval and Adult Mosquito Surveillance 2005 to 2010

14.1 Introduction

The surveillance and identification of mosquitoes, in both larval and adult stages, is a very important aspect of the Middlesex-London Health Unit's (MLHU) Integrated Pest Management (IPM) control and research strategies. Identification offers valuable information about species variation, mosquito habitat preference, viral analysis, and the incidence of West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE). Adult mosquito identification and viral testing has been carried out since 2005, with the assistance of Cosray Laboratories. Adult mosquito trapping and larval surveillance activities are an integral component of the Vector-Borne Disease (VBD) Program.

14.2 A Retrospective Review

From 2005 to 2010 inclusive, 59,995 mosquito larvae have been identified by the MLHU and 144,682 adult mosquitoes have been identified by Cosray Labs. Combined, 204,677 mosquitoes have been identified in both larval and adult stages, representing 55 different species. **Figure 14-1** displays the breakdown of vector and non-vector mosquito species identified from 2005 through 2010 in both, larval and adult stages.

Of the 55 different species identified throughout the past six seasons, vector species were the most abundant representing 77.4%. Non-vector species represented 22.6%, with *Culex territans* (6.6%) comprising the largest portion of this non-vector group. *Aedes vexans* (19.3%) were the most prominent vector species identified. *Culex pipiens/restuans* (18.7%) were the second most abundant vectors identified, followed by *Oc. trivittatus* (13.7 %), *Oc. stimulans* (7.3%), *An. punctipennis* (5.3%), *Cq. perturbans* (3.8%), *An. quadrimaculatus* (2.7%) and *Oc. triseriatus* (2.7%). The remaining species identified; *Oc. canadensis* (2.0%), *Oc. japonicus* (1.7%), *Cx. salinarius* (0.2%), *Cs. melanura* (<0.1%), and *Cx. tarsalis* (<0.1%) represented less than 5% of all mosquito species identified from 2005 to 2010 in both larval and adult stages.

From 2005 to 2010, there have been 37 different species of mosquito larvae identified. This is an increase from only 7 different mosquito larval species identified in 2002 when the VBD Program began. Of the 37 different species identified in the past six seasons, *Cx. pipiens* (29.3%) were the most prominent vectors identified. *Culex restuans* (14.5%) have been the second most abundant vector, followed by *An. punctipennis* (10.3%), *Ae. vexans* (9.9%), and *An. quadrimaculatus* (7.4%). The remaining species identified represented less than 6% of the total larvae identified. Vector mosquito larvae have represented approximately 76.8% of all larvae identified and non-vector larvae have represented 23% of all larvae identified from 2005 to 2010.

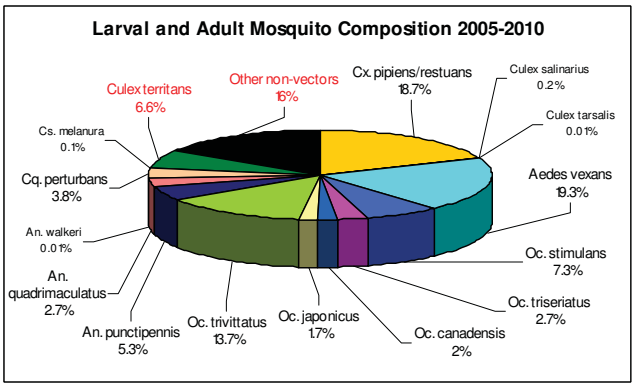

Figure 14-1: Larval and adult mosquito identifications, 2005-2010.

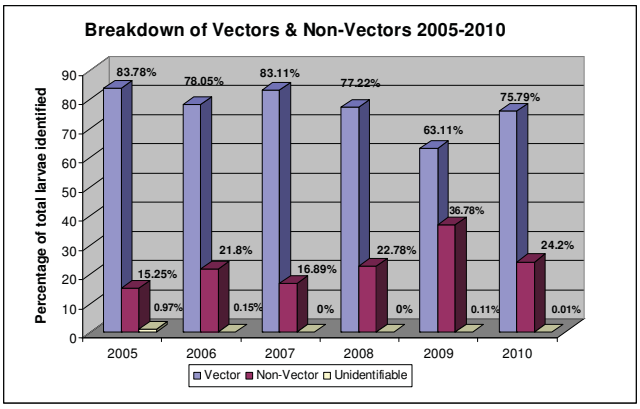

Figure 14-2: Vector versus non-vector mosquito larvae breakdown 2005 to 2010.

14.3 Discussion

Research indicates that there are 77 different mosquito species present in Canada and 58 different mosquito species present in Ontario. There are more than 60 species of mosquitoes present in Canada that are known bird, animal and human biters; however relatively few species are ever present in enough numbers to be considered severe pests based on the discomfort created by their biting preferences. (Darsie and Ward, 2005; Woods et. al)

Since 2002, the mosquito surveillance program has seen a considerable increase in the variety of species identified, in both larval and adult stages throughout Middlesex-London. Currently, there are 18 species considered to be vectors by the Ministry of Health and Long Term Care (MOHLTC), 16 of which have been identified in Middlesex-London. These species classified as vectors comprise 77.4% of all larvae and adult mosquitoes identified in Middlesex-London from 2005 to 2010. For additional information on vector mosquito species and the specific diseases that they transmit, please see **Appendix A**.

Aedes vexans was the most abundant mosquito species found throughout Middlesex-London, accounting for 19.3% of all larvae and adult mosquitoes identified from 2005 to 2010. *Aedes vexans* have been considered a vector mosquito species for both WNV and EEE by the MOHLTC since 2004. Its populations have continued to increase since 2002. *Aedes vexans* are considered to be the worst mosquito pest in Canada, with the generational ability to increase dramatically, especially during seasons of heavy precipitation. From May to September, the larval habitats of *Ae. vexans* vary, however, open, shallow, grass-filled depressions in pastures or along roadsides are its favored locations. Temporary woodland pools can also support large numbers of *Ae. vexans* larvae, however they are not often found in permanent and semi-permanent habitats such as Storm Water Management Facilities, making this a difficult mosquito species to monitor and control in Middlesex-London. (Woods et al.)

Culex pipiens/restuans were the second most abundant vector species found in Middlesex-London, accounting for 18.7% of all larvae and adult mosquitoes identified. The findings observed in this retrospective review of *Cx. pipiens/restuans* are quite interesting. The number of adult *Cx. pipiens/restuans* has decreased each season, however the number of *Cx pipiens/restuans* larvae has increased each season. From 2005 to 2010 25,143 *Cx. pipiens/restuans* larvae have been identified, representing 42% of all mosquito larvae identified in the past six seasons. Comparatively, only 13,216 adults have been observed, representing only 9% of all adult mosquitoes identified from 2005 to 2010. These numbers indicate that the MLHU's control program has been effective in ensuring that *Cx. pipiens/restuans* do not develop into adults, capable of biting and transmitting WNV to humans. The MLHU has targeted these species in particular due to their high priority on the Ministry of Health and Long-Term Care's (MOHLTC) WNV-Testing Order of Preference. This Order rates Cx. pipiens/restuans as the 'highest-risk' mosquito vector in Ontario and therefore the MLHU has focused a majority of its surveillance efforts on controlling these species in particular. The difference between the number of larvae identified in the past six seasons and the decreased number of adults observed indicates that this species still has a strong presence in Middlesex-London and control measures must continue to target this primary vector for WNV.

Ochlerotatus trivittatus was the third most abundant species found in Middlesex-London accounting for 13.7% of all mosquitoes identified. This species has been considered a vector for WNV by the MOHLTC since 2004. Only adult mosquito specimens of *Oc. trivittatus* have been collected in Middlesex London. The MLHU has yet to observe this species in its larval form. *Oc. trivittatus* larvae have rarely been collected in Canada due to the species tendency to bury themselves in vegetation or hide at the bottom of the pool in its latter in-star stages. (Wood et al.)

Ochlerotatus stimulans was the fourth most abundant species found in Middlesex-London accounting for 7.3% of all larvae and adult mosquitoes identified. *Oc. stimulans* have been one of the first species collected in early March, at the beginning of each mosquito season. Due to the early presence of this vector, often in vast numbers, it is essential to begin surveillance in late winter or early spring in order to reduce the amplification of this species. Although this species appears early in the spring, its female specimens are exceptionally long-lived and have been collected in Middlesex-London in early September each year. Yet there is no evidence that this species has more than one generation per year.

Anopheles punctipennis was the fifth most abundant species, accounting for 5.3% of all larvae and adult mosquitoes identified. Larvae of this species are identified in early May and numbers often continue to rise for the duration of the mosquito season. Adult specimens of *An. punctipennis* have been observed in Middlesex-London until late September since 2005.

Coquillettidia perturbans accounted for 3.8% of all larvae and adult mosquito specimens identified from 2005 to 2010. Since 2002, only one larvae of this species has been collected by the VBD Team. Due to its biology, larvae and pupae of *Cq. perturbans* remains buried in the mud at the bottom of permanent marshes, obtaining their oxygen from air tubes within the roots of emergent aquatic plants such as reeds and cattails. This natural condition makes it a difficult species to collect. (Woods et al.)

Culiseta melanura are the prime mosquito vectors for Eastern Equine Encephalitis within avian populations. Due to this species' virus-carrying capabilities and its yearly increase in overall population, *Cs. melanura* continues to be closely monitored within the county by the VBD Team.

14.4 Conclusion

The MLHU has enhanced its adult and larval mosquito surveillance since 2002 by adding new trap locations and identifying new standing water sites. The monitoring and identification of mosquito specimens is an essential component of the VBD Program. Comprehensive surveillance activities have led to the identification of adult and larval vector mosquito species, an increased number of surface water treatments, and ultimately a more effective control program. Since 2005, the VBD Program has provided the MLHU with important information regarding viral trends and population dynamics of mosquito species in Middlesex-London.

A retrospective review of larval and adult mosquito surveillance trends has resulted in the following conclusions:

From 2005 to 2010 the number of *Cx. pipiens/restuans* larvae has increased and the number of adults has decreased. This observation can be attributed to the MLHU's control program, which targets these species in particular, due to their high priority on the MOHLTC's WNV-Testing Order of Preference, their known virus-carrying capabilities and their historical presence as one of the main vectors for WNV.

The diversity of mosquito species has increased since 2002. To date, 55 different mosquito species have been identified in Middlesex-London.

A total of 144,682 adult mosquitoes have been identified and 59,995 mosquito larvae have been identified in Middlesex-London from 2005 to 2010.

West Nile Virus and EEE vector species were the most abundant, representing 77.4% of all mosquitoes (larvae and adult) identified from 2005-2010.

Aedes vexans was the most abundant vector species identified throughout Middlesex-London, followed by *Culex pipiens/restuans* and *Oc. trivittatus*.

Populations of *Oc. japonicus* and *Cs. melanura* mosquitoes have been increasing each season. These species are significant vectors, and should be monitored in future seasons.

Culex territans was the most abundant non-vector species identified from 2005 to 2010. Although this species remains a non-vector in Ontario, its populations and virus-carrying capabilities should be closely monitored since *Cx. territans* have been identified as vectors and have been found positive for WNV in some parts of North America.

Chapter 15: Conclusions and Program Review

15.1 Conclusions and Recommendations

Vector-borne diseases may be transmitted through the bite of an infected mosquito or tick. For the past nine seasons the MLHU has run a comprehensive surveillance and control program to 'Reduce and Repel' the amplification of West Nile Virus (WNV), Eastern Equine Encephalitis (EEE) and Lyme Disease (LD) throughout Middlesex-London.

The following conclusions and recommendations have been drawn from the MLHU's 2010 VBD monitoring and surveillance activities:

West Nile Virus:

- This season, Middlesex-London observed increased viral activity with two WNV-positive mosquito pools and five WNV-positive crows.
- West Nile Virus activity also increased across the province with a total of 56 WNV-positive mosquito pools for the 2010 season, compared to only 14 WNV-positive mosquito pools observed in Ontario in 2009.

The MLHU will continue to monitor for the presence of vector mosquito populations in order to protect human health in Middlesex-London from mosquito bites and vector-borne diseases.

Lyme Disease:

- A total of 43 ticks were submitted to MLHU this year from April 14, 2010 to August 23, 2010.
- Two tick submissions were identified as blacklegged ticks, both of which were acquired outside of Middlesex-London.
- Three positive human travel-related cases were reported from Middlesex-London; one from travel to Poland, one from travel to Prince Edward Point Park (near Picton, Ontario) and one from travel to the state of New Hampshire.

Although the incidence of LD-carrying ticks in Middlesex-London remains low, neighbouring regions of the province have been identified as endemic areas. The MLHU observed an increased number of tick submissions from 2009 to 2010 and hopes to increase that number through greater public education in 2011. In 2010, the VBD Team distributed over 1500 LD brochures, educating the public on endemic areas and encouraging submissions to the health unit.

The MLHU should continue to develop informative material for the public in order to reduce the risk of tick bites.

Eastern Equine Encephalitis:

- In 2010, 48% of all mosquitoes collected in adult traps were vectors for EEE.
- This year there were four *Culiseta melanura* specimens identified in Middlesex-London, all testing negative when subjected to Cosray's standardized test for EEE.
- Eastern Equine Encephalitis has a mortality rate of approximately 33% for all of those infected with EEE.
- An estimated 5% of EEE infections advance to include severe encephalitic symptoms. There is a 70% to 90% mortality rate for those who develop encephalitic symptoms.
- The recovery rate for those who develop severe symptoms of encephalitis is only 3%. Those who recover are left with disabling and progressive mental and physical side effects, which can include minimal brain dysfunction to severe intellectual impairment, personality disorders, seizures, paralysis and cranial nerve dysfunction.

Viral testing on adult mosquito samples remains an important aspect of the VBD Program. Although the incidence of EEE remains low in Middlesex-London, positive pools were identified by Health Unit surveillance for the first time this year in Ontario, indicating that the virus is active within the province. The MLHU should continue to monitor and test vector specimens for the presence of EEE within the community.

Dead Bird Surveillance:

- A total of 71 dead birds were observed in Middlesex-London this season.
- Eighteen dead birds were collected and/or submitted to the MLHU this season, where RAMP testing of 13 specimens in the Strathroy laboratory identified five WNV-positive crows.
- Two of the five WNV-positive crows served as an early indicator of WNV activity in North London this season. Public notice was issued following the confirmation of positive crows in the area, therefore providing advanced warning against mosquito bites to the community just days prior

to an adult mosquito trap being confirmed as WNV-positive in that same area.

The MLHU should continue to accept dead bird submissions and perform RAMP screening, as dead bird surveillance may provide an early indicator of amplification of WNV and/or EEE activity within the community.

Larval Mosquito Surveillance:

- Vector species continue to dominate larval monitoring sites throughout Middlesex-London. *Culex pipiens* remained the most abundant vector species identified.
- This season, *Cx.pipiens*, *Ae.vexans*, *An.punctipennis, Cx.restuans,* and *An.quadrimaculatus* were the most prevalent vector species identified this season.
- *Culex territans* were the most abundant non-vector species, however should be monitored closely since they have been identified with virus-carrying capabilities in several bordering American States.

Monitoring larval mosquito species is an integral part of the MLHU's VBD Program. With the increasing number of vector mosquito larvae identified in early spring months, the earlier monitoring of surface water should be continued.

The MLHU should also continue to use OviPools to track the generation periods of vector mosquito species. OviPools are an effective tool used to analyze mosquito population dynamics, as well as larval development areas conducive to specific species.

Adult Mosquito Surveillance:

- Overall there were 71,889 adult mosquitoes collected from both terrestrial and canopy traps in 2010.
- Ninety percent (90%) of all adult mosquitoes trapped were vector species capable of transmitting WNV and/or EEE.
- Two WNV-positive mosquito pools were confirmed in London this year. One positive pool was a terrestrial trap comprised of *Ochlerotatus japonicus* and the other positive pool was a canopy trap comprised of *Culex pipiens/restuans*.
- The number of *Aedes vexans vexans*, a vector species for WNV and EEE, increased by 63% this year.
- The number of *Ochlerotatus japonicus*, a vector species for WNV, once again increased for the fifth straight season, demonstrating that this species is becoming an established vector and should be closely monitored in future surveillance seasons.
- *Aedes vexans vexans* and *Ochlerotatus trivittatus* were the most prevalent vector species collected in both canopy and terrestrial traps this season.

The two WNV-positive mosquito pools this season can be attributed to the climate and the increased number of vector mosquito populations observed this season. Since one of the positive pools was confirmed in the MLHU's Huron Conservation Area Canopy Trap, continuing to trap adult mosquitoes at varying heights is important to determine the frequency of mosquito vectors and their biting preferences at different heights. Confirmation of a WNV-positive canopy trap in the North London area coincided with the identification of two WNV-positive crows within that same week.

Human Surveillance:

- This season WNV was present in the community, as indicated by two WNV-positive mosquito pools and five WNV-positive crows. There was also one human WNV-case reported from Ontario this season.
- This season there were three confirmed human cases of LD from residents of Middlesex-London. All cases were travel-related.
- Although the risk of acquiring Lyme Disease is low in Middlesex-London, it is possible to acquire LD from an infected tick anywhere in Canada. The number of ticks submitted this season increased significantly from 2009.
- Nearly 50% of all adult mosquitoes identified this season were potential vectors for EEE, therefore, it is imperative that the MLHU monitor for EEE-vector species to protect human health from this emerging vector-borne disease.

Human surveillance is important for understanding the clinical course of infection that vector-borne diseases can take. The combination of human, mosquito, bird, and equine surveillance provides a thorough understanding of the presence of WNV, EEE and LD in a community.

Mosquito Control:

- In 2010, 20% of monitoring visits included treatment, and 63% of all sites were treated one or more times, for a total of 827 treatments encompassing a total of 13.31 hectares of standing water.
- Twenty-seven sites were treated ten or more times this season, an increase from 2009.
- *Bacillus thuringiensis israelensis* (*B.t.i.*) was the larvicide most commonly used to treat standing water sites this season.
- Storm water management facilities were the most frequently treated site type this season.
- This season, 30 treatments using Altosid® granules were performed at seven pollution control plants within Middlesex-London.

The MLHU should continue recording pre- and post-treatment larval counts and also monitor environmental data in order to evaluate larvicide efficacy, trends related to the maturity and naturalisation of sites. The MLHU should continue to monitor standing water sites during the weeks when the greatest numbers of vector mosquito larvae have been observed. For the 2010 season, weeks 17 to 40 possessed the greatest larval presence. Therefore, the MLHU should maintain its current larval surveillance schedule, which encompasses these weeks of greatest larval presence, until future data indicates otherwise.

Catch Basin Treatment:

- This season, approximately 35,000 catch basins were treated three times, for total 87,732 treatments made in Middlesex-London.
- Catch basins were primarily treated with Altosid® pellets or briquettes, which are Methoprene products and/or VectoLex® pouches.

Catch basin treatment remains an important part of the MLHU's VBD Program. Monitoring and treatment of catch basins should remain a fundamental control strategy in future seasons in order to eliminate vector mosquito larvae which proliferate in these highly ideal and organic environments.

Storm Water Management Facilities:

- In 2010, 68 Storm Water Management Facility (SWMF) sites were monitored at 39 different locations. During this time, 53 of these sites bred vector mosquito larvae, and were therefore considered productive.
- There were 366 treatments conducted at SWMFs this year, a 41% increase from the number of treatments conducted in 2009.
- Fifty-three percent (53%) of productive SWMF sites required treatment five or more times. This is an increase from only 25% of sites requiring treatments five or more times in 2009.
- Thirty-nine percent (39%) of all mosquito larvae observed in 2010 were found in SWMFs.

The MLHU should continue to monitor new SWMFs, as the number of SWMF's continues to rise with ongoing residential development. Mature sites should also be actively monitored as the maturity of many sites creates a more favourable habitat for larval mosquito production. As many SWMF sites mature, vegetation levels and organic content proliferate, ultimately supporting increased mosquito larval production. The maturation and naturalisation of SWMFs this season contributed to the increased number of vector mosquito larvae being identified in previously non-naturalised SWMF locations.

Environmentally Sensitive Areas:

- This season, approximately 300 hectares of environmentally sensitive areas were monitored by VBD staff.
- Ten of the 12 ESA sites monitored this season required treatment and seven sites were treated five or more times.
- Westminster Ponds Zone 2 was the most frequently treated ESA (13 treatments), followed by Sunningdale Road Pond (12 treatments).
- *Cx. territans* were once again the most abundant non-vector species identified in ESAs this season, representing 43% of all larvae identified.

The MLHU should maintain ongoing surveillance and treatment of ESAs. Continued monitoring and treatment of vector mosquito larvae within ESAs is imperative in order to alleviate the transmission and amplification of vector-borne diseases to local populations.

Complaints, Comments and Concerns:

- In 2010, the MLHU received and responded to a total of 165 complaints.
- Dead bird reporting represented the greatest concern, comprising 43% of all CCCs this season. Dead bird reporting was a significant aspect of the VBD Program this year as it helped to identify five WNV-positive crows in London.
- An increased number of tick submissions were observed this season, correlating with the MLHU's enhanced Lyme Disease education campaign, encouraging residents to protect themselves against tick bites.
- Standing water complaints decreased this season, representing only 10% of all concerns, whereas in 2009, standing water concerns comprised 54% of all CCC's. This can be attributed to the MLHU's enhanced education campaign, which was effective in encouraging homeowners to identify and reduce possible areas where mosquitoes can breed in and around the home.

The MLHU should continue to emphasise all public education efforts designed to raise awareness and protect against West Nile Virus, Eastern Equine Encephalitis and Lyme Disease. Continuing to educate the public about vector-borne diseases is an important step in reducing the amount of VBD-related concerns the MLHU receives each season, ultimately protecting human health from the threats that VBD concerns pose.

2010 Weather Trends:

- The first treatment of the season was performed in a woodland pool in Strathroy on April 30, at a mean temperature of 17.6 °C. The final treatment of 2010 was performed on October 7, where the mean temperature was 11.8 °C.
- Weather observed this season was hot and humid, which likely contributed to the increased mosquito abundance and viral activity.
- This season the MLHU experienced heavy precipitation in early June, jump-starting this year's large populations of floodwater species, *Aedes vexans* and *Oc.trivittatus*, which became two of this season's most frequently identified species.

It is important to continue to monitor weather trends and environmental conditions in Middlesex-London in order to better map and predict viral trends and generational periods of vector mosquito populations. Another season such as 2010 with hot, humid conditions could lead to increased larval and viral activity, highlighting the need to monitor these environmental conditions in order to effectively plan appropriate surveillance and control strategies.

Catch Basin Study:

- The most abundant mosquito species, found in catch basins were *Cx. pipiens* and *Cx. restuans*. *Culex pipiens*, represented 65.4% of the total larvae identified in catch basins this year.
- *Oc. japonicus* species was also observed in catch basins this season. This invasive species has been observed in other habitats throughout the county and its presence has increased since 2006 in both larval and adult mosquito surveillance.

It is recommended that the MLHU continue to monitor selected catch basins throughout the 2011 season in order to track the generation periods, competition of different vector species and analyze the presence of invasive mosquito species within catch basin structures.

Public Education:

- Display booths were set up at several community events throughout the spring and summer months in order to enhance public education by addressing public inquiries and distributing resources and promotional materials. Some of the event locations included; Strathroy, Glencoe, Parkhill and London.
- This season the VBD Team developed educational Lyme Disease materials and a television commercial to further enhance the LD public education campaign.
- The VBD Team held its Vector-Borne Disease Stakeholders meeting on June 14th, presenting findings from the 2009 season, as well as an overview of the program and its goals for the upcoming 2010 season.

It is imperative that the MLHU continue to implement public education strategies to inform the public of vector-borne diseases of increasing importance in the province. The MLHU must continue to educate the community on preventative measures required to protect against mosquito and tick bites. The MLHU hopes to develop additional educational materials on EEE in future seasons, as this is a disease of growing concern in Ontario and bordering American States.

Larval and Adult Mosquito Surveillance 2005 to 2010

- A total of 144,682 adult mosquitoes and 59,995 mosquito larvae have been identified, representing 55 different species.
- Vector species represent 77.4% of all mosquitoes (larvae and adult) identified from 2005 to 2010.
- *Aedes vexans* have been the most abundant vector species identified throughout Middlesex-London, followed by *Culex pipiens/restuans* and *Oc. trivittatus*.
- The MLHU has observed a decline in adult populations of *Cx. pipiens/restuans* from 2005 to 2010. The number of *Cx. pipiens/restuans* larvae has not decreased; therefore this decline in adult specimens can be attributed to the MLHU's control program, which targets this species in particular, due to it's known virus-carrying capabilities.
- *Culex territans* have been the most abundant non-vector species identified from 2005 to 2010. Although this species remains a non-vector in Ontario, its populations and virus-carrying capabilities should be closely monitored since *Cx. territans* have been identified as vectors in bordering that border Ontario.

15.2 Program Review

The 2010 season identified two WNV-positive mosquito pools and five WNV-positive crows within the City of London. There were also three travel-related LD human cases and a significant increase in the number of adult mosquito EEE vectors identified this season. In addition to increased viral activity, monitoring of adult and larval mosquito populations also revealed an influx of WNV and EEE vector mosquito populations present within Middlesex-London. The MLHU reevaluates its VBD Program each year following the season's end. After careful review of the sites visited, larva collected, adult mosquitoes identified, treatments made and education strategies, the VBD Team can decide the best course of action to take in order to ensure the successful delivery of next year's VBD Program.

The following is an assessment of the VBD Program following the 2010 VBD surveillance season:

- With the recent prevalence of EEE-positive mosquito pools in Ontario, the MLHU would benefit from including more information on EEE in its public education campaign, promotional materials distributed to the public and on its website. This would best be implemented with the support of the MOHLTC, as they would provide the necessary data and statistics to inform the public of EEE's recent incidence in North America.
- Although the MLHU does have a website featuring reports and information regarding WNV, the VBD Team would like to include further details regarding LD and EEE and how residents can assess levels of risk in their area. Improved web design and greater detail on all vector-borne diseases of significance in Middlesex-London is a necessary component of an improved VBD Program in 2011.
- An effective VBD Program includes a strong public education campaign and the ability to reach out to local residents who, in turn, contribute to the prevention of vector-borne diseases in the area. The MLHU does a thorough job at educating the public on vector-borne diseases in the area by participating in community events and interacting with residents to distribute promotional and informational materials throughout the season. Residents of Middlesex-London participate in the program by calling in dead bird sightings and reporting standing water concerns throughout Middlesex-London.

The VBD Team, along with the entire Health Unit, also underwent an extensive Accreditation process this year. From a program standpoint, this was an important aspect of the VBD Program as it allowed the Team to review its Policies and Procedures, staff orientation activities, monitor and evaluate various aspects of the program and ensure that all governing principles and standards of the program remained in place throughout the years.

The VBD Team reviewed all of its program "evidence" to ensure that thorough and accurate records were kept following each season's activities. Staff meetings and minutes binders were compiled, board reports, press releases and all public notification was reviewed and archived. All forms and fact sheets were reviewed and updated, all personnel files and confidential information provided by the public was located and secured in a designated place and all administrative aspects of the program such as operational and outcome plans, budgets, strategic

plans and final reports were assessed and organized. This process ultimately allowed the VBD Team to review its program as a whole, updating and organizing all of the important aspects of the program which must be properly reviewed and archived at each season's end.

It is also important to note that the success of the MLHU's VBD Team can also be attributed to the general maturity of the program as a whole. When the VBD Program began in 2001, West Nile Virus was a new and unfamiliar disease, transmitted by vectors of which few public health officials had any knowledge of. Since its inception, the VBD Program has grown to take into account the complexities of vector-borne diseases and even better, effective monitoring and control strategies to better identify and detect viral activity within the communities of Middlesex-London.

The MLHU has mapped areas of standing water for many years, identifying specific locations of increased concern. Through effective monitoring for larval mosquito specimens, the MLHU has developed a better understanding of mosquito habitat preference, including the ability to identify and understand larval mosquito species and habitat preferences. By understanding the characteristics of vector specimens, the MLHU can better control the populations of these species.

The MLHU has also developed an extensive adult mosquito surveillance system, setting up traps throughout Middlesex-London and identifying viral trends through advanced research and the study of adult mosquito specimens trapped at canopy heights. The MLHU's laboratories have also advanced and have become more efficient in identifying mosquitoes and ticks, and performing viral tests on dead bird specimens. The increased vector mosquito activity observed in 2010 can be attributed to weather trends however at the same time the number of mosquito identifications, treatments and monitoring visits is increasing due to the development and advancements that the VBD Program has made as a whole.

15.3 Final Comment

The Vector-Borne Disease Program aims to minimize the risk of vector-borne diseases to human populations within Middlesex-London through local risk assessment. It is important to adjust surveillance and control strategies based on the changing dynamics of local mosquito and tick populations, species variation and the expansion of new mosquito vectors into Middlesex-London's local environment. This season the VBD Team established a strong presence at local community events, in local media, and by developing relationships with municipalities and local organizations. The MLHU hopes to once again increase its public presence in the 2011 season, focusing on the education of emerging vector-borne diseases of importance, such as Eastern Equine Encephalitis.

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Appendix A - Vector and Non-Vector Mosquito Species Found in Middlesex-London and Ontario

Vector Mosquito Species Identified in Middlesex-London:

Culex pipiens
Culex restuans
Culex quinquefasciatus
*Culex salinarius**
Culex tarsalis
*Aedes vexans vexans**
*Coquillettidia perturbans**
*Culiseta melanura**
*Ochlerotatus canadensis**
Ochlerotatus cantator
Ochlerotatus hendersoni
Ochlerotatus trivittatus
Ochlerotatus triseriatus
Ochlerotatus stimulans
Ochlerotatus japonicus
Anopheles walkeri
Anopheles punctipennis
Anopheles quadrimaculatus

Vector Mosquito Species Identified in Ontario:

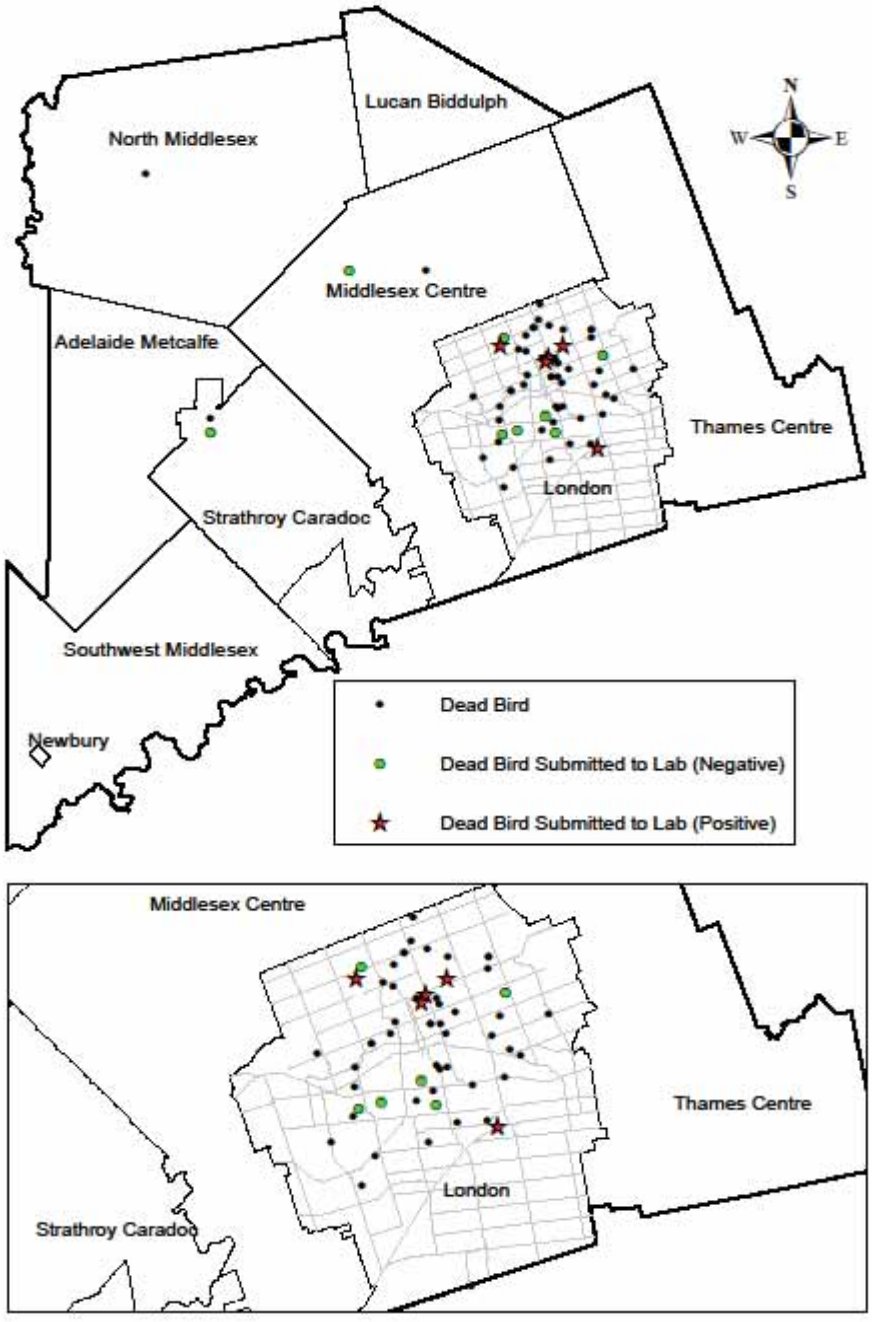
Culex pipiens
Culex restuans
Culex quinquefasciatus
*Culex salinarius**
Culex tarsalis
*Aedes albopictus (Stegomyia albopicta)**
*Aedes vexans vexans**
Aedes vexans nipponii
*Coquillettidia peturbans**
*Culiseta melanura**
*Ochlerotatus canadensis**
Ochlerotatus cantator
Ochlerotatus hendersoni
Ochlerotatus trivittatus
Ochlerotatus triseriatus
Ochlerotatus stimulans
Ochlerotatus japonicus
Ochlerotatus sollicitans
Anopheles walkeri
Anopheles punctipennis
Anopheles quadrimaculatus

Non-Vector Mosquito Species in Ontario:

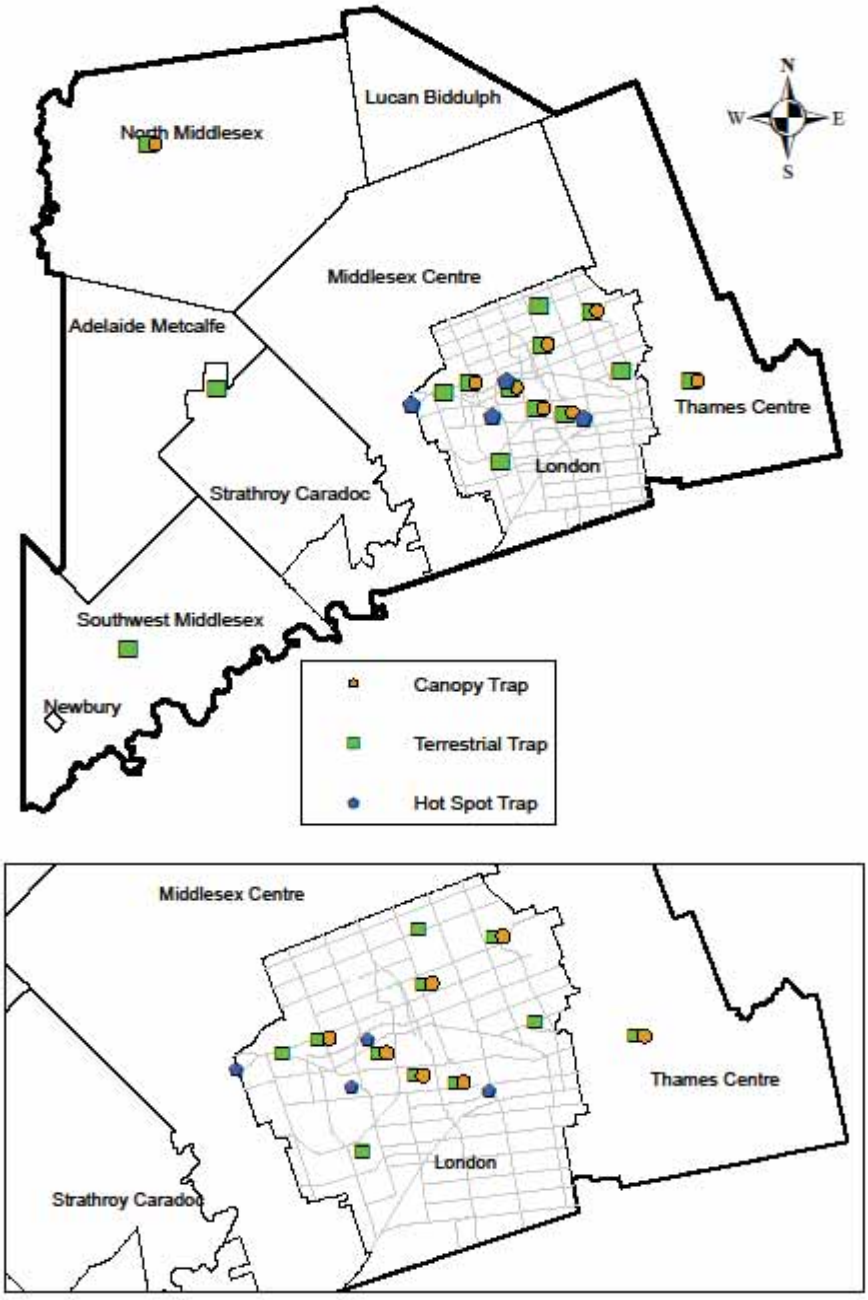
Aedes cinereus
Anopheles barberi
Anopheles earlei
Anopheles perplexens
Culiseta impatiens
Culiseta inornata
Culiseta minnesotae
Culiseta morsitans
Culex erraticus
Culex territans
Ochlerotatus abserratus
Ochlerotatus aurifer
Ochlerotatus churchillensis
Ochlerotatus communis
Ochlerotatus diantaeus
Ochlerotatus dorsalis
Ochlerotatus eudes
Ochlerotatus excrucians
Ochlerotatus fitchii
Ochlerotatus flavescens
Ochlerotatus grossbecki
Ochlerotatus hexodontus
Ochlerotatus impiger
Ochlerotatus intrudens
Ochlerotatus mercurator
Ochlerotatus provocans
Ochlerotatus punctor
Ochlerotatus riparius
Ochlerotatus spencerii
Ochlerotatus sticticus
Orthopodomyia alba
Orthopodomyia signifera
Psorophora ciliata
Psorophora columbiae
Psorophora ferox
Toxorhynchites rutilus
Uranotaenia sapphirina

***Vectors of WNV** *and* **EEE**
** Within Middlesex-London, 55 different mosquito species have been identified from 2001 to 2010.

Appendix B - Middlesex-London Dead Bird Surveillance Results, 2010



Appendix C - Middlesex-London Adult Mosquito Trapping Sites, 2010



Appendix D - Criteria for Diagnosis and Classification of West Nile Virus (WNV) Cases

Clinical Criteria for Diagnosis of WNV

(with excerpts from the Ministry of Health and Long Term Care's Infectious Disease Protocol, 2009)

West Nile Virus Neurological Syndrome (WNNS) Diagnostic Criteria

- History of exposure in an area where WNV activity is occurring **OR**
- History of exposure to an alternative mode of transmission (i.e. lab-acquired, in utero; receipt of blood components, organ/tissue donation; possibly via breastmilk)

AND

- Onset of fever

AND recent onset of at least **one** of the following:

- Encephalitis, viral meningitis, acute flaccid paralysis, movement disorder, Parkinsomism or Parkinsomism-like disorders, or other neurological symptoms (as defined by the PHAC)

West Nile Non-Neurological Syndrome (WN Non-NS) Diagnostic Criteria

- History of exposure in an area where WNV activity is occurring **OR**
- History of exposure to an alternative mode of transmission
- **AND** at least **two** of the following:
- Fever, myalgia, arthralgia, headache, fatigue, lymphadenopathy, or maculopapular rash

West Nile Virus Asymptomatic Infection (WNAI) Diagnostic Criteria

- **There is an absence of clinical criteria in WNAI

Laboratory Criteria for Diagnosis of WNV

(with excerpts from the Ministry of Health and Long Term Care's Infectious Disease Protocol, 2009)

Probable Case Laboratory Criteria:

At least **one** of the following:

- Detection of flavivirus antibodies in a single serum or CSF sample using a WN virus IgM ELISA without confirmatory neutralization serology (e.g. Plaque Reduction Neutralization Test -PRNT) **OR**
- A 4-fold or greater change in flavivirus HI titres in paired acute and convalescent sera or demonstration of a seroconversion using a WN virus IgG ELISA **OR**
- A titre of > 1:320 in a single WN virus HI test, or an elevated titre in a WN virus IgG ELISA, with a confirmatory PRNT result **OR**
  [Note: A confirmatory PRNT or other kind of neutralization assay is not required in a health jurisdiction/authority where cases have already been confirmed in the current year]
- Demonstration of Japanese encephalitis (JE) serocomplex-specific genomic sequences in blood by NAT screening on donor blood, by Blood Operators in Canada.

Confirmed Case Laboratory Criteria:

At least **one** of the following:

- A 4-fold or greater change in WN virus neutralizing antibody titres (using a PRNT or other kind of neutralization assay) in paired acute and convalescent sera, or CSF **OR**
- Isolation of WN virus from, or demonstration of WN virus antigen or WN virus-specific genomic sequences in tissue, blood, CSF or other body fluids **OR**
- Demonstration of flavivirus antibodies in a single serum or CSF sample using a WN virus IgM ELISA, confirmed by the detection of WN virus specific antibodies using a PRNT (acute or convalescent specimen) **OR**
- A 4-fold or greater change in flavivirus HI titres in paired acute and convalescent sera or demonstration of a seroconversion using a WN virus IgG ELISA AND the detection of WN specific antibodies using a PRNT (acute or convalescent serum sample).

Case Classification of WNV

(with excerpts from the Ministry of Health and Long Term Care's Infectious Disease Protocol, 2009)

WNNS and WN Non-NS Case Classification Criteria

Suspect

- Clinical criteria AND absence or pending laboratory criteria AND absence of any other obvious cause

Probable

- Clinical Criteria AND at least one of the probable case laboratory criteria

Confirmed:

- Clinical criteria AND at least one of the confirmed case laboratory criteria

WNAI Case Classification Criteria

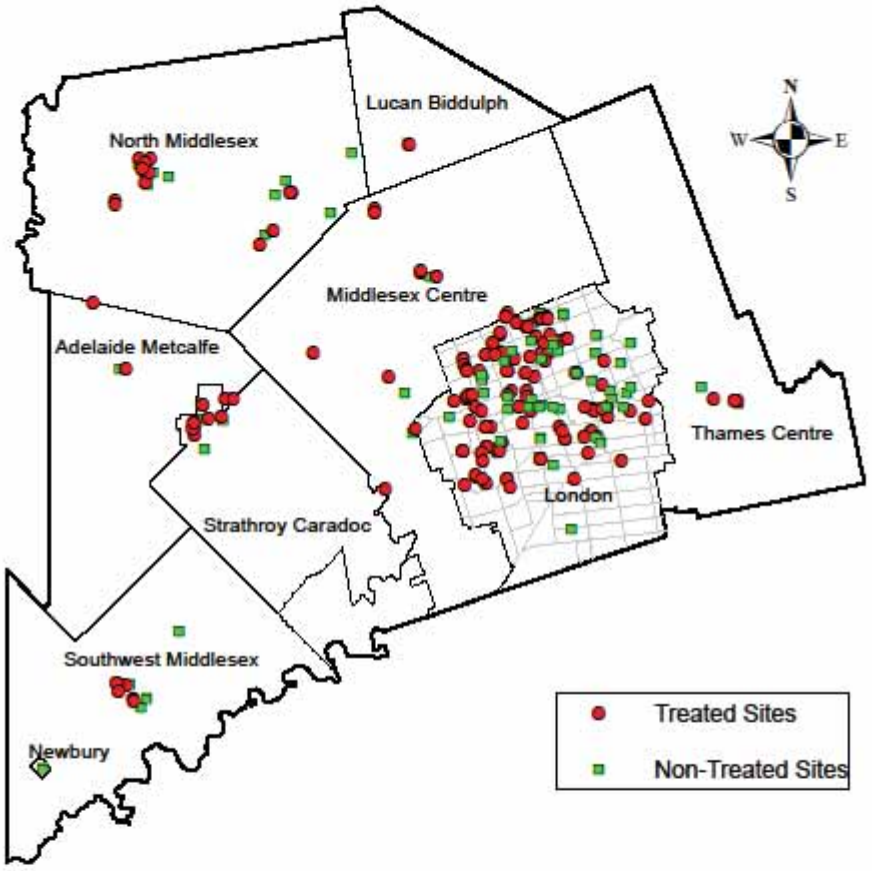
Probable:

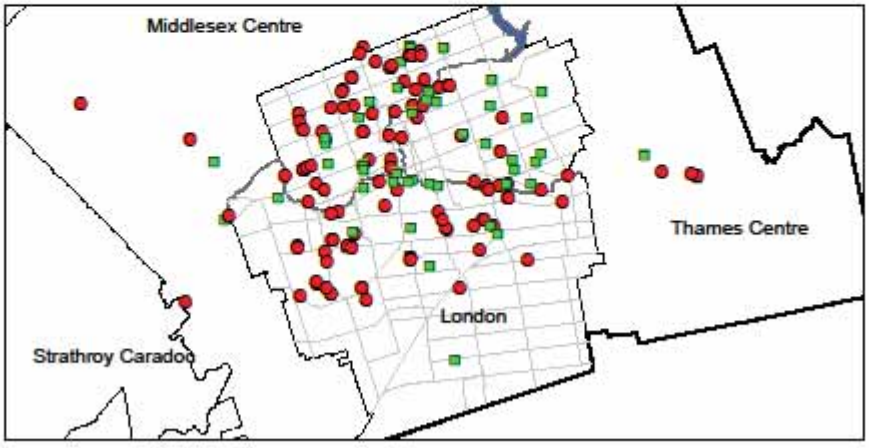
- Probable case laboratory criteria AND absence of clinical criteria

Confirmed:

- Confirmed case laboratory criteria AND absence of clinical criteria

Appendix E - Middlesex-London Surface Water Sites, 2010





Appendix F - 2010 Catch Basin Flyer

MIDDLESEX-LONDON HEALTH UNIT

CATCH BASIN TREATMENT 2010

Why treat catch basins?

Catch basins are a significant breeding site for mosquitoes including Culex pipiens, a West Nile Virus mosquito vector (a species known to carry the virus). Treating catch basins will prevent larvae from maturing into adult mosquitoes and will reduce the risk of amplification and spread of the virus into the human population.

How will I know if the catch basins in my area have been treated?

Each catch basin will be assigned a colour based on the treatment status (see table below). The Canadian Centre for Mosquito Management Inc. will treat catch basins in every urban centre in the Middlesex-London region approximately 3-4 times between June and September. The method of control used will depend on the area. Catch basins within 50m of an outfall to water bodies such as streams, lakes and wetlands are considered sensitive and will be treated with *Bacillus sphaericus* water soluable pouches, a biological larvicide. If the catch basin is not near an outfall, the pesticide methoprene will be used for treatment. Treatment will involve the use of 30-day methoprene pellets for most public catch basins. A 120-day methoprene briquette will be used in rear yard catch basins, park catch basins and other areas that may be difficult to access. Dry catch basins will not be treated. For further information, please contact the Middlesex-London Health Unit Strathroy office at (519) 245-3230.

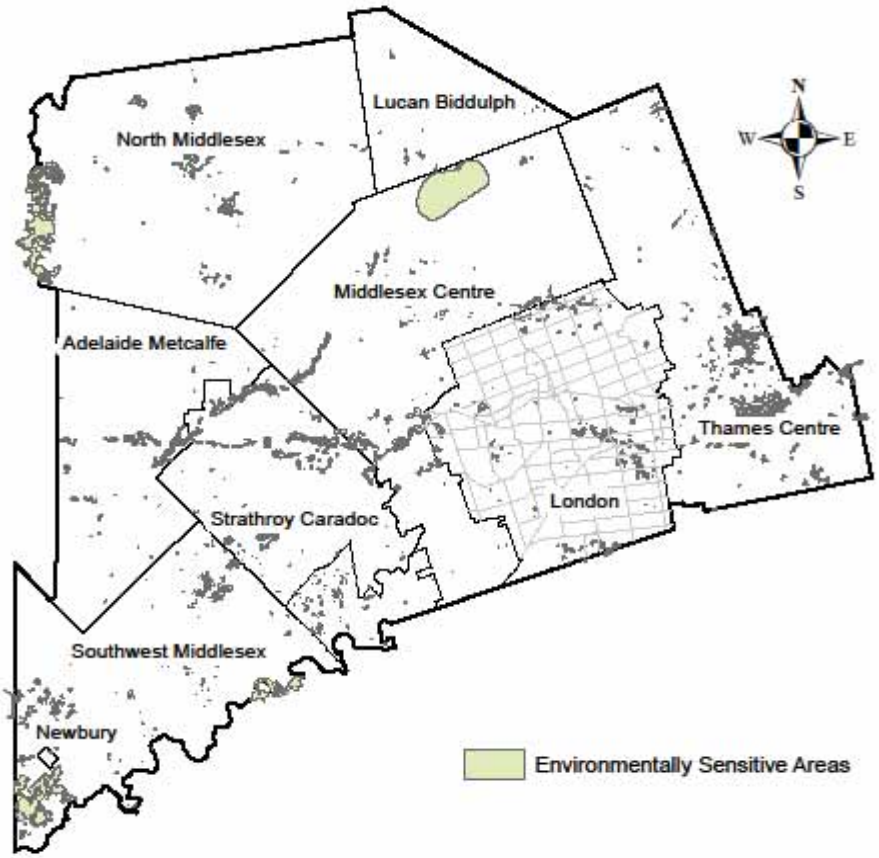
TREATMENT COLOUR CODES	
Purple	Treatment #1
White	Treatment #2
Orange	Treatment #3
Pink	Sensitive Area
Brown	Methoprene Briquette
2 Dots	Untreated Catch Basin (dry)

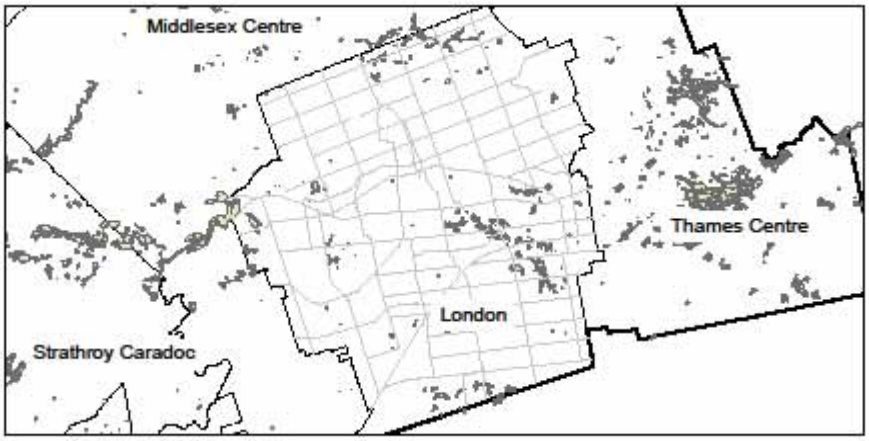
Appendix G - Storm Water Management Facilities Monitored in 2010

Site Name	Component	Larval Count	Most Common Vector Species Identified
Adelaide North*	F	1	*Cx. pipiens (100%)*
Applegate	F, C	189, 214	*An. punctipennis (28%), An. quadrimaculatus (26%)*
Beattie Street	Ch, C	32, 65	*Cx. pipiens (28%), An. punctipennis (32%)*
Corlon	F, C	155, 62	*Cx. pipiens (28%), An. punctipennis (7.4%)*
Cranbrook	F, C	9, 34	*Cx. pipiens (27%), An. quadrimaculatus (50%)*
Crestwood	F, C	229, 118	*Cx. pipiens (57%), An. punctipennis (12%), Ae.vexans (10%)*
Commissioner's Road	C	82	*Cx. restuans (31%), An. punctipennis (29%)*
Dorchester	F1, F2, C	114, 6, 8	*Cx. pipiens (20%), An. quadrimaculatus (49%), Oc. japonicus (20%)*
Duncairn	F, C	33, 59	*An. punctipennis (24%), An. quadrimaculatus (26%)*
Evans Boulevard*	F, C	0	*** No mosquito larvae identified*
Fanshawe Ridge North	F, C	0	*** Under construction*
Ilderton - Meredith Drive	F, C	106, 49	*An. punctipennis (37%), An. quadrimaculatus (10%)*
Ilderton - Meadowcreek	F, C	17, 12	*An. punctipennis (14%), An. quadrimaculatus (35%)*
Hamilton Road	C	91	*Cx. pipiens (22%), An. punctipennis (32%)*
Hunt Club	F, Ch, C	101, 52, 316	*Cx. pipiens (15%), An. punctipennis (19%)*
Killaly I	F	233	*Cx. pipiens (53%), Ae.vexans (28%)*
Killaly II	F, C	228, 42	*Cx. pipiens (6%), An. quadrimaculatus (47%)*
Manning Dump	F	30	*An. punctipennis (20%), An. quadrimaculatus (50%)*
Meadowcreek	F, C	17, 6	*An. punctipennis (17%), An. quadrimaculatus (17%)*
Meadowlilly Woods	PP, C	48, 50	*An. punctipennis (26%), An. quadrimaculatus (50%)*
Meander Creek	F	3	*Cx. pipiens (33%), An. punctipennis (67%)*
Mornington	F, C	264, 87	*Cx. pipiens (41%), Cx. restuans (23%)*
North Lambeth	F, C	173, 101	*An. punctipennis (35%), An. quadrimaculatus (20%)*
Parkview	F1, F2	2, 68	*Cx. pipiens (10%), An. quadrimaculatus (13%)*
Pinecourt	F, C	99, 110	*Cx. pipiens (18%), An. quadrimaculatus (36%), Ae. vexans (18%)*
Pond Mills	F, Ch	797, 427	*Cx. pipiens (72%), An. quadrimaculatus (52%)*
River Road	F	30	*Cx. pipiens (30%), An. quadrimaculatus (17%)*
Jack Nash	F	519	*Cx. pipiens (66%), Cx. restuans (12%), An. punctipennis (9%)*
Saintsbury	F	58	*Cx. restuans (43%), An. quadrimaculatus (16%)*
Sam's Club	F, C	71, 117	*Cx. pipiens (70%), An. quadrimaculatus (8%)*
Second Street	F	3	*Only non-vector mosquito larvae identified*
South River	F, C	682, 40	*Cx. pipiens (29%), An. quadrimaculatus(50%)*
South Wenige 2*	F, C	66, 49	*An. punctipennis (29%), An. quadrimaculatus (20%)*
Summercrest	F, C	96, 39	*Cx. pipiens (19%), An. punctipennis (39%)*
Talbot Village	F, C	90, 18	*An. punctipennis (32%), An. quadrimaculatus (28%)*
Ted Earley Park	Ch, C	0	*** No mosquito larvae identified*
Thornhead	F, C	456, 102	*Cx. pipiens (38%), An. quadrimaculatus (42%)*
Upland Hills	F1, F2, C	72, 56, 59	*An. punctipennis (32%), An. quadrimaculatus (22%), Ae. vexans (20%)*
White Oak	F, C	278, 65	*Cx. pipiens (15%), An. quadrimaculatus (55%)*
Wilton Grove Road	F	21	*Cx. pipiens (76%), An. punctipennis (24%)*

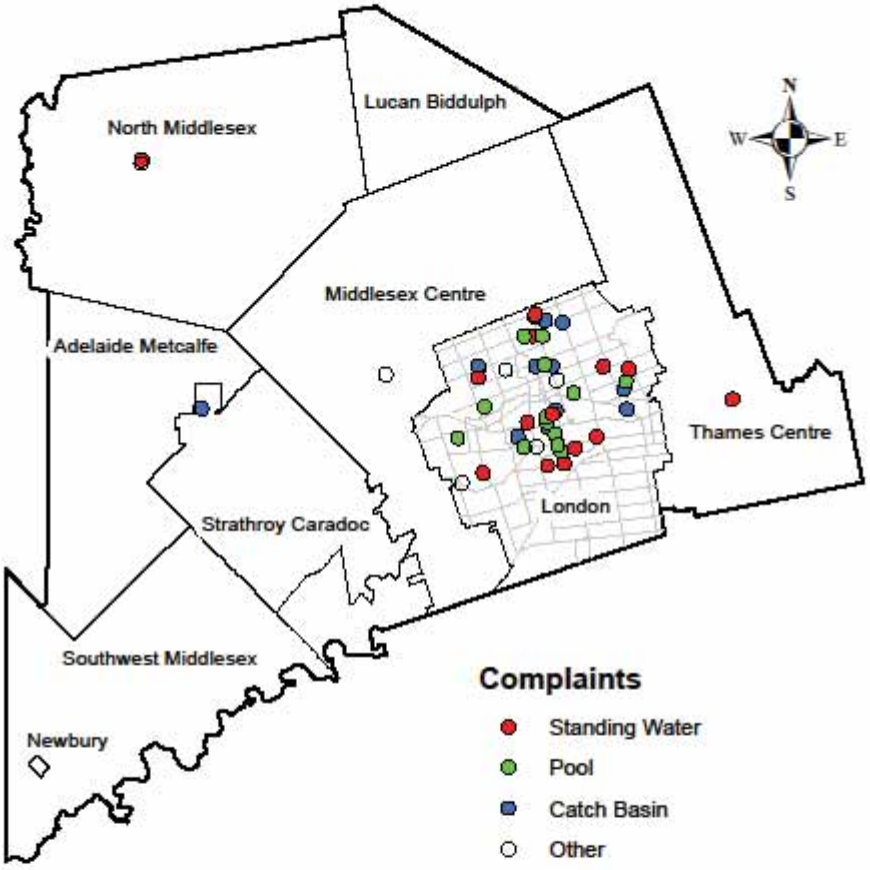
F= forebay
C= cell
Ch= channel
PP= plunge pool
* Site added in 2010 season

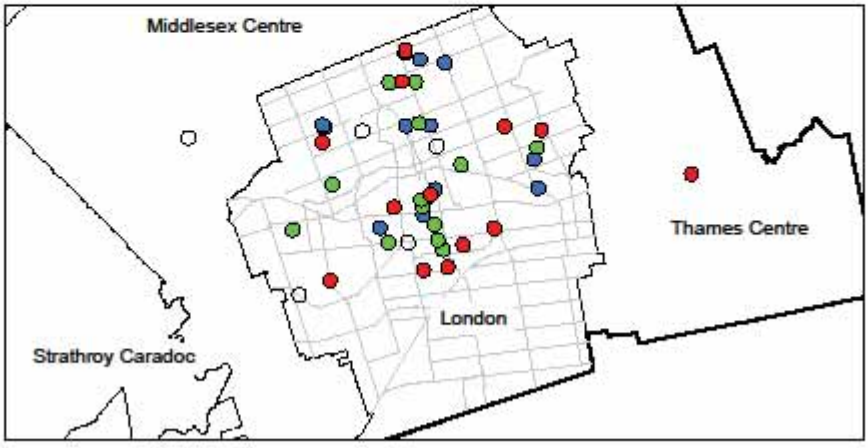
Appendix H - Middlesex-London Environmentally Sensitive Areas, 2010





Appendix I - Middlesex-London Complaints, Comments and Concerns, 2010





MIDDLESEX-LONDON HEALTH UNIT
REPORT No. 026-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011, March 17

2011 Budget Update

Recommendation

It is recommended:

1) That the Board of Health endorse the submission of a revised 2011 Mandatory & Related Programs budget (Cost-Shared Programs) to the Ministry of Health and Long-Term Care in the amount of $22,640,173 representing an increase of 3% (i.e., $431,16) to the provincial portion of the budget with a 0% increase to the municipal portion; and further
2) Following the receipt of Ministry of Health and Long-Term Care funding approval, that staff be directed to submit to the Board of Health recommendations for application of the additional $215,580 funding.

Background

On January 20, 2011, the Board of Health approved the 2011 Mandatory & Related Programs budget in the net amount of $22,424,593 (Appendix A). The 2011 budget was developed with a 1.5% increase from the province and a 0% increase from the City of London and the County of Middlesex. The provincial increase would generate an additional $215,580 and this would cover changes to pension and employment insurance costs, anticipated job reclassifications, and minor increases in software charges.

Municipal Approval

Since the Board of Health approval, the City of London has endorsed the 2011 budget and a presentation was made to Middlesex County Council by the Medical Officer of Health and Mr. John Millson, Director, Finance and Operations at the March 8, 2011, meeting. It is anticipated that County Council will approve the Health Unit budget on March 22, 2011, when the entire 2011 County budget is considered.

Provincial Grant – New Information

On Friday March 4, 2011, Mr. John Millson attended a Ministry of Health and Long-Term Care (MOHLTC) meeting related to 2011 provincial funding. Mr. Millson and his colleagues were advised at that time to expect a 3% increase from the MOHLTC.

Table 1 (over) provides revised budget changes for cost-shared programs with a 3% provincial increase. It can be seen that under this new estimate, a total increase of $431,160 would be realized from the Province, representing an additional $215,580 to the budget approved by the Board of Health on January 20th.

Table 1 – 2011 Revised Cost Shared Budget By Funding Body

	Total	Province	City	County
Mandatory Programs	$ 22,024,217	$ 14,803,136	$ 6,065,708	$ 1,155,373
Vector Borne Disease	615,956	461,967	129,351	24,638
2011 Total Cost Shared	**$ 22,640,173**	**$ 15,265,103**	**$ 6,195,059**	**$ 1,180,011**
2010 Total Cost Shared	**$ 22,209,013**	**$ 14,833,943**	**$ 6,195,059**	**$ 1,180,011**
Increase/(Decrease)	**$ 431,160**	**$ 431,160**	**$ 0**	**$ 0**

A 3% provincial increase would also increase the overall provincial share of the Health Unit budget from 66.8% to 67.2% which in turn would reduce each municipal funder's proportionate share on a percentage basis. This is reflected in Table 2 below.

Table 2 – Comparison of Proportionate Share of Funding by Funding Body

	Province	City	County
2004	50.00%	42.00%	8.00%
2005	55.00%	37.80%	7.20%
2006	62.00%	31.90%	6.10%
2007	66.00%	28.60%	5.40%
2008	66.30%	28.31%	5.39%
2009	67.18%	27.57%	5.25%
2010	66.56%	28.09%	5.35%
2011	66.89%	27.81%	5.30%
2011R	67.21%	27.54%	5.25%

Conclusion

An unusual situation has evolved since the Board of Health approved the 2011 budget in that the MOHLTC is encouraging boards of health to submit budgets calling for a 3% increase to the provincial portion of the cost-shared budget. Accordingly, it is recommended that the Board of Health approve a revised budget consistent with the provincial direction. Upon receiving MOHLTC approval of the revised budget, staff would present to the Board recommendations for application of the additional $215,580 funding.

This report was prepared by Mr. John Millson, Director, Finance and Operations.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

MIDDLESEX-LONDON HEALTH UNIT

APPENDIX A

REPORT NO. 002-11

TO: Chair and Members of the Board of Health

FROM: Graham L. Pollett, MD, FRCPC
Medical Officer of Health

DATE: 2011 January 20

2011 BUDGET

Recommendation

It is recommended that the Board of Health approve the 2011 Mandatory & Related Programs budget (Cost-Shared Programs) at the net amount of $22,424,593 representing an increase of $215,580.

Background

Each year the Board of Health reviews and approves the Health Unit's Cost-Shared Programs budget. This budget accounts for approximately 75% of the total Board of Health net expenditures. The remaining 25% of net expenditures are made up of 100% programs. The Mandatory & Related Programs budget is cost-shared between the Ministry of Health & Long-Term Care (MOHLTC), Ministry of Health Promotion and Sport (MHPS), City of London, and County of Middlesex.

Consistent with past practice, the City of London's budget submission is the first required of the funding agencies. Table 1 below, summarizes the relevant steps in the City's budget process and the anticipated completion dates.

Table 1 – 2011 City of London Budget Timetable

	Due Date
Financial Planning & Policy Technical Review	October 22nd , 2010
Tabling of the City of London Budget to Board of Control	December 20th , 2010
Budget Orientation and Strategic Planning	January 25th , 2011
Public Participation Sessions	February 2nd , 2011
Committee of the Whole	February 16th , 2011
Council Approval	February 28th , 2011

2011 Cost-Shared Programs Budget

Senior management, in preparing this budget, was guided by the following:

1) Current economic environment – In the province's 2010/11 budget, it announced a variety of restraint measures to contain costs. Earlier in the Fall of 2010, provincial staff indicated that health units should expect no more than a 1.5% increase for mandatory programs. Accordingly, the proposed budget includes a 1.5% increase to the provincial share.

2) Board of Health's commitment to maintain the municipal funding at the 2004 level or a 0% increase over 2010 funding amount.

It can be seen from Table 2 (Appendix A) that these assumptions would yield an additional $215,580 in provincial grants or an increase of 1.0% over the 2010 net budget for Mandatory Programs. In addition, the Vector Borne Disease program would receive no increase in funding over the amount provided in 2010. Table 3 (Appendix A) provides the 2011 net budget by funding body.

Table 4 (Appendix A) provides an overview of budget changes for cost-shared programs across the entire organization. It can be seen that the increase is needed primarily to fund anticipated changes in pension and employment insurance costs, job reclassifications, and equipment related costs.

Subsequent Events

Since the development of the budget, there have been a number of events that may impact the final outcome of the 2011 budget, namely:

1) Municipal Elections – initial budget targets provided to City departments and boards/commissions may be altered to achieve an overall 0% increase in municipal taxes.

2) New Provincial programs/funding – at the end of 2010, there were a number of funding announcements that potentially could impact this budget.

3) Contract Negotiations – Both Ontario Nurses Association (ONA) and Canadian Union of Public Employees (CUPE) contract negotiations are still underway.

The outcomes of the above events may prompt further budget adjustments prior to the budget submission to the province this spring. Staff will endeavor to keep the Board of Health apprised of these and all events affecting the operating budget.

Summary

The 2011 cost-shared budget has been prepared on the assumption that the Board of Health will receive a 1.5% increase in the provincial share of the cost-shared programs, with a 0% increase to the municipal component. Under this scenario, the anticipated changes to pension and employment insurance costs, and job reclassifications can be accommodated, along with some marginal software charges.

Mr. John Millson, Director, Finance and Operations, will make a budget presentation at the January 20, 2011, Board of Health meeting.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 027-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

Violence in Hockey

Recommendation
It is recommended that Report No. 027-11 re Violence in Hockey be received for information.

In response to recent incidents of fighting and violence in the National Hockey League (NHL), the Medical Officer of Health together with Dr. Peter Jaffe, Professor, Faculty of Education, University of Western Ontario and Executive Director of the Centre For Research on Violence Against Women and Children and Mr. Ray Hughes, National Coordinator, Centre for Addiction and Mental Health, Centre for Prevention and Science, sent an open letter to Mr. Gary Bettman, NHL Commissioner, and the NHL Board of Governors (Appendix A). This initiative is consistent with past actions undertaken by the Medical Officer of Health and the Board of Health concerning violence in hockey as part of a comprehensive strategy to address violence in society, particularly the prevention of violence against women and children.

The letter generated considerable media attention, several examples of which are attached as Appendices B, C and D.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

Western
Education

Appendix A

Centre for Research & Education
on Violence against Women and Children

February 25, 2011

An Open Letter to Gary Bettman & the NHL Board of Governors

We are enthusiastic, life-long hockey fans who want to lend support to Mario Lemieux and many commentators' views that the recent incidents of fighting in hockey cannot be tolerated. In particular, we endorse Mario Lemieux's words after a recent Penguin-Islander brawl, "it was painful to watch the game I love turn into a sideshow ..... The NHL (needs) to send a clear and strong message that those kinds of actions are unacceptable and embarrassing to the sport." We agree with these sentiments.

As fans, we note the level of self-control that players at the junior and NHL level can demonstrate during international competitions such as the World Junior Championship and the Olympics. Even the NHL players reduce fighting by almost 50% during the Stanley Cup Playoff without affecting attendance or TV viewers. Scandinavian countries have banned hockey fights and other leagues such as college hockey have managed to eliminate this part of the game.

We know that the NHL wants to put the best possible product on the ice and you are always looking for ways to improve the game. We would ask you to consider a number of points in your upcoming discussions:

1. There is increasing research and public awareness about the short and long-term harm from concussions. We have gone from celebrating Sydney Crosby's gold medal goal last year to worrying about his future as a result of several blindside hits to his head. Other stars like Marc Savard are facing uncertain futures from repeated hits to the head. What is frequently missed is that there is no difference in a hit to the head by an elbow or shoulder than a punch to the head in a fight. Recent fights have sidelined a number of NHL players with concussions and other injuries. Fights are not always consensual acts between players of the same size and experience. Hockey is an intense and physical game that requires protection of players and prevention of injuries wherever possible.

2. What message do we send junior hockey leagues and younger players when we don't send stronger messages against hockey violence? NHL players are role models and set the standards for youth playing hockey. Junior hockey players who aspire to be drafted by the NHL have to fight and risk injury in order to prove their worth and full potential. These young men are teenagers and face unnecessary risks of concussion to pursue their dreams. Junior hockey team owners have stated that their teens have to fight since they are suppliers to the NHL. Hockey should be about athletic speed, skill and determination

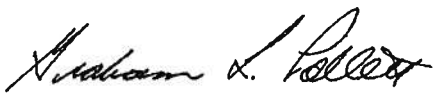
rather than becoming a goon for a team. In a recent Bruins-Stars game, there were 3 fights in the first 6 seconds of play. It is hard to argue that fighting is essential to the game and is part of the flow of the sport under those conditions.

3. Many parents and educators are worried about the impact of media violence on our children's development. The fights and hits to the head have become a form of entertainment where videos have been created to glorify these incidents and sports shows that highlight the fights of the week are part of a hockey entertainment package. The media promotes the most negative aspects of the game and signals to our youth that this unsportsmanlike conduct is to be admired.

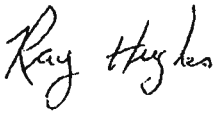
We understand that there is tremendous resistance to change. We recognize that some fans and commentators support the violence and see it as inevitable in a high-speed contact sport like hockey. The Olympics prove the opposite. Fighting and violence sells but we would argue that the fans would not turn away. In fact in some of the US markets, you might find more families interested in the game without the fighting.

We know that fighting has always been part of hockey but rules change in hockey on a regular basis from penalty calls to the size of the goal crease. Goalies wore no masks in the NHL just 30 years ago and junior players didn't have to wear mouth guards or helmets with visors. Eliminating all intentional hits to the head including fighting should be part of that same shift and would send a strong message that violence is no longer acceptable to our hockey heroes and our national pastime.

Peter Jaffe PhD, Professor, Faculty of Education, University of Western Ontario
Centre for Research and Education on Violence against Women and Children
Jaffe 519-661-2018 e-mail: pjaffe@uwo.ca



Graham Pollett MD, Medical Officer of Health,
The Middlesex-London Health Unit
519-663-5317 ext 2444 email: graham.pollett@mlhu.on.ca



Ray Hughes MEd, National Coordinator, CAMH Centre for Prevention Science
519-858-5144 ext. 25508 email: r.hughes@tvdsb.on.ca

Appendix B

London activist takes a swing at hockey fights

A silent majority deplore fighting but don't dare say so, claims Peter Jaffe

By PATRICK MALONEY, THE LONDON FREE PRESS

Last Updated: February 25, 2011 9:53pm

A silent chorus of hockey players, including some NHLers, is afraid to publicly speak out against fighting in the sport, an anti-violence advocate says.

In the wake of Mario Lemieux's anger over a brawl involving his Pittsburgh Penguins, Peter Jaffe of the University of Western Ontario has co-signed a public letter urging NHL Commissioner Gary Bettman to ban fights.

Jaffe says he speaks for a group of hockey players too intimidated by the sport's culture to speak up.

"I have contact with junior hockey and NHL players and all of them are afraid to come out publicly," Jaffe said. "They say (speaking out) will hurt their careers; they'll be seen as chickens. There's a code of silence. If you challenge the issue you're going to be singled out."

Jaffe wrote his letter to Bettman with Graham Pollett, London's chief public health official, and Ray Hughes of the Centre for Addiction and Mental Health.

A huge hockey fan, Jaffe says he has interviewed countless major-junior players and three NHLers who've expressed those anti-fighting feelings off the record.

NHL fighting is receiving renewed scrutiny after a Feb 11 brawl between the New York Islanders and Pittsburgh.

That brawl prompted the Penguins' famed owner, Lemieux, to rip the league's response.

"If the events relating to (the fight) reflect the state of the league, I need to re-think whether I want to be a part of it," Lemieux said. "What happened . . . wasn't hockey. It was a travesty."

Jaffe and Pollett cite Lemieux's comments in the letter to Bettman and the NHL governors. They also note fighting disappears in the playoffs and is a non-entity in U.S. college hockey.

E-mails to NHL spokesperson and Bill Daly, the NHL's deputy commissioner, were not returned.

The concerns of Jaffe and Pollett appear to be two-pronged: The physical damage, specifically concussions, fighting poses to players and the message about violence it sends to fans, particularly children.

But any attempt to alter hockey's culture, given the passionate support many fans have for fighting, will face severe resistance.

A New York-based website, hockeyfights.com, underscores on-ice pugilism's popularity. The site, featuring video clips and analysis of NHL fights, draws a whopping 10 million page views a month.

Its founder is David Singer, an articulate web developer and father of two who questions whether hockey fighting hurts society.

"I can't think of anyone who loves a good hockey fight more than I do and I certainly know better than to walk down the street and punch someone in the face," he said.

"A group targeting all forms of violence . . . is looking for some sort of nanny state and not looking for anybody to have self-responsibility or parental responsibility.

"The players will tell you, 'I want to hurt the other guy but not injure him.' It sounds contradictory but it's how they go about their business."

Singer says he gets only a few e-mails every month complaining about hockey: "It seems to be wildly popular."

Fighting clearly causes injuries. This season alone, Toronto tough guy Colton Orr and Calgary goon Raitis Ivanans were concussed in fights and Islanders goalie Rick DiPietro suffered a facial fracture.

Perhaps more important to Jaffe, is the impression it leaves on young fans.

"The fights go against everything else we tell children about their behaviour," he said. "If no one was watching (hockey), I wouldn't care. I'm concerned about the impact it has on boys and young men."

Jaffe is less concerned with the torrent of nasty e-mails he expects to receive from pro-fighting fans.

Having spoken out publicly before, he's prepared for another wave of nasty feedback.

"The bullies don't own hockey. Hockey is my sport, too . It's my favourite sport," he said. "I also believe I'm part of the silent majority who are afraid to speak out because they'll be drowned out by the Neanderthals who control the sport."

Jaffe said he hopes his letter generates debate when Bettman meets with the NHL's governors in March.

E-mail patrick maloney@sunmedia ca, read Patrick's City Hall blog or follow patatLFPress on Twitter.

An Open Letter to Gary Bettman and the NHL Board of Governors

We are enthusiastic, lifelong hockey fans who want to lend support to Mario Lemieux and many commentators' views that the recent incidents of fighting in hockey cannot be tolerated. In particular, we endorse Mario Lemieux's words after a recent Penguin-Islander brawl: "It was painful to watch the game I love turn into a sideshow . . . . The NHL (needs) to send a clear and strong message that those kinds of actions are unacceptable and embarrassing to the sport." We agree with these sentiments.

We know that the NHL wants to put the best possible product on the ice and you are always looking for ways to improve the game. We would ask you to consider a number of points in your upcoming discussions:

1. There is increasing research and public awareness about the short- and long-term harm from concussions. We have gone from celebrating Sidney Crosby's gold-medal goal last year to worrying about his future as a result of several blindside hits to his head. Other stars, like Marc Savard, are facing uncertain futures from repeated hits to the head. What is frequently missed is that there is no difference in a hit to the head by an elbow or shoulder than a punch to the head in a fight.

2. What message do we send junior-hockey leagues and younger players when we don't send stronger messages against hockey violence?

NHL players are role models and set the standards for youth playing hockey. Junior hockey players who aspire to be drafted by the NHL have to fight and risk injury in order to prove their worth and full potential. These young men are teenagers and face unnecessary risks of concussion to pursue their dreams.

Junior-hockey team owners have stated that their teens have to fight since they are suppliers to the NHL. Hockey should be about athletic speed, skill and determination rather than becoming a goon for a team. In a recent Bruins-Stars game, there were three fights in the first six seconds of play.

3. Many parents and educators are worried about the impact of media violence on our children's development. The fights and hits to the head have become a form of entertainment such as videos which glorify these incidents and sports shows that highlight the fights of the week as part of a hockey entertainment package. The media promotes the most negative aspects of the game and signals to our youth that this unsportsmanlike conduct is to be admired.

Peter Jaffe PhD, professor, faculty of education, University of Western Ontario

Graham Pollett MD, medical officer of health, the Middlesex-London Health Unit

Appendix C

London Free Press
Saturday, March 5, 2011

Concussion concern a no-brainer

Late last month, three prominent Londoners penned an open letter to Gary Bettman, commissioner of the National Hockey League, and his board of governors, eloquently pleading for action on the problem of violence in the NHL.

It was signed by Peter Jaffe, an education professor at the University of Western Ontario, Graham Pollett, medical officer of health at the Middlesex-London Health Unit, and Ray Hughes, national co-ordinator of the Centre for Addiction and Mental Health's centre for prevention science.

Larry Cornies

The letter made clear to Bettman that the trio was writing as "enthusiastic, lifelong hockey fans." They understood, they wrote, that intense physicality is part of the game and that Bettman faces "tremendous resistance to change."

But they concluded that "eliminating all intentional hits to the head, including fighting" must be part of hockey's next iteration. It's time, they wrote, for the NHL to "send a strong message that violence is no longer acceptable to our hockey heroes and our national pastime."

It would be nice to think that the letter got Bettman's notice — that it wasn't simply noted and filed by some administrative assistant three org-chart levels down from the executive office. Open letters to the NHL commissioner are about as common as pucks in a net during practice.

In the short time since that letter was posted, several additional bits of evidence have emerged to buttress the case.

Marty McSorley, the former NHL tough guy who ranks fourth among all-time penalty minutes leaders, said he worries about telltale signs that his career as an enforcer is coming back to haunt him.

"The Dallas Morning News reported this week that the Centers for Disease Control and Prevention now estimates the number of sports- and recreation-related concussions in the U.S. each year to be more than 3.8 million."

"When I try to shave my right sideburn, I have trouble focusing on it," McSorley told *Globe and Mail* hockey writer Eric Duhatschek. "Then there are times when I'll walk into a room and I'll stand there and go 'Why am I here again?' and you just don't know."

Dr. Charles Tator, a Toronto neurologist widely regarded as the country's most prominent expert on concussions, ramped up a public awareness campaign to get both kids and coaches to understand the brain's delicacy and how susceptible it is, especially before the age of 20, to injury.

He visits schools and coaching clinics carrying a "brain" made of Jell-O, asking onlookers to jiggle it and emphasizing that a human brain has the same consistency and fragility, protected only by a thin skull.

The *Dallas Morning News* reported this week that the Centers for Disease Control and Prevention in Atlanta now estimates the number of sports- and recreation-related concussions in the United States each year to be more than 3.8 million. Football and hockey were among the most problematic sports, but others that ranked surprisingly high were cheerleading and girls' soccer.

see **CORNIES** | Page E8

comment

CORNIES

NHL can't bury its head in the sand

FROM PAGE E1

And on Thursday, Boston University scientists revealed the results of their study of the brain of Bob Probert, the former NHL enforcer in fifth spot — right behind McSorley — on the all-time penalty minutes list.

Probert died of a heart attack last summer at the age of 45. His brain, investigators said, showed he had chronic traumatic encephalopathy (CTE), a degenerative disease that may have had its roots in Probert's three documented concussions and the hundreds of other blows to his head over his hockey career. Boston University is trying to address what it calls a "concussion crisis" in sports.

Little more than a year ago, Sidney Crosby was the hero of every hockey fan in Canada as he scored the goal that won gold at the Winter Olympics. Today, he's out of action (since Jan. 5) because of a concussion — the most valuable player in the world, sitting on hockey's sidelines.

There's no doubt the Crosby effect has brought increased attention to, and awareness of, violence in hockey. It's a much-needed antidote to the "rock-'em, sock-'em" culture that has come to dominate the sport's pro ranks since the 1980s.

The notion that brawls, head shots and other forms of hockey violence are an integral and indispensable part of the game is a canard. Look no further than the Olympics or the annual world junior tournament for proof.

Bettman and his board need to pay attention and act. Doing otherwise would be to inadvertently mimic a certain minister of information who, during Saddam Hussein's demise, insisted there were no Americans in Baghdad.

Or a certain North African dictator who insists no protests are occurring in his country, when all the world knows otherwise.

cornies@gmail.com

Fighting doesn't belong in hockey

Rants & Reasonings

SHERYL ROOTH

Sheryl Rooth is a London mother and creative writer. You can reach her at srooth@sympatico.ca

About a year or two ago, I wrote a column about my opposition to fighting in hockey. Now I understand it's a passionate sport, both for those playing and those watching and cheering on their favourite team. However, I know I'm not the only one that feels this way. So I was cheering myself when I read the excerpts from Dr. Peter Jaffe, Graham Pollett, (London's Chief Public Health Official) and Ray Hughes (Centre of Addiction and Mental Health) letter to Gary Bettman and the NHL Board of Governors. The letter focuses on reasons to consider removing fights from the game.

The feedback that I received from my column was a mixed bag. Some were from people who felt the same as I, that the sport can be appreciated without watching some guy get beaten to a pulp. These were from mostly mothers and a few fathers who had children playing the sport and were concerned about taking their kids up to the competitive level, even though they were really talented and loved the sport. Others thought that the game would lose that raw edge to it, where men settle their disputes with their fists instead of goals. And then there were many that were downright ugly about the fact that they believed fighting was a part of hockey and made no bones about it. Some of my favourite quotes include:

"Get back in the kitchen."

"You're an empty skirt."

"This is why women shouldn't be involved in hockey."

And my favourite, "Ur stupd" came from an executive at a large corporation in London, who sent his message on his company Blackberry. Surprised that he had opposable thumbs to even tap out his message, I just took it from where it came. He was a hockey fan that lives for the blood rush of seeing two other people fight. I guess it's pretty exciting when it's not you with the concussion. After watching hockey with my husband, the world's biggest hockey fan, for over 20 years, I still don't get the thrill of a fight. Perhaps I just have too much estrogen or compassion.

I found it interesting that the authors of this letter used Mario Lemieux as a pivotal point in their argument. Citing comments he made from his disgust over a recent brawl between his team, the Pittsburg Penguins and the New York Islanders. All I could think of was an introduction between the Pot and the Kettle. Mario has had his share of ugly encounters on the ice. Gary Lupul, Gary Carpenter, Bobby Gould, Todd Krygier, Brad Ference, the list goes on. To renounce fighting now seems a little silly on his part, but perhaps years off the bench has changed his perspective. But he didn't say that. His quote "It was painful to watch the game I love turn into a sideshow.... The NHL (needs) to send a clear and strong message that those kinds of actions are unacceptable and embarrassing to the sport." There was nothing that I saw in that fight that was any different than the fight between the Pens and the Caps in 1987, to which Mario was involved.

I believe there are many hockey players who hate the fighting. Who spend hundreds of hours perfecting their game, in hopes that they don't ever have to use their fists to prove themselves. But you'll never hear them say it out loud. When you look at the kids on the Knights or the Bulls or the Spits, they're barely shaving. We love the game, the entertainment they provide, the money they generate. I spend every day teaching my kids that fighting isn't the answer, and they click to the big game where fighting is the answer. Oh sure, there's a five-minute consequence for their actions, but that's it. You don't get a lot of close-ups on the scars.

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 028-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

Medical Officer of Health Activity Report – March

Recommendation
It is recommended that Report No. 028-11 re Medical Officer of Health Activity Report – March be received for information.

The following report highlights activities of the Medical Officer of Health since the last Board of Health meeting.

Subsequent to the Board of Health endorsing the continuation of fluoridating the City of London's drinking water supply, there has been a great deal of activity concerning this issue. Leading up to and following an anti-fluoridation lecture by Dr. Paul Connett, PhD, the Medical Officer of Health and Dr. Bryna Warshawsky, Associate Medical Officer of Health and Director, Oral Health Communicable Disease and Sexual Health Services, were involved in multiple media interviews. In addition, responses were provided to queries from a number of members of City Council. A further update will be provided at the March 17th Board of Health meeting.

The implementation of the DineSafe Food Premises Inspection Disclosure System continues to progress. The Medical Officer of Health was involved in presentations to Adelaide Metcalfe and North Middlesex Municipal Councils. An update on this initiative is provided in Board Report 030-11 (Item #7) of this Agenda.

At the March 8th Middlesex County Council meeting, the Medical Officer of Health participated in a number of presentations to Council. The first was an orientation for newly elected members to Council on the Board of Health Mandate and Programs and Services. This was followed by an overview of the 2011 Board of Health approved budget. Together with representatives from Stantec, the proposed site plan for a backup power generator for 50 King St. was presented. Following this, a plaque was presented on behalf of the Board of Health to County Councillor, Mr. Vance Blackmore, in recognition of his 16 years of service on the Middlesex-London Board of Health.

It has been necessary to implement a number of interim management changes for Environment Health and Chronic Disease Prevention (EHCDP) Services. Mr. Jim Reffle, Director, began a four month leave of absence on March 7th. During this time, Mr. Wally Adams will be Acting Director and to allow him to assume this role, Ms. Betsy Kerr, Public Health Inspector, will be Acting Manager of the Rabies and Safe Water Team (Mr. Adam's Team). These changes were directly communicated to the EHCDP Services staff by the Medical Officer of Health at a staff meeting the morning of March 7th. All staff were subsequently advised by email.

Other activities involving the Medical Officer of Health since the last Board of Health meeting included: participation in an Engaging Boys to Men Working Group meeting; attendance at an Ontario Health Protection and Promotion Agency Workshop on Risk Communication; attendance at the 11th Annual International Women's Day Breakfast; attendance at a Regional HIV AIDS Connection Board of Directors meeting; and attendance at the memorial service for Ms. Joanne Powell, former Public Health Inspector.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 029-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

Healthy Babies Healthy Children Research Project with a Social Worker

Recommendation
It is recommended that Report No. 029-11 re Healthy Babies Healthy Children Research Project with a Social Worker be received for information

Background
In 2009, four Health Units were selected by the Ontario Ministry of Children and Youth Services (MCYS) to pilot test the services of a Social Worker in the Healthy Babies Healthy Children (HBHC) Home Visiting Program and evaluate the impact of these services on families. Middlesex-London; Thunder Bay and District; Ottawa; and Kingston, Frontenac and Lennox & Addington were selected to participate in the research project. Each pilot site receives $100,000 annually in order to carry out the requirements of the research. The Board of Health has been informed of this research through Reports No.011-09, 085-09 and 043-10.

In addition, three Health Units (Peterborough County-City, Sudbury & District and Windsor Essex) continue to serve as comparison sites for the blended home visiting model. These sites are demographically and geographically similar to the four pilot sites. Survey data indicate the HBHC blended home visiting model in the comparison sites is congruent with the HBHC guidelines.

The Pilot Project
One of the methods being used to evaluate the integration of the Social Worker into HBHC is the Family Service Plans (FSP). The FSP allows for the collection of information on the achievement of goals identified by families in HBHC. The FSP is completed by the team of Public Health Nurses (PHN's), Family Home Visitors (FHV's) and the Social Worker in conjunction with the family. Service plan data are entered into a provincial electronic data base. Currently, all 36 Health Units use the FSP.

In addition to the FSP, the seven Health Units will be implementing additional data collection tools during the project to better understand how HBHC is supporting families. The tools currently being used are Nipissing District Development Screens, In-Depth Assessment Supplement, on all families entering the program. The Home Observation for the Measurement of the Environment – Infant/Toddler and Maternal Confidence Questionnaire will be completed on 30 families entering the program for the first time and with children under eight months.

Cathexis Consulting Inc. was engaged by the MCYS to conduct a comparative analysis of the models of HBHC home visiting. This research protocol was reviewed by a Tri-Council Ethics Review Board in addition to an internal review within the Health Unit. Cathexis Consulting Inc. completed site visits to all seven Health Units. The site visits included focus group interviews with managers and staff, interviews with clients, and review of program documents. The site visit for Middlesex-London took place May 17 to 21, 2010.

The Social Worker, recruited by the Health Unit, started in February 2010. Social Work services were provided to selected HBHC high risk families in the areas of financial assistance, housing, employment and education, and immigration. From February 2010 until December 2010, the Social Worker received 46 referrals from PHN's who were already engaged with families through HBHC. She provided services in four domains: financial stability (32 families), housing (19 families), continued education /employment training (13 families), and effective settlement and cultural adaptation (3 families). On two occasions, she functioned in the role of service coordinator, but for the majority of the cases, the PHN functioned as the service coordinator (44 families). In addition to the direct service, the Social Worker provided consultation to PHN's on 6 families who did not require in depth social work services.

Next Steps
The MCYS will review all of the data to make recommendations and determine next steps for the HBHC Program. Participation in this model has provided HBHC families with access to services in the areas of financial stability, housing, continued education /employment training, and effective settlement and cultural adaptation. The services of the Social Worker enable the PHN's and FHV's to focus on assisting

and educating the families as to how to provide a healthy start for their children. The Health Unit has received a letter from MYCS indicating the funding for the Social Worker position has been extended until June 30, 2011 (Appendix A).

This report was prepared by Ms. Suzanne Vandervoort, Manager, Home Visiting Team, Family Health Services.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

This report addresses the following requirement(s) of the Ontario Public Health Standards: Child Health

Ministry of Children and Youth Services

Early Learning and Child Development Branch

Strategic Policy and Planning Division
3rd Floor
101 Bloor St. W.
Toronto ON M5S 2Z7

Tel: 416 325-5874
Fax: 416 326-0478

Ministère des Services à l'enfance et à la jeunesse

Direction de l'apprentissage et du développement des jeunes enfants

Division des politiques et de la planification stratégiques
3e étage
101, rue Bloor Ouest
Toronto ON M5S 2Z7

Tél. : 416 325-5874
Téléc. : 416 326-0478

Ontario

February 11, 2010

Dr. Graham Pollett
Medical Officer of Health
Middlesex-London Health Unit
50 King Street
London, ON N6A 5L7

Dear Dr. Pollett:

I am pleased to inform you that we are providing an additional $25,000 to extend the Healthy Babies Healthy Children (HBHC) Home Visiting Research Project support of your Social Worker to June 30, 2011.

The Home Visiting Research Project included the services of a Social Worker as part of the HBHC home visiting team in order to determine the best model of service delivery for high risk families in the HBHC program.

The HBHC Home Visiting Research Project will conclude this year. This payment and an earlier one in January 2011 will provide support to your Social Worker to the end of June 30, 2011.

If you have any questions, please do not hesitate to call Alex Rishea, Senior Analyst at 416 326-8370.

Sincerely,

Julie Mathien, Director
Early Learning and Child Development Branch

c: Diane Bewick, Director, Middlesex-London Health Unit

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 030-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

Bylaws for Food Premises Inspection Disclosure and Foodhandler Certification – County Update

Recommendation
It is recommended that Report No. 030-11 re Bylaws for Food Premises Inspection Disclosure and Foodhandler Certification – County Update be received for information.

Background
On April 27, 2010, the Medical Officer of Health, together with Mr. Jim Reffle, Director, Environmental Health and Chronic Disease & Injury Prevention Services and Mr. David White, Manager, Environmental Health, addressed Middlesex County Council on the proposed colour-coded signage and foodhandler certification requirements as part of a Food Premises Inspection Disclosure System. County Council was supportive of the implementation of such a system throughout the County and directed staff to review whether or not this required individual Municipal Council approval versus passage by County Council of a County-wide bylaw.

Follow-up meetings involving Mr. Reffle, Dr. Pollett, Mr. Bill Rayburn (Chief Administrative Officer for Middlesex County) and Ms. Kathy Bunting (County Clerk) were held. After seeking legal opinion, it was determined that County Council did not have the legal authority to establish a county-wide bylaw of this nature. Therefore, Health Unit staff was required to seek approvals for local bylaws from individual Municipal Councils.

Local Bylaw Approval Process
As proposed to County Council, staff recommended that once the City of London bylaw had been established, efforts would proceed within the County. The City of London bylaw would serve as a template to provide a consistent approach across the Health Unit's jurisdiction. A meeting was held with Middlesex Municipal Chief Administrative Officers/Clerks who advised not beginning this process until after the Municipal election.

Information packages about the DineSafe Middlesex-London program and a draft bylaw were developed and provided to each Municipal Council beginning in January 2011. Formal presentations were provided to each Municipal Council by the Medical Officer of Health, Mr. Reffle and Mr. White.

As a result, the following list summarizes the outcomes to date:

- Municipality of Middlesex Centre passed the bylaw on January 12th
- Municipality of Lucan Biddulph passed the bylaw on January 17th
- Municipality of Thames Centre passed the bylaw on January 24th
- Municipality of Southwest Middlesex passed the bylaw on February 2nd
- Municipality of Strathroy-Caradoc passed the bylaw on February 7th

Each of the approved, local bylaws is the same as the London bylaw. The effective date for the green-yellow-red sign provisions is July 1, 2011. The effective date for the certified foodhandler on duty requirement is January 1, 2012.

At the time of writing of this report, the outcome for the remainder of the Municipal Councils was still to be determined. A verbal update for the results of the deliberations from the Village of Newbury (presented on February 14th), Municipality of Adelaide Metcalfe (presented on February 22nd) and Municipality of North Middlesex (presented on March 7th) will be given at the March Board of Health meeting.

Conclusion
The goal of having a consistent approach for food safety inspection disclosure and certified foodhandler training across municipalities in Middlesex County is progressing. Public Health Inspectors will be visiting all food premises throughout the County to provide printed materials and answer questions about the new program and bylaws. A media campaign will also be implemented, similar to what had been done in the

City of London, prior to the launch last year. This will include interviews, newspaper ads and public information sessions in convenient locations across the County.

This report was prepared by Mr. James Reffle, Director, Environmental Health and Chronic Disease & Injury Prevention Services and Mr. David White, Manager of Environmental Health (Food Safety and Vector Borne Disease Programs).

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

This report addresses the following requirements of the Ontario Public Health Standards:
Requirement 4. of the *Food Safety Standard* that the board of health shall ensure food handlers in food premises have access to training in safe food-handling practices and principles in accordance with the *Food Safety Protocol, 2008* (or as current).
Requirement 4. c. of *Food Safety Protocol (2008)*, requiring that the board of health shall establish a procedure for disclosure of information from food premises compliance inspection reports, to be provided upon request by the public. Reference to the process by which the public may obtain such information shall be posted on the board of health's website.

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 031-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

Media Summary Report – July 2010 to December 2010

Recommendation
It is recommended that Report No. 031-11 re Media Summary Report – July 2010 to December 2010 be received for information

There were 594 media reports in the second half of 2010 noting the involvement and activities of the Health Unit in the community. This is a significant decrease (47%) from the number of media reports in the second half of 2009, when there were 1,115 media stories about the Health Unit. It should be noted however, that media coverage in 2009 was unusually high due to significant media attention focusing on the H1N1 Pandemic. The total number of media reports for 2010 was 1,188, which compares closely with the number of media reports in 2007 (1,221) and 2008 (1,157).

Seasonal influenza was the top story in the second half of 2010, including the vaccine, an early outbreak at a long-term care facility in September and the fall immunization campaign itself. The media showed interest in the Heat Alerts that were issued in the summer of 2010. There was also good media coverage of the launch of the DineSafe Middlesex-London program, including the September public information sessions and the launch of the DineSafe program on October 1st.

Radio reports were the main source of information in London, citing the Health Unit 300 times; followed by 110 print media stories and 73 TV news stories; there were also 15 talk show appearances. It should be noted that the lower number of television news stories in the second half of 2010 was due in large part to the cancellation of Rogers' First Local, its daily supper-hour newscast. Historically, this program had provided the Health Unit with an excellent vehicle for coverage of its programs and services.

In all, 39.5% of stories were initiated by the media themselves, while, 35.5% of stories came as a result of news releases; slightly less than 22.4% of media coverage was part of program promotion, while Board of Health reports accounted for about 2.6% of stories. As a result, there were on average just over 3.2 media stories about the health unit per day in the second half of 2010. For a detailed overview, please refer to the attached Media Summary Report (Appendix A).

This report was prepared by Mr. Dan Flaherty, Manager, Communications.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

This report addresses Policy #9-40 Media Relations, as outlined in the MLHU Administration Policy Manual.

BUREAU DE SANTÉ DE MIDDLESEX-LONDON HEALTH UNIT
www.healthunit.com

MEDIA SUMMARY REPORT
JULY – DECEMBER 2010

1. MEDIA COVERAGE*				TOTAL: 594
RADIO	**TALK SHOW**	**TV**	**PRINT**	**INTERNET**
300	15	73	110	3

* These figures reflect the number of times that each item was aired.

2. Origin Codes			
Media Release (MR)	81	Media Initiated (EXT)	90
Board Reports (BR)	6	MLHU Initiated (INT)	51

3. NEWS/CURRENT AFFAIRS COVERAGE

Date	Code	Outlet	Topic
02-Jul	MR	London Free Press	Heat Alert Issued for Middlesex-London (July 2)
05-Jul	MR	Rogers TV - First Local	Heat Alert Extended for Middlesex-London (July 5)
05-Jul	MR	NewsTalk 1290 CJBK	Heat Alert Extended for Middlesex-London (July 5)
05-Jul	MR	A-News	Heat Alert Extended for Middlesex-London (July 5)
06-Jul	MR	CBC Radio Ontario Morning	Heat Alert Extended for Middlesex-London (July 5)
06-Jul	MR	NewsTalk 1290 CJBK	Heat Alert Extended for Middlesex-London (July 5)
06-Jul	MR	London Free Press	Heat Alert Extended for Middlesex-London (July 5)
06-Jul	MR	CHRW	Heat Alert Extended for Middlesex-London (July 5)
06-Jul	EXT	Rogers TV - First Local	Pool Safety in the Summer
07-Jul	MR	Middlesex Banner	Heat Alert Issued for Middlesex-London (July 2)
07-Jul	MR	Middlesex Banner	Heat Alert Issued for Middlesex-London (July 2)
07-Jul	EXT	Rogers TV - Eye on the Wall	Mixed Martial Arts
08-Jul	MR	Parkhill Gazette	Heat Alert Extended (July 5)
08-Jul	MR	London Free Press	Precautions for athletes during sports in hot temperatures
13-Jul	EXT	My FM Radio Strathroy	Water safety
15-Jul	EXT	NewsTalk 1290 CJBK	FluMist vaccine approved by Health Canada
15-Jul	EXT	Rogers TV - First Local	FluMist vaccine approved by Health Canada
15-Jul	EXT	Rogers TV - First Local	How to prevent heat-related illness
16-Jul	EXT	A-News	Bed bugs
21-Jul	EXT	Sun Media	Back to school safety - dropping kids off at school
21-Jul	EXT	XFM - Fanshawe	Eating habits for teens and early adults, ways to lose the extra weight to get a beach body
21-Jul	EXT	XFM - Fanshawe	FluMist vaccine approved by Health Canada
21-Jul	EXT	Middlesex Banner	Mosquito problem in Parkhill
23-Jul	MR	AM980	Heat Alert Issued for Middlesex-London (July 23)

3. NEWS/CURRENT AFFAIRS COVERAGE

Date	Code	Outlet	Topic
23-Jul	MR	CHRW Radio Western	Heat Alert Issued for Middlesex-London (July 23)
23-Jul	MR	CJBK	Heat Alert Issued for Middlesex-London (July 23)
23-Jul	MR	A-News	Heat Alert Issued for Middlesex-London (July 23)
23-Jul	MR	Toronto Star	Heat Alert Issued for Middlesex-London (July 23)
24-Jul	MR	London Free Press	Heat Alert Issued for Middlesex-London (July 23)
26-Jul	EXT	A-News	Increasing popularity of highly caffeinated energy drinks among kids and teens
26-Jul	EXT	NewsTalk 1290 CJBK	Increasing popularity of highly caffeinated energy drinks among kids and teens
30-Jul	EXT	London Free Press	Update on food inspection disclosure system - new enforcement activities feature
30-Jul	EXT	XFM - Fanshawe	STIs in adults aged 50+
04-Aug	EXT	UWO Journalism	Portion control when visiting and eating at outdoor festivals
04-Aug	EXT	AM980	Food Inspections of Festival Food vendors
05-Aug	EXT	NewsTalk 1290 CJBK	WNV-Positive mosquitoes found in SW Ontario and GTA
05-Aug	MR	A-News	WNV-Positive mosquitoes found in SW Ontario and GTA
05-Aug	EXT	London Free Press	C. Difficile outbreak at Victoria Hospital
05-Aug	MR	X-FM Fanshawe	WNV-Positive mosquitoes found in SW Ontario and GTA
06-Aug	EXT	Middlesex Banner	WNV and mosquitoes in Parkhill
06-Aug	MR	UWO Journalism	WNV-Positive mosquitoes found in SW Ontario and GTA
06-Aug	MR	Rogers TV - First Local	WNV-Positive mosquitoes found in SW Ontario and GTA
07-Aug	INT	London Free Press	Tender for generator installation
09-Aug	EXT	AM980	H1N1 pandemic is officially over
09-Aug	EXT	Sun Media	How a parent can assess whether their child is legitimately ill and should stay home from school
11-Aug	MR	Middlesex Banner	WNV positive mosquitoes found in SW Ontario and GTA
12-Aug	MR	Parkhill Gazette	WNV positive mosquitoes found in SW Ontario and GTA
12-Aug	MR	Londoner	WNV found in local mosquito pool and 2 dead birds
16-Aug	MR	A-News	WNV found in local mosquito pool and 2 dead birds
16-Aug	MR	Parkhill Gazette	WNV found in local mosquito pool and 2 dead birds
16-Aug	EXT	AM980	Mixed Martial Arts
16-Aug	MR	NewsTalk 1290 CJBK	WNV found in local mosquito pool and 2 dead birds
20-Aug	MR	CHRW	WNV found in local mosquito pool and 2 dead birds
19-Aug	EXT	Parkhill Gazette	Dog attack - quarantined by MLHU - euthanized after 2nd attack
20-Aug	MR	London Free Press	WNV found in local mosquito pool and 2 dead birds
26-Aug	EXT	Rogers TV - First Local	CMA and its call for a ban on Mixed Martial Arts
30-Aug	MR	X-FM Fanshawe	Heat Alert issued for Middlesex-London
30-Aug	MR	My-FM Strathroy	Heat Alert issued for Middlesex-London
30-Aug	MR	Rogers TV - First Local	Heat Alert issued for Middlesex-London
30-Aug	MR	A-News	Heat Alert issued for Middlesex-London
30-Aug	MR	CBC Radio One - London	Heat Alert issued for Middlesex-London

3. NEWS/CURRENT AFFAIRS COVERAGE

Date	Code	Outlet	Topic
31-Aug	MR	London Free Press	Heat Alert issued for Middlesex-London
01-Sep	MR	Middlesex Banner	Heat Alert Issued for Middlesex-London (Aug 30)
08-Sep	EXT	London Free Press	Stats Canada survey on behalf of MLHU - Sept 15-20
09-Sep	MR	X-FM Fanshawe	Mocktail Madness event to mark FASDay
09-Sep	MR	London Free Press	Mocktail Madness event to mark FASDay
09-Sep	EXT	Parkhill Gazette	Dog bite info to municipality
10-Sep	EXT	X-FM Fanshawe	Influenza vaccinations - getting your flu shot
13-Sep	MR	London Free Press	Promotion of public info sessions re: DineSafe Program
13-Sep	MR	A-News	Promotion of public info sessions re: DineSafe Program
14-Sep	EXT	CBC Radio	Promotion of public info sessions re: DineSafe Program
14-Sep	EXT	London Free Press	LDCSB to create a smoking area on property next to Regina Mundi
14-Sep	EXT	X-FM Fanshawe	How is MLHU gearing up for flu season?
14-Sep	MR	X-FM Fanshawe	DineSafe information sessions
14-Sep	EXT	L'Action	Défi de la santé dans les écoles
14-Sep	MR	Rogers TV - First Local	DineSafe information sessions
15-Sep	INT	London Free Press	Internet Streaming of September Board of Health Meeting
15-Sep	BR	X-FM Fanshawe	End to Generational Poverty - BoH report
15-Sep	BR	X-FM Fanshawe	DineSafe information sessions
15-Sep	BR	X-FM Fanshawe	HPV Information session video
16-Sep	EXT	The Londoner	Stats Canada survey on behalf of MLHU - Sept 15-20
16-Sep	INT	The Londoner	Promotion of public info sessions re: DineSafe Program
17-Sep	EXT	Readers Digest	PCB Cleanup in East London - follow-up what did survey cost?
18-Sep	INT	London Free Press	Promotion of public info sessions re: DineSafe Program
20-Sep	EXT	Interrobang	Sexual Health
20-Sep	EXT	A-News	2010 Flu Season/GSK Fluviral vaccine
21-Sep	EXT	X-FM Fanshawe	Seasonal flu shot and lower risk of heart attack (radio documentary)
22-Sep	EXT	AM980	Number of smog days in the summer of 2010
23-Sep	MR	The Londoner	Promotion of public info sessions re: DineSafe Program
23-Sep	MR	NewsTalk 1290 CJBK	Influenza Cases at Local Long-Term Care Facility
23-Sep	MR	AM980	Influenza Cases at Local Long-Term Care Facility
23-Sep	MR	My-FM Strathroy	Promotion of public info sessions re: DineSafe Program
23-Sep	MR	Strathroy Age Dispatch	Promotion of public info sessions re: DineSafe Program
23-Sep	MR	A-News	Influenza Cases at Local Long-Term Care Facility
23-Sep	MR	NewsTalk 1290 CJBK	Influenza Cases at Local Long-Term Care Facility
24-Sep	MR	London Free Press	Influenza Cases at Local Long-Term Care Facility
30-Sep	INT	London Free Press	DineSafe coming October 1
30-Sep	EXT	London Free Press	Pest control companies busy with requests from eateries as postings loom

3. NEWS/CURRENT AFFAIRS COVERAGE

Date	Code	Outlet	Topic
30-Sep	INT	Rogers TV - First Local	DineSafe coming October 1
01-Oct	INT	London Free Press	DineSafe starts today
01-Oct	INT	L'Action	DineSafe starts today
01-Oct	EXT	London Free Press	New restaurant postings a tool to protect consumers
01-Oct	MR	X-FM Fanshawe	Minister of Health announces Healthy Smiles program at MLHU
01-Oct	MR	Rogers TV - First Local	Minister of Health announces Healthy Smiles program at MLHU
01-Oct	MR	AM980	Minister of Health announces Healthy Smiles program at MLHU
01-Oct	MR	NewsTalk 1290 CJBK	Minister of Health announces Healthy Smiles program at MLHU
01-Oct	MR	Magazine Latino	Minister of Health announces Healthy Smiles program at MLHU
01-Oct	MR	London Free Press	Minister of Health announces Healthy Smiles program at MLHU
02-Oct	INT	London Free Press	Prenatal Fair (Oct 6)
05-Oct	INT	London Free Press	Prenatal Fair (Oct 6)
06-Oct	EXT	AM980	British study shows occasional drink doesn't seem to affect fetus
06-Oct	MR	Dorchester Signpost	Healthy Smiles program
07-Oct	EXT	Rogers TV - Daytime	Feeding your busy family
07-Oct	EXT	X-FM Fanshawe	Preventing the flu - steps you can take to stay healthy
07-Oct	EXT	X-FM Fanshawe	Rotavirus
07-Oct	MR	St. Thomas Times Journal	Healthy Smiles program
07-Oct	MR	Toronto Sun	Healthy Smiles program
07-Oct	EXT	The Londoner	Health Unit offered advice in advance of flu season
07-Oct	EXT	X-FM Fanshawe	Adventures in Sex City
14-Oct	EXT	Rogers TV - Daytime	Enjoy the fall harvest
14-Oct	EXT	Transcript & Free Press	St. Charles named as Healthy School
14-Oct	EXT	X-FM Fanshawe	Radio documentary on local produce
14-Oct	EXT	A-News	KFC Double Down sandwich - nutritional value?
19-Oct	MR	AM980	Launch of community influenza clinics
19-Oct	EXT	A-News	Ontario's new Tobacco Control Strategy
19-Oct	EXT	London Free Press	First yellow signs posted at London eateries
20-Oct	INT	London Free Press	Internet Streaming of October Board of Health Meeting
20-Oct	INT	London Free Press	list of Influenza Vaccination Clinics (Oct 23 - Dec 16)
20-Oct	EXT	UWO Gazette	Launch of DineSafe program
20-Oct	EXT	UWO Gazette	DineSafe program
21-Oct	EXT	Rogers TV - Daytime	Healthy Living Champions Award for Elementary Schools
21-Oct	MR	London Free Press	Launch of community influenza clinics
21-Oct	EXT	X-FM Fanshawe	Bed bugs in London
21-Oct	BR	X-FM Fanshawe	Flu O/Bs in Long-term care facilities

3. NEWS/CURRENT AFFAIRS COVERAGE

Date	Code	Outlet	Topic
21-Oct	EXT	London Free Press	Bed bugs not a problem in London
25-Oct	EXT	AM980	Influenza immunization clinic numbers
25-Oct	MR	UWO Gazette	MLHU Sex Squad out on Saturday night
25-Oct	MR	X-FM Fanshawe	MLHU Sex Squad out on Saturday night
25-Oct	EXT	X-FM Fanshawe	Radio documentary on influenza vaccination
26-Oct	EXT	X-FM Fanshawe	Mumps cases at UWO
27-Oct	EXT	UWO Gazette	Mumps cases at UWO
27-Oct	MR	Middlesex Banner	Launch of community influenza clinics
27-Oct	INT	Middlesex Banner	List of Influenza Vaccination Clinics (Oct 28 - Nov 30)
27-Oct	INT	Dorchester Signpost	List of Influenza Vaccination Clinics (Oct 28 - Nov 30)
28-Oct	EXT	Rogers TV - Daytime	Halloween treats
28-Oct	EXT	NewsTalk 1290 CJBK	Hunt Club - Norovirus outbreak at Thanksgiving
28-Oct	EXT	A-News	Hunt Club - Norovirus outbreak at Thanksgiving
28-Oct	EXT	NewsTalk 1290 CJBK	Hunt Club - Norovirus outbreak at Thanksgiving
28-Oct	INT	Parkhill Gazette	list of Influenza Vaccination Clinics (Oct 28 - Nov 30)
28-Oct	INT	Transcript & Free Press	list of Influenza Vaccination Clinics (Oct 28 - Nov 30)
28-Oct	MR	Strathroy Age Dispatch	Flu clinics being held in Strathroy
29-Oct	EXT	London Free Press	Norovirus outbreak at London Hunt & Country Club
29-Oct	MR	XFM - Fanshawe	Adventures in Sex City - sequel in the works
29-Oct	MR	London Free Press	Adventures in Sex City - sequel in the works
02-Nov	EXT	Rogers TV - Daytime	Healthy breakfast in a hurry
02-Nov	EXT	A-News	Influenza Clinics and numbers who've attended
02-Nov	EXT	UWO Gazette	Bed bugs
03-Nov	EXT	Hamilton Spectator	C .difficile outbreak in Hamilton / understand may be one in London
03-Nov	INT	London Free Press	List of Influenza Vaccination Clinics (Nov 3-Dec16)
04-Nov	MR	XFM - Fanshawe	TFSR - Youth video contest
04-Nov	EXT	Rogers TV - Daytime	One pot meals
08-Nov	EXT	My-FM Strathroy	MLHU Seasonal Flu Clinics - update
10-Nov	INT	Dorchester Signpost	List of Influenza Vaccination Clinics (Nov 16-30)
10-Nov	EXT	UWO Gazette	Cell phone STI test
11-Nov	MR	NewsTalk 1290 CJBK	Local mumps cases prompts health unit to remind Londoners to get immunized
11-Nov	MR	A-News	Local mumps cases prompts health unit to remind Londoners to get immunized
11-Nov	MR	AM980	Local mumps cases prompts health unit to remind Londoners to get immunized
11-Nov	MR	X-FM Fanshawe	Local mumps cases prompts health unit to remind Londoners to get immunized
11-Nov	INT	Transcript & Free Press	List of Influenza Vaccination Clinics (Nov 16-30)
11-Nov	INT	Strathroy Age Dispatch	List of Influenza Vaccination Clinics (Nov 16-30)
11-Nov	INT	Parkhill Gazette	List of Influenza Vaccination Clinics (Nov 16-30)

3. NEWS/CURRENT AFFAIRS COVERAGE

Date	Code	Outlet	Topic
11-Nov	EXT	Rogers TV - Daytime	Quick easy meals for your family
17-Nov	MR	The Londoner	Local mumps cases prompts health unit to remind Londoners to get immunized
17-Nov	INT	London Free Press	Internet Streaming of November Board of Health meeting
17-Nov	INT	Dorchester Signpost	Because…the driver was distracted…
17-Nov	INT	Dorchester Signpost	List of Influenza Vaccination Clinics (Nov 23-30)
17-Nov	INT	Middlesex Banner	List of Influenza Vaccination Clinics (Nov 23-30)
18-Nov	EXT	XFM - Fanshawe	The effects of tanning beds / cancer prevention
18-Nov	INT	Parkhill Gazette	Because…the driver was distracted…
18-Nov	INT	Transcript & Free Press	Because…the driver was distracted…
18-Nov	INT	Parkhill Gazette	List of Influenza Vaccination Clinics (Nov 23-30)
18-Nov	INT	Transcript & Free Press	List of Influenza Vaccination Clinics (Nov 23-30)
18-Nov	INT	Strathroy Age Dispatch	List of Influenza Vaccination Clinics (Nov 23-30)
18-Nov	INT	Strathroy Age Dispatch	Because…the driver was distracted…
18-Nov	BR	X-FM Fanshawe	Youth Engagement strategies in FHS
18-Nov	BR	X-FM Fanshawe	Nutritious Food Basket - Cost of Basic Needs
18-Nov	EXT	Rogers TV - Daytime	Quick and easy breakfast ideas
19-Nov	EXT	Rogers TV - Daytime	Menu Maker
19-Nov	INT	London Free Press	Connecting Children & Youth to Lifelong Phys Activity & Sports
19-Nov	EXT	A-News	Closing of Ming's Buffet
19-Nov	EXT	NewsTalk 1290 CJBK	Closing of Ming's Buffet
19-Nov	EXT	X-FM Fanshawe	Safety of tanning beds - Radio Doc
20-Nov	INT	London Free Press	List of Influenza Vaccination Clinics (Nov 20-Dec 16)
23-Nov	MR	AM980	HU issues warning about home-based tattoo & body piercing business
23-Nov	MR	A-News	HU issues warning about home-based tattoo & body piercing business
23-Nov	MR	London Free Press	HU issues warning about home-based tattoo & body piercing business
24-Nov	MR	XFM - Fanshawe	HU issues warning about home-based tattoo & body piercing business
24-Nov	MR	Middlesex Banner	Influenza Surveillance Report - Nov 18/2010
24-Nov	MR	Dorchester Signpost	Ontario Youth Unite to Take Action Against Smoking in Movies
24-Nov	INT	Dorchester Signpost	Little Sleepers Need a Safe Place to Sleep
25-Nov	INT	Parkhill Gazette	Little Sleepers Need a Safe Place to Sleep
25-Nov	INT	Transcript & Free Press	Little Sleepers Need a Safe Place to Sleep
25-Nov	INT	Strathroy Age Dispatch	Little Sleepers Need a Safe Place to Sleep
25-Nov	EXT	X-FM Fanshawe	Spotting the hidden fats in food
25-Nov	EXT	Rogers TV - Daytime	Hot drinks for winter
30-Nov	INT	Magazine Latino	Congratulations on 100th issue
30-Nov	EXT	X-FM Fanshawe	Ontario Lung Association story - Ontarians not concerned abt. Flu

3. NEWS/CURRENT AFFAIRS COVERAGE

Date	Code	Outlet	Topic
01-Dec	INT	Middlesex Banner	Influenza Surveillance Report - Nov 25/2010
01-Dec	INT	London Free Press	List of Influenza Vaccination Clinics (Dec 2-16))
01-Dec	MR	Middlesex Banner	HU issues warning about home-based tattoo & body piercing business
01-Dec	EXT	X-Fm Fanshawe	Importance of HIV testing / what's involved / who should be tested?
02-Dec	INT	Parkhill Gazette	Because…the driver was distracted…
02-Dec	INT	Transcript & Free Press	Because…the driver was distracted…
02-Dec	INT	Strathroy Age Dispatch	Because…the driver was distracted…
02-Dec	EXT	Rogers TV - Daytime	Healthy holidays
03-Dec	EXT	A-News	Update on local influenza cases
07-Dec	INT	NewsTalk 1290 CJBK	MLHU Office closed
07-Dec	INT	AM980	MLHU Office closed
08-Dec	INT	NewsTalk 1290 CJBK	MLHU Office closed
08-Dec	INT	AM980	MLHU Office closed
08-Dec	INT	Dorchester Signpost	Your life, Your health, Your Health Unit
08-Dec	INT	Middlesex Banner	Your life, Your health, Your Health Unit
09-Dec	INT	Parkhill Gazette	Your life, Your health, Your Health Unit
09-Dec	INT	Strathroy Age Dispatch	Your life, Your health, Your Health Unit
09-Dec	EXT	Rogers TV - Daytime	Assessing your child's growth
14-Dec	EXT	Rogers TV - Daytime	Health eating for the holidays
20-Dec	EXT	Your Health and Fitness	Prenatal / Post natal care and classes
20-Dec	EXT	Your Health and Fitness	Breast cancer screening

* The Communications Department issues Public Service Announcements (PSA's) to all local radio, tv & newspaper outlets on a regular basis. However, because it is very difficult to track if or when PSA's are aired we have not included this information.

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 032-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

Social Media Working Group – Report on Status of Development of a Social Media Strategy

Recommendation
It is recommended that Report No. 032-11 re Social Media Working Group – Report on Status of Development of a Social Media Strategy be received as information.

Background
Social Media is one of the fastest growing means through which people communicate with each other and share information. Social Media websites such as Twitter, Facebook, LinkedIn, YouTube and many others are changing the way that many people, professionals, artists, businesses, organizations and governments keep in touch, discuss and share ideas, reach new clients and customers, and drive traffic to their websites.

The Health Unit is already using some Social Media tools to reach some audiences, including:

- Twitter, which was first used during H1N1 to communicate clinic locations and wait times. More recently, staff has used Twitter to promote programs, upcoming events, news releases, office closings and other public health matters. Today, over 997 people follow on the Health Unit on Twitter, with more signing on each day.

- YouTube, where the Health Unit has a dedicated channel. Videos including the HPV Information Sessions, Play Begins at Home and most recently the first two Teen Parenting Modules have been uploaded to this channel. While this channel is in its very early public stages, it has allowed staff to embed some of the Health Unit video resources directly into the Health Unit website.

- Facebook, which has been used to advertise events and programs, allowing staff to reach a wide audience in a very cost-effective way. Facebook has also been used to promote a video contest among London-area teens and also for some investigative work.

These Social Media “pilot projects” have underscored the need for a broader Health Unit strategy and framework to guide the use of these new resources.

Social Media Working Group
In the Fall of 2010 an initial meeting was held to lay the groundwork for the creation of a working group that would develop a Social Media strategy for the Health Unit. It was proposed that a committee with representation from each service area be convened to develop guidelines and a framework for the Health Unit’s use of social media to reach clients and partners.

The members of the Health Unit’s Social Media Working Group are: Mary Lou Albanese (Environmental Health and Chronic Disease Prevention), Dan Flaherty (Office of the Medical Officer of Health), Eleanor Paget (Oral Health Communicable Diseases and Sexual Health), Graham Smith (Family Health Services), Yvonne Tyml (Human Resources), Rick Shantz (Information Technology), Vanessa Bell (Office of the Medical Officer of Health). Each member of the working group has a particular interest or experience in the use of Social Media tools and websites.

The group met most recently on Friday, February 11th. Among the resources the group is using to develop the Social Media Strategy are the Centres for Disease Control’s The Health Communicator’s Social Media Toolkit; Social Media Tools Investigation prepared by Yvonne Tyml, Health Unit Librarian; and a Library of Parliament Background Paper entitled Social Media: 2. Who Uses Them? The Social Media Working Group also surveyed several staff members about their understanding and use of Social Media and how these resources could be used in their work.

Next Steps
This working group will continue to develop a Social Media strategy for the Health Unit and will present its recommendations to the Directors Committee in the coming months. The next meeting of the Social Media Working Group is scheduled for Thursday, March 31st.

This report was prepared by Mr. Dan Flaherty, Manager, Communications.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 033-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

2010 Budget – Fourth Quarter Review

Recommendation

It is recommended that Report No. 033–11 re 2010 Budget – Fourth Quarter Review be received for information.

2010 4th Quarter Review

The attached Budget Summary (Appendix A) shows actual and budgeted expenditures net of offset revenues for the twelve month period January 1st to December 31st, 2010. For the programs with a March 31st Year-End, this report shows the actual and budgeted expenditures net of offset revenues for the nine-month period April 1st to December 31st, 2010.

Mandatory and Related Programs

For 2010, the Mandatory and Related Programs are reporting an overall favourable variance of $360,040. The primary reason for the favourable variance was the lower than anticipated closure costs for the Public Health Research Education and Development (PHRED) program which was ended in May 2010. The timing of the closure was chosen to ensure closure costs could be paid with the 2010 PHRED funding. Subsequent to the closure decision, the Ministry of Health and Long-Term Care provided additional 100% funding (PHRED was funded on a 50/50 cost-shared basis) for some of the closure costs of the program. Also, one of the staff members who would have been affected by the closure found employment prior to May. Both these factors resulted in a positive variance of approximately $150,000.

The remaining positive variance can be explained by salary and wage savings due to vacancies and staff turnover.

The negative variance for Communicable Diseases and Sexual Health Services is primarily accounted for by cost overruns in the Needle Exchange Program. The negative variance for Corporate Services is the result of planned spending for the Information Technology infrastructure and for Accreditation related costs. These negative variances were offset by the positive variances explained above.

Other Programs

For the items listed under Other Programs (December 31st Year- End Programs), the fourth quarter ended with a favourable variance of $73,455. The majority of this is related to salary and benefit savings as a result of vacancies and staff turnover.

The Dental Treatment program finished the year with a $19,021 deficit. This has been a trend over the past number of years due to the fact that the increase in fees (provincially controlled) has not kept pace with program costs to deliver the service. This deficit has been offset from the Dental Treatment Program Reserve. The new Healthy Smiles Ontario program, which provides financial assistance to low income families, should help the financial position in future years.

March 31st Year-End Programs

For the March 31st Year-End Programs, there is currently a favourable variance of $197,862 which is primarily in the Infant Hearing Screening and tykeTALK programs. This variance will largely be eliminated when necessary warrantees for hearing equipment are purchased this quarter, as well as late receipt of invoices from various agencies.

Summary

The Health Unit has generated a 2010 operating surplus of $360,040 from Mandatory and Related Programs. These programs are cost-shared among the Province, City of London and Middlesex County. The amount owing to each funding partner will be known after the completion of the annual audit by KPMG which is expected to be finalized by the end of March 2011. It is anticipated that the March 31st Year-End Programs will end the fiscal year in a break-even position.

Mr. John Millson, Director, Finance and Operations, will be in attendance at the March 17th Board of Health meeting to address any questions regarding this report.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

This report addresses - Policy No. 4-20 Expenditure Reports as outlined in the MLHU Administration Policy Manual.

Middlesex-London Health Unit
BUDGET SUMMARY
As at December 31, 2010

	2010 YTD ACTUAL	2010 YTD BUDGET	VARIANCE (OVER) / UNDER	% VARIANCE	2010 ANNUAL BUDGET
MANDATORY & RELATED PROGRAMS					
Mandatory Programs:					
Communicable Disease & Sexual Health Services					
Office of the Associate Medical Officer of Health	$ 276,096	$ 317,078	$ 40,982	12.9%	$ 317,078
Vaccine Preventable Diseases	1,097,513	999,325	(98,188)	-9.8%	999,325
The Clinic	1,231,580	1,092,773	(138,807)	-12.7%	1,092,773
Sexual Health Promotion	327,782	330,502	2,720	0.8%	330,502
Infectious Disease Control	509,465	544,867	35,402	6.5%	544,867
Total Communicable Disease & Sexual Health Services	***$ 3,442,436***	***$ 3,284,545***	***$ (157,891)***	***-4.8%***	***$ 3,284,545***
Corporate Services					
Office of the Medical Officer of Health	$ 402,907	$ 355,339	$ (47,568)	-13.4%	$ 355,339
Communications	236,984	233,373	(3,611)	-1.5%	233,373
Special Projects	218,667	134,463	(84,204)	-62.6%	134,463
Travel Clinic	68,017	69,635	1,618	2.3%	69,635
Finance & Operations	562,071	575,355	13,284	2.3%	575,355
Human Resources	487,960	480,043	(7,917)	-1.6%	480,043
Information Services	785,406	653,606	(131,800)	-20.2%	653,606
Emergency Planning	25,501	28,820	3,319	11.5%	28,820
Total Corporate Services	***$ 2,787,512***	***$ 2,530,634***	***$ (256,878)***	***-10.2%***	***2,530,634***
Dental Services					
Dental Prevention	$ 772,940	$ 797,735	$ 24,795	3.1%	$ 797,735
Children in Need of Treatment (CINOT)	513,324	473,680	$ (39,644)	-8.4%	473,680
Total Dental Services	***$ 1,286,263***	***$ 1,271,415***	***$ (14,848)***	***-1.2%***	***$ 1,271,415***
Environmental Health & Chronic Disease & Injury Prevention					
Office of the Director	$ 219,918	$ 199,460	$ (20,458)	-10.3%	$ 199,460
Environmental Health	2,144,311	2,228,380	84,069	3.8%	2,228,380
Chronic Disease and Injury Prevention	1,434,216	1,441,596	7,380	0.5%	1,441,596
Total Environmental Health & Chronic Disease & Injury Prev	***$ 3,798,444***	***$ 3,869,436***	***$ 70,992***	***1.8%***	***$ 3,869,436***

	2010 YTD ACTUAL	2010 YTD BUDGET	VARIANCE (OVER) / UNDER	% VARIANCE	2010 ANNUAL BUDGET
Family Health Services					
Office of the Director	$ 408,337	$ 479,344	$ 71,007	14.8%	$ 479,344
Young Families Team	1,243,408	1,272,669	29,261	2.3%	1,272,669
Family Health Promotion Team	1,123,293	1,127,560	4,267	0.4%	1,127,560
Infant & Family Development Team	671,265	703,938	32,673	4.6%	703,938
Young Adult Team	891,722	918,814	27,092	2.9%	918,814
Child Health Team	1,297,237	1,333,283	36,046	2.7%	1,333,283
Infant Line Program	56,269	68,004	11,735	17.3%	68,004
Let's Grow Program	46,930	43,303	(3,627)	-8.4%	43,303
Total Family Health Services	***$ 5,738,460***	***$ 5,946,915***	***$ 208,455***	***3.5%***	***$ 5,946,915***
General Expenses & Revenues (Benefits and Operations)	***3,624,720***	***3,886,315***	***261,595***	***6.7%***	***3,886,315***
REED Services					
Epidemiology	$ 234,561	$ 265,865	$ 31,304	11.8%	$ 265,865
Program Evaluation	170,356	229,390	59,034	25.7%	229,390
Total REED Services	***$ 404,917***	***$ 495,255***	***$ 90,338***	***18.2%***	***$ 495,255***
TOTAL MANDATORY PROGRAMS	**$ 21,082,754**	**$ 21,284,515**	**$ 201,761**	**0.9%**	**$ 21,284,515**
Related Programs:					
Public Health Research & Development (PHRED) (50:50)	$ 561,830	$ 706,827	$ 144,997	20.5%	$ 706,827
Vector Borne Disease Program (75:25)	602,674	615,956	13,282	2.2%	615,956
TOTAL MANDATORY AND RELATED PROGRAMS	**$ 22,247,258**	**$ 22,607,298**	**$ 360,040**	**1.6%**	**$ 22,607,298**

	2010 YTD ACTUAL	2010 YTD BUDGET	VARIANCE (OVER) / UNDER	% VARIANCE	2010 ANNUAL BUDGET
OTHER PROGRAMS					
December 31 Year-End Programs:					
Infectious Disease Control (MOHLTC)	$1,129,306	$ 1,132,740	$ 3,434	0.3%	$ 1,132,740
Small Drinking Water Systems (MOHLTC)	94,442	107,100	12,658	11.8%	107,100
Infection Control & Prevention Nurse (MOHLTC)	$72,269	82,400	10,131	12.3%	82,400
Smoke Free Ontario (MHP)	$1,011,010	1,017,502	6,492	0.6%	1,017,502
Dental Treatment (User Fees)	$19,021	-	(19,021)	-	-
Healthy Babies/Healthy Children (MCYS)	2,429,789	2,483,313	53,524	2.2%	2,483,313
Health Living (MHP)	$17,332.80	23,570	6,237	26.5%	23,570
Total December 31 Year End Programs	***$ 4,773,170***	***$ 4,846,625***	***$ 73,455***	***1.5%***	***$ 4,846,625***
March 31 Year-End Programs (1):					
Smart Start for Babies (Federal)	$ 99,142	$ 114,323	$ 15,181	13.3%	$ 152,430
Tyke Talk - Preschool Speech & Language (MCYS)	1,068,273	1,105,736	37,463	3.4%	1,474,315
Blind-Low Vision Program (MCYS)	90,878	119,027	28,149	23.6%	158,702
Infant Hearing Screening Program (MCYS)	610,754	727,823	117,069	16.1%	970,430
Total March 31 Year End Programs	***$ 1,869,047***	***$ 2,066,909***	***$ 197,862***	***9.6%***	***$ 2,755,877***
TOTAL OTHER PROGRAMS	**$ 6,642,217**	**$ 6,913,534**	**$ 271,317**	**3.9%**	**$ 7,602,502**
TOTAL MIDDLESEX-LONDON HEALTH UNIT	**$ 28,889,475**	**$ 29,520,832**	**$ 631,357**	**2.1%**	**$ 30,209,800**

MIDDLESEX-LONDON HEALTH UNIT
REPORT NO. 034-11

TO: Chair and Members of the Board of Health
FROM: Graham L. Pollett, MD, FRCPC, Medical Officer of Health
DATE: 2011 March 17

Board of Health Performance Assessment

Recommendation
It is recommended that Report No. 034-11 re Board of Health Performance Assessment be received for information.

Background
On November 18, 2010, the Board of Health approved the use of the Board of Health Performance Assessment Tool. The tool is to be used three times per year i.e., March, June and November, with the first assessment to be done in March 2011. The Board agreed to review the process after one year of implementation.

The adoption of the tool was in follow-up to earlier discussions by the Board and the recommendations made by a Working Group comprised of former Board Chair, Mr. Al Edmondson; former Board member, Mr. Tom McLaughlin; and Board member, Mr. Mark Studenny. Furthermore, the draft Ontario Public Health Organizational Standards identifies Board of Health self-evaluation as a requirement.

The purpose of the assessment is to:

A. Focus on the performance of the Board of Health as a whole, not the performance of individual Board members;

B. Identify areas of Board strength; and

C. Identify areas that could be enhanced.

Description of the Tool
The Board of Health Performance Assessment Tool (Appendix A) is comprised of three sections:

A. How well has the Board done its job?

B. How well has the Board conducted itself?

C. Summary open-ended questions.

Based on a pilot with Board members in October 2010, the tool takes approximately 10- 15 minutes to complete. Participation is voluntary, yet the value of the assessment is enhanced with greater participation and if responses are provided to the open-ended questions.

An Individual Performance Evaluation Tool
Performance of Individual Board Members (Appendix B) is offered as a resource to assist Board members to assess their individual performance. This tool is for personal use only and is not to be submitted.

Process for Completing and Receiving Results
The tool can be completed on-line or by hard copy. Shortly after the Board meeting, Board members will receive an email which will provide a link to the on-line version and an attachment if a paper copy is preferred. Since the quality of feedback is most often richer the sooner the tool is completed, Board members will have until March 25, 2011, to submit their responses. Hard copies are to be returned to Ms. Sherri Sanders, Executive Assistant to the Board of Health. If any difficulties are experienced, either with the paper or electronic version, Ms. Sanders is to be contacted.

The findings will be summarized so that individual responses cannot be indentified. A summary report will be presented in Board Report format no later than the May 19, 2011, Board of Health meeting. Completed questionnaires will be destroyed following the presentation of results to the Board.

This report was prepared by Ms. Charlene Beynon, Manager, Special Projects.

Graham L. Pollett, MD, FRCPC
Medical Officer of Health

This report addresses Board of Health direction given to Board Working Group # 3 and the draft Ontario Public Health Organizational Standards.

Appendix A- paper copy

MIDDLESEX-LONDON HEALTH UNIT

Board of Health Performance Assessment Tool

This survey is expected to take approximately 10-15 minutes.

Please complete by Friday March 25, 2011.

As part of the Board's commitment to good governance and continuous quality improvement, all Board members are invited to complete the Board of Health Performance Assessment Tool. The tool is intended to 1) focus on the Board as a whole, 2) identify areas of strength, and 3) areas that could be enhanced.

Please note however, that your participation is voluntary and you may choose not to participate or not to respond to all questions.

"*Performance of Individual Board Members*" should not be submitted. It is provided to support self-reflection on your role as a Board member.

The results will be summarized and shared with the Board. All responses will be handled in confidence and individual responses will not be identifiable from the summary.

Once the summary has been shared with the Board, the questionnaires will be destroyed.

Please return your questionnaire in a sealed envelope to Sherri Sanders, Executive Assistant to the Board of Health. If you have any questions about the survey, please contact Sherri Sanders, 519-663-5317, Ext. 3011 or at sherri.sanders@mlhu.on.ca

Thank you

The electronic copy has the same content, yet will look different to accommodate the formatting required for the on-line survey.

A. How Well Has the Board Done Its Job?

Please Note: the scale is from 1= "Strongly Disagree" to 7 = "Strongly Agree"

Please indicate the extent to which you agree with the following statements?

The Board:

	Strongly Disagree 1	2	3	Neither Disagree Or Agree 4	5	6	Strongly Agree 7	Don't Know
1. Has a common understanding of the Board's mandate, scope and authority.	❑	❑	❑	❑	❑	❑	❑	❑
2. Keeps abreast of relevant trends, events and emerging issues.	❑	❑	❑	❑	❑	❑	❑	❑
3. Understands the Health Unit's mission.	❑	❑	❑	❑	❑	❑	❑	❑
4. Has a working knowledge of Board bylaws.	❑	❑	❑	❑	❑	❑	❑	❑
5. Ensures that the Health Unit has a long-term strategic plan.	❑	❑	❑	❑	❑	❑	❑	❑
6. Ensures that the Health Unit is responsive to needs of local communities.	❑	❑	❑	❑	❑	❑	❑	❑
7. Ensures processes are in place to identify, assess and manage any risks to the Health Unit	❑	❑	❑	❑	❑	❑	❑	❑
8. Focuses on long-term results and substantial policy issues rather than operational detail.	❑	❑	❑	❑	❑	❑	❑	❑
9. Is able to interpret, analyze and assess financial information, reports and proposals.	❑	❑	❑	❑	❑	❑	❑	❑

Please Note: the scale is from 1= "Strongly Disagree" to 7 = "Strongly Agree"

	Strongly Disagree 1	2	3	Neither Disagree Or Agree 4	5	6	Strongly Agree 7	Don't Know
10. Has adequate information to monitor organizational performance. e.g. financial management; delivery of Ontario Public Health Standards ; work force issues, etc.	❑	❑	❑	❑	❑	❑	❑	❑
11. Ensures that decisions are based on accurate, timely and the best available information.	❑	❑	❑	❑	❑	❑	❑	❑
12. Has a process for handing urgent matters between meetings.	❑	❑	❑	❑	❑	❑	❑	❑
13. Is knowledgeable of the programs and services offered by the Health Unit.	❑	❑	❑	❑	❑	❑	❑	❑
14. Regularly assesses the performance of the MOH/CEO in a systematic way.	❑	❑	❑	❑	❑	❑	❑	❑

15. Additional observations, comments or suggestions about how well the Board has done its job:

B. How Well Has the Board Conducted Itself?

Please Note: the scale is from 1= "Strongly Disagree" to 7 = "Strongly Agree"

Please indicate the extent to which you agree with the following statements?

	Strongly Disagree 1	2	3	Neither Agree or Disagree 4	5	6	Strongly Agree 7	Don't Know
1. Board members are aware of what is expected of them.	❑	❑	❑	❑	❑	❑	❑	❑
2. The roles and responsibilities of the board are clearly defined and separate from those of staff.	❑	❑	❑	❑	❑	❑	❑	❑
3. <u>Complete ONLY If a New Board member</u> New Board members receive an effective orientation to their responsibilities as a Board member.	❑	❑	❑	❑	❑	❑	❑	❑
4. The Board is satisfied with the ongoing education it receives in order to fulfill its responsibilities.	❑	❑	❑	❑	❑	❑	❑	❑
5. Board information packages provide the right information and are received in a timely manner.	❑	❑	❑	❑	❑	❑	❑	❑
6. Board meeting agendas are well planned so that all necessary board business is addressed.	❑	❑	❑	❑	❑	❑	❑	❑
7. Agendas are appropriate e.g. topics are relevant to the mission and goals of the Health Unit; items are clearly identified as for information, discussion or decision.	❑	❑	❑	❑	❑	❑	❑	❑
8. Board members come prepared to participate in the discussion and decision–making.	❑	❑	❑	❑	❑	❑	❑	❑

Please Note: the scale is from 1= "Strongly Disagree" to 7 = "Strongly Agree"

	Strongly Disagree 1	2	3	Neither Disagree Or Agree 4	5	6	Strongly Agree 7	Don't Know
9. The Board uses its meeting time effectively and efficiently i.e. discussion is focused, clear, concise and on topic.	❑	❑	❑	❑	❑	❑	❑	❑
10. All board members participate in important board discussions.	❑	❑	❑	❑	❑	❑	❑	❑
11. Board members do a good job of encouraging and dealing with different points of view.	❑	❑	❑	❑	❑	❑	❑	❑
12. Board members respect the rules of confidentiality	❑	❑	❑	❑	❑	❑	❑	❑
13. Decisions are supported once made.	❑	❑	❑	❑	❑	❑	❑	❑
14. Board decisions and processes are available to staff and community partners.	❑	❑	❑	❑	❑	❑	❑	❑
15. The Board Chair runs the meetings effectively.	❑	❑	❑	❑	❑	❑	❑	❑

16. Additional observations, comments or suggestions about how well the Board has conducted itself:

C. Open-Ended Questions

1. **What I like most about our meetings:**

2. **What I like least about our meetings:**

3. **Please indicate what training opportunities you would like as a board member.**

4. **What is the most important thing the Board could do to improve its performance as a Board?**

5. **Do you have additional comments that will help the Board increase its effectiveness?**

Thank you!

Appendix B

MIDDLESEX LONDON HEALTH UNIT

Performance of Individual Board Members
(Not to be Submitted)

Are you satisfied with your performance as a board member in the following areas?

Please Note: the scale is from 1= "Strongly Disagree" to 7 = "Strongly Agree"

	Strongly Disagree 1	2	3	Neither Disagree or Agree 4	5	6	Strongly Agree 7	Don't Know
1. I am aware of what is expected of me as a board member.	❑	❑	❑	❑	❑	❑	❑	❑
2. I have a good record of meeting attendance.	❑	❑	❑	❑	❑	❑	❑	❑
3. I read the minutes, reports and other materials in advance of the board meetings.	❑	❑	❑	❑	❑	❑	❑	❑
4. I frequently encourage other board members to express their opinions at board meetings.	❑	❑	❑	❑	❑	❑	❑	❑
5. I am encouraged to express my opinions at board meetings.	❑	❑	❑	❑	❑	❑	❑	❑
6. I feel comfortable to ask questions if I do not understand something.	❑	❑	❑	❑	❑	❑	❑	❑
7. I am a good listener at board meetings.	❑	❑	❑	❑	❑	❑	❑	❑
8. I follow through on things I have said I would do.	❑	❑	❑	❑	❑	❑	❑	❑
9. I maintain the confidentiality of all board decisions.	❑	❑	❑	❑	❑	❑	❑	❑
10. When I have a different opinion than the majority, I raise it.	❑	❑	❑	❑	❑	❑	❑	❑

Please Note: the scale is from 1= "Strongly Disagree" to 7 = "Strongly Agree"

	Strongly Disagree 1	2	3	Neither Disagree or Agree 4	5	6	Strongly Agree 7	Don't Know
11. I support board decisions once they are made even if I do not agree with them.	❑	❑	❑	❑	❑	❑	❑	❑
12. I stay informed about issues relevant to the Health Unit mission and bring information to the attention of the board.	❑	❑	❑	❑	❑	❑	❑	❑
13. I understand my legal responsibilities.	❑	❑	❑	❑	❑	❑	❑	❑

14. Additional observations, comments or suggestions about my own performance as a Board Member:

THIS QUESTIONNAIRE IS FOR INDIVIDUAL USE ONLY AND IS NOT TO BE SUBMITTED.