

ONTARIO MINISTRY OF AGRICULTURE, FOOD
AND RURAL AFFAIRS

AND

UNIVERSITY OF GUELPH

AGREEMENT

CONSOLIDATED ANNUAL REPORT
2014 / 2015

UNIVERSITY
of GUELPH



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EXECUTIVE SUMMARY

This annual report is being submitted to the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) in accordance with the terms and commitments under the OMAFRA-University of Guelph (U of G) Agreement (also known as the OMAFRA-U of G Partnership, or Partnership Agreement). This is the seventh annual report under the current Agreement between the University of Guelph and OMAFRA that was signed April 1, 2008, for the period April 1, 2008 to March 31, 2018.

The University has complied with all material provisions of the Agreement and is managing the transfer payment funds provided under the Agreement effectively and efficiently and with due regard to obtaining appropriate value for money expended.

The reporting period of this annual report is the U of G's 2014/15 fiscal year (May 1, 2014 – April 30, 2015). The report covers the activities, budgets, expenditures and performance measures for each of the four program areas of the Agreement: Research, Veterinary Clinical Education Program (VCEP), Animal Health Laboratory (AHL) and the Agriculture and Food Laboratory (AFL) programs.

Further details concerning the Agreement are available at:

www.uoguelph.ca/omafra_partnership/en/omafrauofgpartnership.asp

The OMAFRA-U of G Agreement annual reports are posted at:

www.uoguelph.ca/omafra_partnership/research/en/researchresult/ReportsAndPublications.asp

SELECTED PROGRAM HIGHLIGHTS (2014/15) IN BRIEF

Reported below are selected highlights from each of the four Agreement programs during 2014/15. More comprehensive updates, budgets and performance indicators for each of the programs are available in the following sections of this report.

Laboratory Services Division

Laboratory Services Division (LSD) is comprised of the Animal Health Laboratory (AHL) and the Agriculture and Food Laboratory (AFL). The Laboratories continues to optimize the leveraging of services offered within the Partnership to other government, commercial and academic clients while maintaining status of self-sustaining divisions of the U of G.

Agriculture and Food Laboratory (AFL) Program

This leveraging of services benefits both the AFL and OMAFRA through means such as:

- i. Introducing efficiencies in economies of scale:
 - Improved pesticide screening method expanding the complement of pesticides screened.
 - Increased the sensitivity and specificity of the method and economic savings to OMAFRA.
- ii. Introducing new methods/techniques for non-OMAFRA projects to expand the depth of services available to OMAFRA at no development costs to the Partnership:
 - Installation of specialized fatty acid testing to identify DHA in milk
 - Custom method for low level detection of neonicotinoids.
- iii. Expanding current expertise through projects with other clients that is readily applied to OMAFRA programs:
 - Collaboration with Public Health Agency of Canada (PHAC) to develop Top 7 Shigatoxigenic *E.coli* identification.
 - Validation and installation of CHARM Trio Test for determination of sulpha, β -lactam and tetracycline drug classes in bovine milk.
 - AFL-enhanced detection of neonicotinoid pesticides in bee products and environmental samples through method modification.
 - A more specific and sensitive method for the determination of glyphosate in fruits and vegetables was validated and installed.

Animal Health Laboratory (AHL) Program

In 2014/15, the Animal Health Lab (AHL) was granted 5 years full accreditation status for all species by the American Association of Veterinary Laboratory Diagnosticians. Significant new testing equipment was added to AHL's inventory to accommodate new testing for fish and bees and to improve efficiency and surge capacity of the lab. The building's sample reception was

reconstructed to provide for improved flow of incoming samples and improved bio-containment. AHL provided emergency response in the April 2015 outbreak of highly pathogenic avian influenza (H5N2) in Ontario.

In 2013/14 the AHL had contracted with OMAFRA for the delivery of a disease surveillance plan (DSP) that would offer early detection and improved preparedness / response to animal disease in Ontario. Following stakeholder consultations in 2013/14, AHL assembled networks of species experts in 2014/15 consisting of OMAFRA specialists, Ontario Veterinary College and other U of G researchers, AHL personnel and veterinarians working in bovine, equine, swine, poultry, fish and other species. The networks began regular scheduled communications and information sharing with the objective of baseline health monitoring and flagging of potential irregularities, so as to prevent epidemics before they arise.

AHL also addressed another component of the DSP in 2014/15 - the integration of Ontario animal health surveillance data with national databases. AHL and its federal and provincial partners worked towards an action plan for this complex undertaking. AHL continues to collaborate in building a 'network of networks' that will best serve provincial and national interests.

Research Programs

Investment in the Agreement's research program continued to leverage external third party funding. For 2014/15, the ratio of leveraged research operating funds was 2.2:1, or \$11.5 million of third party (non-Ontario government funds) leveraged by OMAFRA's \$5.3 million of research operating funding.

One of the strategy's key research infrastructure projects – the Livestock Research and Innovation Corporation (LRIC) dairy phase at Elora - was completed in September 2015 (though slightly outside this fiscal reporting period). The Vineland Research and Innovation Centre's new commercial scale greenhouse moved ahead with much progress completed in 2014/15. Both projects have been funded through the Agricultural Research Institute of Ontario's research infrastructure strategy, which is providing the modern research capacity needed for an innovative and competitive agri-food industry.

Knowledge Translation and Transfer (KTT)*

Mobilizing research results from the lab to knowledge and technology users continued to be a focus of the Agreement in 2014/15. Through a competitive process, funding is awarded to projects that would most effectively communicate research results to targeted users; and since 2008/2009 more than 75 projects have been supported by the KTT Program. The program continues to provide knowledge translation and transfer expertise and support to the research programs and the broader knowledge mobilization community by hosting and participating in events which foster collaboration and knowledge sharing.

Commercialization

The U of G's Catalyst Centre provides expertise in the management of intellectual property (IP), generated from Agreement-funded research. The development of new plant germplasm is a significant generator of IP. Total returns from plant IP technologies of \$1.1M in 2014-2015 bring total returns since 1977 to over \$13.3 million. The returns are reinvested back into further plant research. It is noteworthy that the \$13.3 million represents only a fraction of the billions of dollars that have resulted from sale of the seed, crops, and value-added plant products. Royalties from non-seed technologies also increased, as technologies such as DHA-enhanced milk and cheese, and enhanced-immunity dairy genetics have found market success in Ontario and across Canada.

Management of the Gryphon's LAAIR research commercialization program was brought inside the Catalyst Centre for 2015 and was successful, funding 15 projects for a total of \$812,000. Funding projects included a range of research from greenhouse robotics to control of honeybee pathogens and development of new strains of brewing yeast.

*Highly Qualified Personnel (HQP)**

The Agreement has funded the development of graduate students with specialized training in agri-business, research and innovation so that they can bring a greater understanding of these to both the laboratory and the marketplace. The HQP program complements the Research Infrastructure Strategy as both expertise and infrastructure are needed for modern research capacity. Since 2008/09, 122 students and their employers have benefitted from the HQP program.

*** Note:** Although most of the KTT and HQP initiatives occurred within the Agreement's Research Program in 2014/15, the Animal Health Lab and Veterinary Clinical Education programs also included KTT and HQP components. In the financial tables of this report they are shown as 'Growing Forward 2' (GF2), a.k.a. 'Fund 112'. GF2 is a federal-provincial-territorial initiative.

Veterinary Clinical Education Program (VCEP)

On July 14, 2014, OMAFRA confirmed total annual funding for VCEP for the remainder of the current Agreement, and funding changes made within VCEP to better align with OMAFRA priorities and research themes. The realignment reflects OMAFRA's interests in development of highly qualified personnel (HQP) through experiential learning, research priorities that capitalize on OVC's research strengths to support industry prosperity and animal, public and environmental health, and in effective mobilization of research results.

The Ontario Veterinary College is ranked as one of the top four veterinary schools in the world by the prestigious Quacquarelli Symonds (QS) World Rankings. Based on academic and employer reputation as well as how often faculty research is cited within academic publications, the Ontario Veterinary College at the University of Guelph ranks the highest of any Canadian

university program in any discipline (Quacquarelli Symonds (QS) World Rankings, April 2015. www.topuniversities.com).

An economic impact study of the OVC (Deloitte, July 2014) noted the significance of OVC's research beyond Ontario's livestock industry, environmental sustainability, and public health and zoonoses. It also serves as an important tool to address challenges in human health. 'Translational' medicine builds on findings from disease in animals to develop new therapies for treatment of diseases in people. OVC researchers have collaborated with human medicine specialists in epilepsy, obesity, arthritis and oncology.

PROGRAM UPDATES (2014/15)

Laboratory Services Division (LSD)

Agriculture and Food Laboratory Program (AFL)

Vision:

We will be a laboratory partner of choice for government and universities in Canada, for agriculture, food safety, and animal health testing. We will also be a leader in providing high-value laboratory services to the private sector in selected niche markets.

Mission:

Working together toward a healthier future ... we provide high-value analytical and diagnostic services for the agricultural, food and veterinary sectors.

The AFL Strategic Plan has been updated for the final years of the Agreement (2015-2018). No significant changes were made from strategies in the previous 2011-2014 Strategic Plan. The AFL will maintain its focus on these strategies and is gaining strength in reputation and position as a fee-for-service laboratory domestically and abroad.

The Agriculture and Food Lab continues to use strong business processes and targeted marketing activities to build revenue in identified niche areas. As always, the goal is to continue to build external revenues for reinvestment and sustainability (per Schedules “E” and “F” of the Agreement). While some of the AFL revenue is project-based and may not be recurring, the Lab continues to develop expertise and novel services that will serve us well in sustaining a successful not-for-profit business enterprise. Working from its strengths, the AFL continues to develop partnerships throughout its regulatory partner organizations to secure its role as a “laboratory partner of choice” across Canada.

AFL continues to offer a high level of service to clients in agriculture, food and beverage, corporate and research sectors while meeting the challenge of maintaining technology and infrastructure that is capital intensive and rapidly changing. LSD continues to reinvest in large capital items strategically identified by its management team in keeping with the available revenue surplus. Ongoing support from OMAFRA Capital Expenditure Fund to provide funds annually for equipment purchases by LSD is a critical part of this process given the challenges in securing sufficient external funds for reinvestment.

In 2014/15 the AFL continued the implementation of innovative test approaches and other initiatives that benefit the OMAFRA-University of Guelph Agreement and the Ministry of the Environment Climate Change Program:

1. AFL maintains a high profile in the industry in the use of molecular techniques. The Lab continues to collaborate on a project with the Public Health Agency of Canada (PHAC) to develop a user friendly, accurate and consistent methodology for the detection and identification of the top seven genotypes of shigatoxin producing *E.coli* organisms. The AFL’s contribution to this “leading edge”, advanced level technological expertise will continue to establish the AFL apart from its peers.

2. Further improvements to methodology for pesticide determination has resulted in greater batch efficiencies, detection limits and scope of compounds now applied and available for OMAFRA ongoing monitoring and research projects. A modification of this method provides low level detection of neonicotinoid residues in water samples to the parts per trillion level. It is being further investigated for application to pollen, bees, honey and plant material.
3. In the fifth and final year of its renewable contract, the AFL successfully collaborated with the Dairy Farmers of Ontario (DFO) to secure an extension of the current contract effective for an additional two years (2017). The lab tests over 800,000 samples annually and works closely with the Dairy Farmers of Ontario (DFO), the Ontario Dairy Council (ODC) and OMAFRA to support any program issues that may arise periodically in this industry.
4. The AFL laboratory scientists continue to work closely with OMAFRA Dairy Food Safety Program staff to develop testing programs that benefit all species in the dairy industry including the growing sheep milk industry. New residue screening and confirmation tests have continued to be validated for use in both goat and sheep milk that were previously unavailable, e.g. quantitation of tetracycline and sulfa residues in goat milk by liquid chromatography-mass spectrometry (LC-MS/MS) technique.
5. The AFL multi-residue methods continue to be improved upon and expanded to include regulatory testing of drug, pesticide and mycotoxin residues in the considerable variety of matrices received from OMAFRA including animal tissues and milk across several species, as well as fruits and vegetables and grains/feeds.

In 2014-2015 the AFL Chemistry Method Development group began laying the foundation to improve on existing methods of drug residue detection that will expand the number of residues that can be simultaneously detected, and target customized lists of compounds that meet OMAFRA's need to be closely aligned with the National Chemical Residue Program. This is important when regulatory action from OMAFRA is required. Through these activities, OMAFRA continues to reap the benefit of the AFL's position as the only non-government lab in Canada to hold accreditation that permits the application of non-routine testing to client samples under defined conditions.

6. AFL continues to look for niche sector opportunities that are critical to the success of the leveraging strategy needed to secure sufficient revenue to sustain the Laboratory Services Division as a whole. To this end, the AFL continues to build important relationships and revenue with the private sector including the bundling of complementary services for the purpose of food contaminant and/or adulteration investigations.

Program Highlights and Case Studies

Advancements in Molecular Biology and Microbiology

The AFL continues to work through collaboration with regulatory partners to expand expertise in molecular subtyping methodologies for food-borne pathogens, such as a single nucleotide

polymorphism-polymerase chain reaction (SNP-PCR) method for highly discriminatory subtyping of *Salmonella enteritidis* (in collaboration with CFIA).

The AFL scientists, in collaboration with regulatory and industry partners, have been developing and validating a “Comprehensive Method for Detection, Isolation, and Confirmation of Shiga toxin-producing *Escherichia coli* (STEC) including ‘Top Seven’ O-Serogroups in Food Samples”. The method represents a rapid, comprehensive and flexible alternative to existing methods and allows for selective testing for the ‘Top 7’ STEC or all STEC. By providing more accurate and sensitive testing results, it will help to reduce risks of releasing contaminated food products or unnecessary product downgrades due to limitations of the current methods for testing STEC.

Pesticide testing

The AFL Chemistry Section is very cognizant of OMAFRA’s desire to remain aligned with the national testing programs. Following up on work done in 2013/2014, this group developed and implemented a streamlined method capable of testing over 500 pesticides in a single extraction, providing significant savings and efficiencies, as well as a customized low level detection method for the detection of neonicotinoid class residues in water. The Chemistry unit has also implemented and accredited sensitive and specific methods for glyphosate and phenoxy acid herbicides determination in fruits and vegetables. The AFL is looking to further implement this expanded scope of pesticide residue detection to the Foods of Plant Origin programs in 2015/2016.

Through work with both the Canadian Food Inspection Agency (CFIA) and Agriculture and Agri-Food Canada (AAFC), AFL leverages its expertise and resources in pesticide testing to the benefit of OMAFRA. The AFL maintains Standards Council of Canada accreditation status that states the AFL complies with requirements of OECD Principles of Good Laboratory Practice (GLP) 1998. This accreditation allows the AFL to work on behalf of the AAFC to verify characteristics of new pesticides coming to market. Knowledge gained through this testing continues to be applied to testing when these compounds come to routine use in the agricultural sector.

Dr. Linda Lissemore, Manager, AFL Chemistry Unit, works collaboratively with University of Guelph researchers from Environmental Biology within the School of Environmental Sciences on a number of research studies. This work further establishes the AFL as experts in the area of pesticide residue chemistry and expands the scope of services that LSD is able to provide to OMAFRA.

Dairy Testing

Raw Milk Testing Contract

In the fifth and final year of a renewable contract, the AFL successfully collaborated with the Dairy Farmers of Ontario (DFO) to secure an extension of the current contract effective for an additional two years (2017). The lab tests over 800,000 samples annually and works closely with the Dairy Farmers of Ontario (DFO), the Ontario Dairy Council (ODC) and OMAFRA to support any program issues that may arise periodically in this industry.

Analytical testing information and quality testing for regulatory purposes are delivered through the relationship that has been in place for four decades between the Laboratory and the Dairy Farmers of Ontario, the Ontario Dairy Council and OMAFRA.

The AFL has implemented a method for the determination of DHA (fatty acids) in bovine milk to confirm evidence of this health claim in eligible products. This expanded scope of testing is now available to OMAFRA for their use as needed.

Other Milk Species

Verification of tests for the determination of veterinary drug residues in goat milk has been completed, along with a validated and installed LC-MS/MS method for the quantitation of specific drug residues in goat milk using as requested by OMAFRA. This is the first year that these tests are available to provide both screening and quantitative analysis for use by the industry and OMAFRA for monitoring the safety of these food products.

In 2014/15 the AFL began testing sheep milk for composition and quality parameters as a routine project in the Dairy Food Safety Program. This program is expected to expand in keeping with the growth in the sheep milk market in Ontario.

Multi- Residue Methodology

Dr. Perry Martos continues to apply significant efforts into upgrading 'Multiple Residue Methodologies for the Detection and Quantitative Analysis of Veterinary Drugs' that are developed specifically for OMAFRA's Meat Inspection and Dairy Food Safety Programs. This work includes all facets of sample extraction and analysis that must meet Standards Council of Canada criteria. The list of target compounds, regulatory and detection limit requirements, and matrices of interest, changes and expands regularly. OMAFRA and the AFL must respond to evolving surveillance and monitoring needs based on the potential use of a wide range of veterinary drugs in various meat and food industries, both domestically and abroad.

Collaboratively with the OMAFRA Food Safety Science Unit, they investigate how to best implement changes that optimize the Ministry's testing resources toward fulfilling their mandate for food safety in Ontario within these program areas. Once again, it is extremely important for the AFL and OMAFRA to work closely together on these development programs in order to meet OMAFRA's ongoing need to remain aligned with the national and international testing programs.

Knowledge Translation and Transfer (KTT):

The AFL continues to support the academic enterprise at the University of Guelph directed toward advancing knowledge and technology that can be directly applied to the benefit of regulators and industry.

This is evidenced by the following list of KTT activities for 2014/15:

JOURNAL PUBLICATIONS

1. Complete genome sequence of bacteriophage vB_YenP_AP5 which infects *Yersinia enterocolitica* of serotype O:3. **Leon-Velarde CG**, Kropinski AM, Chen S, Abbasifar A, Griffiths MW, Odumeru JA. Virol J. 2014 Oct 28;11(1):188.
2. Evaluation of the Thermo Scientific SureTect *Salmonella* species assay. AOAC Performance Tested Method 051303. Cloke J, Clark D Jr, Radcliff R, **Leon-Velarde C**, **Larson N**, **Dave K**, **Evans K**, Crabtree D, Hughes A, Simpson H, Holopainen J, Wickstrand N, Kauppinen M. J AOAC Int. 2014 Mar-Apr;97(2):539-60.
3. Evaluation of the Thermo Scientific SureTect *Listeria* species assay. AOAC Performance Tested Method 071304. Cloke J, Evans K, Crabtree D, Hughes A, Simpson H, Holopainen J, Wickstrand N, Kauppinen M, **Leon-Velarde C**, **Larson N**, **Dave K**. J AOAC Int. 2014 Mar-Apr;97(2):521-38.
4. Balamurugan, S., Ahmed, R., **Gao, A**. 2015. Survival of Shiga toxin-producing *Escherichia coli* in broth as influenced by pH, water activity and temperature. *Letters in Applied Microbiology* 60, 341-346.
5. KD Broders, ML Parker, **MS Melzer** and GJ Boland. 2014. Phylogenetic Diversity of *Rhizoctonia solani* associated with canola and wheat in Alberta, Manitoba, and Saskatchewan. *Plant Disease*. 1695-1707.
6. **MS Melzer and X Shan**. "Diseases diagnosed on plant samples submitted to the Pest Diagnostic Clinic, University of Guelph in 2012". Canadian Plant Disease Survey, 2014.

PRESENTATIONS

1. Meat Inspection Program - Meat Inspector tours of AFL (**Amanda Hauck, Lynne Fruhner, Paul Oliver, Louise Spilsbury, Mark Mitchell, Susan Lee and Cynthia Logie**)
2. Foods of Plant Origin – Sampler tour of AFL (**Amanda Hauck, Paul Oliver, Susan Lee, and Cynthia Logie**)
3. **X Shan**, "Plant Disease Diagnosis – The Science and Art of Identifying plant Diseases. Integrated Pest Management workshop" July 2014. Guelph, Ontario.
4. University of Guelph, Plant Pathology Student Tour – **X Shan and MS Melzer**, Nov 2014
5. **A Moore**. "Quantitative Analysis of Veterinary Uroliths Session Title: ASVCP Pre-Meeting Workshop: The Ins and Outs of the Kidney". November 2014, Atlanta, Georgia.
6. University of Guelph, Landscape Architecture Student Tour – **X Shan and MS Melzer**, March 2015

POSTER PRESENTATIONS

1. Development of an Antibody Microarray Method for Detection of 'Top Seven' O-Serogroups of Shiga toxin-producing Escherichia coli (STEC) Shivani Ojha, Roger Johnson, **Anli Gao, Carlos Leon-Velarde and Shu Chen**. Presented at American Society for Microbiology (ASM) 114th General Meeting, Boston, Massachusetts. May 2014.
2. Identification of Foodborne Organisms Using MALDITOF-MS and 16S rRNA Gene Sequence-Based Method. **Anli Gao, J. Fischer-Jenssen, S. Lee, C. Leon-Velarde, J. Li, S. Chen, P. Martos**. Presented at AOAC International Annual Meeting, Boca Raton, Florida, USA. September 2014.
3. Estimation of Measurement Uncertainty of Bacterial Enumeration in Experiments with Factorial Design (Poster P-T-056 plus Oral presentation). **Gao, A., P. Martos, S. Balamurugan**. AOAC 128th Annual Meeting and Exposition, Sep. 7-10, 2014. Boca Raton, FL.
4. Application of Bacteriophage Receptor Binding Proteins for the Selective Separation of Yersinia enterocolitica in Foods. **Carlos G. Leon-Velarde, Shu Chen**, Mansel W. Griffiths, Roger P. Johnson, Joseph A. Odumeru. Presented at Ontario Food Protection (OFPA), Mississauga, Ontario. April 23 2015.
5. Characterization of Shiga Toxin Escherichia coli Recovered from a Beef Processing Facility within Southern Ontario and Comparative Performance of Molecular Diagnostic Platforms Jessica Bannon, Cleso Mendonça Jordão Junior, Mohammad Melebari, **Carlos Leon-Velarde**, Roger Johnson, and Keith Warriner. Presented at Ontario Food Protection (OFPA), Mississauga, Ontario. April 23 2015.
6. Evaluation of rapid Screening Methods for the detection of Salmonella Enteritidis in Poultry Environmental Samples. **Cynthia Logie, Carlos Leon-Velarde, Susan Lee, Saleema Saleh-Lakha, Anli Gao**, Jim Chambers, Keith Warriner, Joseph A Odumeru. Presented at Ontario Food Protection (OFPA), Mississauga, Ontario. April 23 2015.
7. Survey of Norovirus Incidence in Fresh Produce and Raw Bovine Milk. Sue W Si, Shivani Ojha, Susan Lee, Joseph Odumeru and Shu Chen. Presented at Ontario Food Protection (OFPA), Mississauga, Ontario. April 23 2014.

Progress and final reports for the research projects (shown above) have been delivered to the corresponding funding agencies by the Principal Investigators. Additional activities (such as project meetings) in addition to publications and presentations for Knowledge Translation and Transfer (KTT) took place as proposed in the KTT plans for each of the projects.

Leveraging for Reinvestment and Sustainability

The AFL continues to seek revenue sources with various large, on-going and one-time projects to provide the necessary reinvestment funds for the long-term sustainability of the Division. Laboratory Services continues to modify and improve its approach to securing new business opportunities and increasing external revenues for reinvestment (per Schedules "E" and "F" of

the Agreement). The Division requires a reinvestment of approximately \$1.5M to \$2.0M into equipment, building infrastructure and new capabilities each and every year.

In 2014/15, capital investment included the replacement of several instruments used to support the OMAFRA Meat Inspection and Foods of Plant Origin Programs, and the Environmental Management Branch. This equipment is integral to the AFL's ability to detect and quantify chemical residues as low as parts per trillion levels for the Ministry's monitoring and surveillance programs as well as Emergency Response capacity.

It is recognized that the Master Agreement with OMAFRA is a critical element in the Division's ability to maintain the balance between its capability and capacity for the leveraging of services and remaining a self-sustaining entity within the University of Guelph. For seventeen years the AFL has demonstrated its ability to leverage expertise and capacity by generating sufficient revenue from select commercial, government and research projects. Continued success is assured, in part, through ongoing referrals based on the lab's reputation for quality and expertise. In the coming year, the lab is looking to continue to leverage its opportunities for growth in pesticide GLP testing, advanced molecular testing, and continuing with applied research with industry and government partners.

AFL is committed to providing timely support for urgent/emergency response initiatives as required, as well as ongoing scheduled testing programs for OMAFRA.

Animal Health Laboratory (AHL) Program

Core activities

AHL receives sample submissions from private veterinarians, the Ontario Veterinary College Health Sciences Center, the Canadian Wildlife Health Cooperative, and researchers. Direct submissions to the AHL from OMAFRA are primarily meat inspection cases. AHL's average caseload is 66,000 cases per year, which generates ~800,000 procedures and 1,000,000 tests. Tests are conducted on specimens from all of the major and minor animal species in Ontario, with the addition in 2014/15 of aquaculture fish and honeybees. AHL also performs a significant volume of export testing for clients in Ontario and across Canada.

The test spectrum offered by the AHL continues to evolve with newer technologies. For example, fluorescent antibody (FA) testing has largely been replaced by immunohistochemistry (IHC) and molecular techniques. Also, in 2014/15, most virus isolation testing in tissue culture or in eggs was replaced by molecular testing, primarily real-time polymerase chain reaction (PCR). Subsequent to identification of pathogens by PCR, gene sequencing is increasingly pursued.

The AHL continues to have close contact with clients through a range of meetings and activities, including the annual Feedback Group meeting, bimonthly AHL/PBI/HSC liaison meetings, and membership in the key veterinary associations in Ontario. Regular communication with clients has occurred since 1997 via the quarterly AHL newsletter, now in its 19th volume. AHL has moved the Newsletter to an electronic format in 2014 as a cost-saving measure, and continues to distribute the Newsletter to 1,400 readers.

The AHL has routinely surveyed its clients, by commodity, to determine their satisfaction with key elements of AHL service. In response to feedback from clients, and with agreement from OMAFRA, the survey is now conducted biennially, with the latest survey conducted in the fall of 2013 and the next survey scheduled for fall of 2015.

In addition to the core AHL program encompassed in Schedule E in the 2013-2018 partnership agreement, OMAFRA contracted with the AHL to develop collaboratively a "Disease Surveillance Plan" (DSP) for Ontario.

AHL Infrastructure

- The higher containment laboratory (CL2+), room 1822, in the Pathobiology-Animal Health Laboratory is used for routine TSE testing [transmissible spongiform encephalopathies – bovine spongiform encephalopathy (BSE, mad cow disease); chronic wasting disease in deer and elk (CWD), and scrapie in small ruminants]. This lab was also put to good use in winter 2015 for testing for highly pathogenic avian influenza (HPAI) virus during the outbreak in southern Ontario.
- The alkaline tissue digester is in bi-weekly use for disposal of animal anatomical waste with the exception of cattle. Final documentation has been submitted to CFIA for approval of bovine SRM (specified risk materials) handling. Upgrading of the heating/ventilation/air-conditioning (HVAC) system of the digester suite was completed in winter 2015.

- The pneumatic tube system between building 89 and the OVC Health Sciences Center, installed to expedite delivery of specimens from the HSC to the AHL, is now fully functional.
- Significant new testing equipment was added to the inventory of the AHL through funding from DSP in order to accommodate new testing (fish, bees) and to improve efficiency and surge capacity of the lab.
- In order to improve biosecurity and biocontainment at specimen receipt and accessioning, and to improve efficiency of throughput in specimen reception, the AHL-Guelph Specimen Reception area was renovated in winter, 2015.

Operations

The AHL continued to offer a wide spectrum of tests, with addition/replacement of improved tests over time as enhanced through the AHSI and DSP. Following is a list of new and/or improved tests offered by the AHL in 2014/15:

- Porcine coronavirus (PEDV, TGEV, PDCoV), triplex PCR
- Orf virus/Papular stomatitis virus, PCR
- Virus sequencing (Canine distemper virus, Canine parvovirus 2/Feline panleukopenia virus)
- Feline calicivirus/Felid herpesvirus 1, PCR
- Fish viral hemorrhagic septicemia virus (VHSV), PCR
- Fish bacterial identification by MALDI-TOF MS
- *Batrachochytrium dendrobatidis* and *B. salamandrivorans*, duplex PCR

AHL has inactivated many older or less popular tests, such as virus isolation (in eggs and in tissue culture) and fluorescent antibody testing, in favor of more efficient PCR tests.

The AHL accessioned 66,521 cases and performed 745,081 procedures in 2014/15 in support of disease surveillance. Individual procedures are often comprised of multiple tests, e.g., biochemistry profiles of 20 tests each, thus exceeding 1,000,000 tests annually. (See AHL caseload distribution tables and graphs below).

- The AHL published 23 scientific articles in the quarterly AHL Newsletters in 2014 (total of 36 pages in 2014). As well, AHL veterinarians authored or co-authored 22 oral or poster presentations and 32 peer-reviewed publications in the 2014 calendar year.
- The American Association of Veterinary Laboratory Diagnosticians (AAVLD) accreditation site visit conducted on June 16-19, 2014 resulted in the Animal Health Laboratory, Laboratory Services Division, University of Guelph maintaining full accreditation for all species. The AHL has full accreditation by the AAVLD for 5 years through December 31, 2019.
- Pathologists in the AHL-Kemptville lab participated in a foot-and-mouth-like disease post-mortem-based laboratory FAD emergency exercise in October 2014.

- The Ontario Livestock and Poultry Council (OLPC) in conjunction with Beef Farmers of Ontario (BFO), OMAFRA, and with financial support from the AHL, held a Beef Foreign Animal Disease Workshop (Guelph) on November 19, 2014.
- Real time reporting to OMAFRA of immediately notifiable hazards identified in the OCVO Regulations occurs throughout the day via automatic email alerts of positive results in the range of tests available for each hazard. OMAFRA is hence kept well informed of laboratory-based identification of hazards, and can access full information on each case cited by the Web Intelligence (WebI) system that queries the AHL data warehouse. This auto-alert system was fully functional on January 1, 2013. From May 1, 2014 to April 30, 2015, 441 WebI searches were done for OMAFRA, AHL veterinarians, OVC researchers, CFIA, and the OAHN expert networks. These searches form the basis of Ontario's animal health surveillance data, from disease investigations, zoonotic disease reports, research projects, AHL newsletters, and OIE reports.

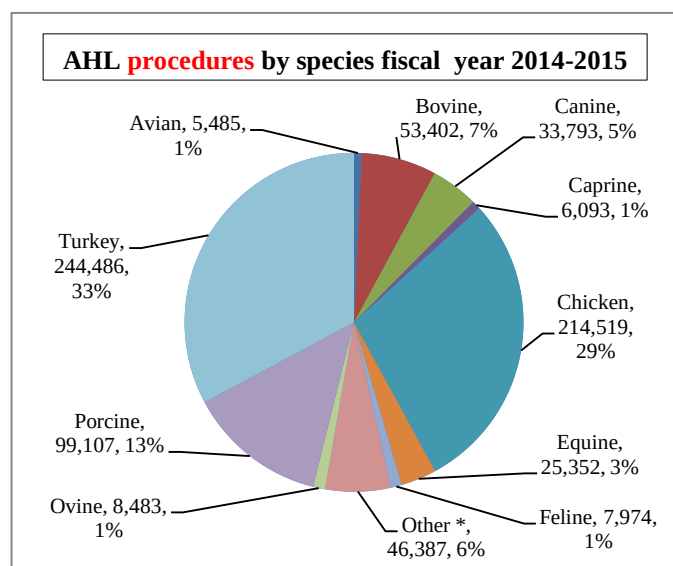
AHL caseload distribution (May 1, 2014 – Apr 30, 2015)

66,521 cases

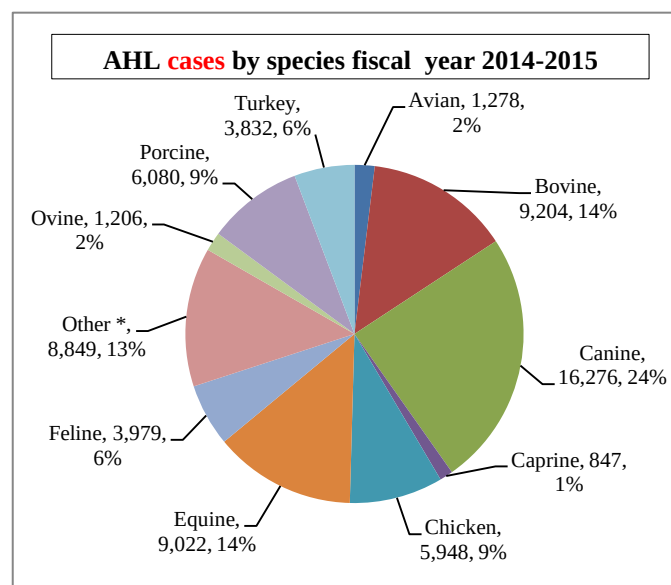
745,081 procedures

1,000,000 tests

	# tests
Virology	566,937
Bacteriology	58,325
Clinical Pathology	44,523
Histotechnology	29,153
External	20,234
Mycoplasmology	10,680
Parasitology	6,001
Anatomic Pathology	5,675
Toxicology	3,553
Total Tests	745,081



	# cases
Clinical Pathology	16,661
Virology	15,027
Bacteriology	13,493
Toxicology	6,852
Histotechnology	5,782
Parasitology	2,688
Anatomic Pathology	2,449
External	1,903
Mycoplasmology	1,666
Total Cases	66,521



*Other = bees, fish, other animals and non-animal

Disease Surveillance Program (DSP)

The 2013-2018 Disease Surveillance Plan (DSP) was funded at \$1.3M/year for 5 years, based on the OMAFRA - U of Guelph Agreement and Growing Forward 2 funds, and began May 1, 2013.

The 4 pillars of the DSP are:

1. Environmental scan, consult and engage stakeholders

2. Enhance Ontario disease surveillance through the development of expert species-based networks
3. Integrate Ontario animal health surveillance with national surveillance
4. Develop better tools to manage risk

In 2014/15, building of the Ontario Animal Health Network (OAHN) was the focus of the DSP. Based on broad stakeholder input in 2013 and 2014, these expert species networks include membership from OMAFRA, OVC, the AHL, and private practice in support of disease surveillance in all of the major and minor animal sectors in Ontario. The networks will contribute to:

- Early detection to prevent epidemics,
- Monitoring animal health to maintain baseline data, and
- Proving freedom from disease in support of productivity and trade.

Pillar 1 – Developmental activities

- January, 2014 – Hired Dr. Andrew Vince, to enhance pathology input to client interactions.
 - Conducted an environmental scan of client education resources.
- February 2014 – Feb 2015 – Appointed Dr. Maria Spinato as Deputy AHL Director to back up Dr. Grant Maxie, DSP project manager; during DSP start-up.
- February, 2014 – Hired Dr. Bruce McNab as AHL's part-time consulting epidemiologist.
- February, 2014 – Consulted with MAPAQ re RAIZO (Quebec Alert and Animal Health Information Network), which has a >20-year track record, and excellent results.
- July, 2014 – Hired Dr. Melanie Barham as Ontario Animal Health Network Coordinator to develop and implement expert networks in Ontario serving various sectors – swine, poultry, bovine, small ruminants, equine, camelids, cervids, fish, bees, companion animals.
- September 10, 2014 – annual “Staying ahead of the curve” (the epidemic curve that is!) stakeholder meeting.
 - Presentations posted on Partnership website:
http://www.uoguelph.ca/omafra_partnership/en/partnershipprograms/DiseaseSurveillancePlanDSP.asp
- Fall 2014, winter 2015 – conducted various stakeholder consultations, focus groups, presentations
 - OAPV, SRVO, OAEP, OABP, OASV
 - Participated in the Ontario Pork-led Swine Health Strategy meetings
- March, 2015 – Hired Michael Deane as OAHN Communications Assistant

Pillar 2 – Enhance Ontario disease surveillance

Objectives of the Ontario Animal Health Network (OAHN) Strategic Plan are:

1. Develop and maintain expert networks in all of the major commodity sectors in Ontario
2. Build OAHN as a brand that is recognized and trusted as a destination for sending and receiving animal health information

3. Create a sustainable program of demonstrated value to stakeholders

Each network consists of an expert from each of OMAFRA, OVC, the AHL, and 1 to 4 private practitioners in support of disease surveillance in all of the major animal sectors in Ontario. “Clinical impression” surveys of private veterinarians are conducted quarterly, combined with AHL and private laboratory data, plus OMAFRA abattoir condemnation data, and discussed in a quarterly teleconference of the expert network.

During fiscal year 2014-15, all of the expert networks were initiated.

- small ruminants
- swine – the OAHN-swine network serves as the Ontario node in the Canadian Swine Health Information Network (CSHIN), which had been operating for 2 years.
- poultry
- equine
- bovine
- fish
- honeybees
- fur-bearing animals
- companion animals
- wildlife, in concert with the Canadian Wildlife Health Cooperative (CWHC).

Pillar 3 – **Integration with national surveillance**

- Began collaboration with a cross-Canada technical working group planning for the integration of selected provincial laboratory surveillance data into the Canadian Animal Health Surveillance Network CAHSN) – BC, SK, ON (GF2)
- Developed a framework for the ‘network of networks’
- September, 2014 – CAHSN Governance meeting Ottawa, facilitated by Dr. McNab
- October, 2014 – CEZD-IIR (Center of Emerging and Zoonotic disease – Integrated Intelligence and Response) – Ottawa
- November, 2014 – National Farmed Animal Health and Welfare Council, Ottawa
 - Support was formally received for the ‘network of networks’ concept
 - Appointed Cheryl James, CAHSN coordinator, and Francois Bedard, AAFC, secretariat
- December, 2014; Jan, 2015 – CAHSS Champions group met – Vision, Mission developed
- March, May, 2015 – Directors’ group teleconferences – Purpose, Principles generated
- June 23/24, 2015 – Directors meet in Ottawa – action plan developed

Pillar 4 – **Better tools for managing risk**

- Staffing - 6 technicians were hired, 2-year temporary full time (TFT), to expedite test development
- Equipment
 - Molecular – Lightcycler 480, Lightcycler 96
 - Microscopes (Guelph-Kemptville link)
 - -80 freezers, microplate dispensers, decapper, Advia 2120, pass-through fridges

- Renovate Specimen Reception – streamline flow, improve biocontainment
- New tests –note SCC flexible scope additions
 - Bees – validated tests for: mites, PCR for 7 viruses, *Nosema* fungus, vitellogenin biomarker. 26,000 bee PCRs conducted in winter 2015
 - Fish – gross and histopathology, VHSV, bacteria (MALDI-TOF) - Dr. Nikki LePage, contract fish pathologist
 - Swine – porcine coronavirus triplex PCR (PEDV, PDCoV, TGEV), orf virus/papular stomatitis virus PCR, virus sequencing
- CDV, CPV-2/FPLV PCR, feline calicivirus / herpesvirus PCR, amphibian chytrid fungus PCR
- Surge capacity
 - 120,000 porcine coronavirus PCR reactions in 2014/15

Research Programs

The Agreement's research program addresses the innovation continuum comprehensively, from funding of market-driven research, to mobilization of research results – into both the public domain and marketplace. Together with research partners along the continuum, the program delivers new knowledge and technologies that support industry competitiveness and public benefits, thereby maximizing the return on public investment.

For 2014/15, the Agreement research program continued under seven areas of priority to OMAFRA: Agricultural Policy & Rural Development*, Bioeconomy – Industrial Uses, Emergency Management, Environmental Sustainability, Food for Health, Product Development & Enhancement through Value Chain Collaboration*, and Production Systems – Plants and Animals (*names were revised in 2013/14).

135 letters of intent were submitted of which 95 advanced to the full proposal stage. Following rigorous review, 60 full proposals were approved for funding early in 2015. Six of the full proposals addressed more than one research priority area. Examples of proposals funded included:

- Management of phosphorus loads on a field to watershed basis: An assessment of current practices as an integrated system (Environmental Sustainability theme)
- Modelling Ontario's chicken industry for policy analysis (Ag. & Rural Policy theme)
- Factors associated with veal calf well-being and mortality in the Ontario veal calf industry (Production Systems – Animal theme)
- Development of new apple varieties with molecular breeding technology. (Production Systems – Plant theme)
- Development of natural binders from Canadian agricultural by-products for applications in the landscaping industry (Bioeconomy theme)
- Robotics in greenhouses: precision scouting for disease detection and yield prediction. (Products and Value Chains theme)
- Screening Ontario grown onion varieties for antioxidant properties (Food for Health theme)
- Using network analysis and dynamic models to develop an understanding of the opportunities and challenges for disease control in equine populations. (Emergency Management theme)

More examples of research projects underway in each theme area can be found in the [2015 Agri-Food Yearbook](#), published annually and posted on the U of G website.

OMAFRA investment in the Agreement's research program continued to leverage external third party funding. For 2014/15, the ratio of leveraged research operating funds to OMAFRA funding was 2.2:1. Specifically, \$11.5 million of third party (non-Ontario government funds) was leveraged by OMAFRA's \$5.3 million of research operating funding. This is one of the research program's key performance indicators.

The [Agricultural Research Institute of Ontario's](#) (ARIO) ten year research infrastructure strategy continued to be implemented through 2014/15. The strategy is foundational to the Agreement research program and its ability to deliver OMAFRA research priorities.

Much construction progress was made on two of the strategy's key research infrastructure projects – the Vineland Research and Innovation Centre (VRIC), and the Livestock Research and Innovation Corporation (LRIC) dairy phase at Elora. Both are funded jointly through OMAFRA, U of G, and industry. The LRIC – Dairy grand opening was held on May 28th (slightly after this reporting period), with more than 3000 in attendance. VRIC's greenhouse is set to open in October 2015.

*Knowledge Translation and Transfer (KTT) **

The KTT initiative established under the OMAFRA - U of G Partnership Agreement in 2008 is designed to accelerate the transformation of knowledge into use. This program includes long-established practices in extension and technology transfer, building and expanding on them. The 'Agri-Food and Rural Link' continued to brand the KTT program primarily through the use of this logo on materials associated with the KTT funded projects. Over the past year, significant progress has been made in the continued development and delivery of the program. Achievements made during the 2014/15 fiscal year are described below.

Funding Call

Overall administration of the project funding program was provided by the U of G KTT staff. U of G KTT staff have also been sharing the successes learned from this funding program, which is unique in Canada, with broader audiences at conferences such as the fourth Canadian Knowledge Mobilization Conference in Saskatoon. U of G KTT staff also participated as KTT experts on the research review committees and as observers at the Theme Advisory Group meetings.

During the 2014/15 year, KTT staff transitioned the KTT Funding Call from a one stage process to a two stage process, matching the research program (letter of intent and full proposal). The review committees included OMAFRA and U of G KTT staff as well as knowledge mobilization subject matter specialists external to these two organizations. Their experience and insight were paramount in the selection process.

The 2013/2014 funding call resulted in 6 projects (award notices were sent in May 2014 so these projects are being reported on in this 2014/15 Annual Report). Another funding call was launched October 2014 and was completed in April 2015. Ten proposals with a total value of \$605,750 were funded, their executive summaries are available on the [KTT website](#)

or through the [search tool](#) (information on Research Program and Gryphon's LAAIR projects are also available on the search tool).

There are currently 63 completed KTT projects and 19 active projects. The projects span across the research themes and OMAFRA priorities and can be found by searching the [Research Link](#).

Knowledge Mobilization and Communications

The Agri-Food and Rural Link name and logo continue to be used as a Twitter feed which currently has over 2,680 followers (up by more than 300 from last year). The Twitter feed allows for rapid dissemination of Agreement funded research stories as well as networking and relationship-building in the Ontario agriculture social media environment.

U of G KTT staff continues to manage the Agreement websites; the Research program homepage, the Highly Qualified Personnel homepage, and the Knowledge Translation and Transfer homepage. A calendar of events and the 'What's Happening' newsfeed are kept up to date in order to share upcoming activities and newsworthy events related to the Agreement. Information on projects from the partnership (KTT, Gryphon's LAAIR and Research Program) is available from our websites through the [search tool](#).

Three editions of the "Buzz" newsletter were sent out to more than 2800 contacts in the 2014/2015 year. The newsletter showcases partnership research and events to internal and external stakeholders.

In preparation of the 2015 Food for Health Research Day (more below), two KTT Program's HQP interns created a Food for Health booklet based on a previously funded project. This booklet attracted attention and by request more than 100 copies have been distributed.

The U of G KTT staff continued to plan and deliver on research and knowledge exchange activities by hosting 'knowledge exchange' events for several research themes.

Agri-Food and Rural Link has developed and enhanced networks and exchange of knowledge between a variety of internal and external stakeholders through individual networking, co-hosting, organizing and participating in research highlight days and events including:

- **2014 Canadian Knowledge Mobilization Forum (June, 2014)**
 - KTT staff participated in this forum and shared information about the KTT program in one of the concurrent sessions.
- **Environmental Sustainability Research Day (November, 2014)**
 - Provided the opportunity to learn about current environmental sustainability research in Ontario and connect with the stakeholders in this area
- **2014 Emergency Management Research Expo (December, 2014)**
 - Learn about Emergency Management research
 - See a creative knowledge translation and transfer project and discuss the process with the researcher
 - Get engaged on timely topics with researchers, government and industry
 - Network and learn from graduate student research posters

- **Knowledge Mobilization Leaders Roundtable (January, 2015)**
 - 2 day meeting of knowledge mobilization leaders to discuss state of the profession, gaps, research needs, HR needs, and opportunities
 - Network and foster collaborations with knowledge mobilization professionals from different disciplines and sectors; as a result of this event a new working group was formed and one of the knowledge leaders came to Guelph to host a CoP (community of practice) session.
- **Production Systems Plants Research Forum (March, 2015)**
 - Provided the opportunity to learn about current production systems research in Ontario and connect with the stakeholders in this area
 - Students also had the opportunity to practice their verbal research communication skills by giving one-minute pitch to highlight the take home message of their research project.
- **Biomass Cooperative Research Day (March 2015)**
 - An Overview of Bioeconomy Research in Ontario – Scope, Capacity and Results and *Accelerating Ontario's Bioeconomy*
- **Food For Health Research Day (April 2015)**
 - Research findings were disseminated from the partnership project Exploring the Feasibility and Benefits of Incorporating Local Foods into Ontario's Healthcare System
 - Provided an opportunity for political leaders, healthcare administrators, academics and representatives from the food industry to dialogue objectively about local food and Ontario's healthcare system
- **KTT Community of Practice (CoP)**
 - This community of practice provides an opportunity for researchers and staff from a variety of departments at U of G, OMAFRA, and agencies around Guelph such as Public Health Agency of Canada, Centre for Public Health and Zoonoses, and the Institute for Community Engaged Scholarship to interact and to share knowledge and best practices for effective KTT.
 - This CoP meets monthly with the exception of the summer months to discuss KTT research, best practices, projects, and ideas. Meetings are usually held at 1 Stone Rd with a variety of people leading the discussion depending on the topic. The CoP is also supported with a listserv which is used to share key information, news about upcoming events and meeting reminders.
- **Highly Qualified Personnel**
 - The KTT Program actively promotes the training of highly qualified personnel in the area of KTT. This is supported by leading training sessions, participating in career path seminars, consulting in the HQP Programs course.

Research Commercialization

An important component of the innovation continuum is the protection of intellectual property. Whereas the KTT program mobilizes information into the public domain, the University's Catalyst Centre (CC) helps researchers identify results more appropriately managed via

protected intellectual property. The Centre also connects researchers and industry contacts, leveraging collaborations and funding opportunities.

The Director of the CC and the OMAFRA Research Program Co-Chair are the voting members of the Agreement's 'Joint Intellectual Property Management Committee', through which decisions are shared on the various technologies being reviewed and/or managed by the CC.

In 2014/15, the CC reported 82 disclosures of intellectual property, 17 patents filed, 15 licenses granted and 6 patents and plant breeders rights certificates issued related to OMAFRA funded technologies. Total license revenue for OMAFRA-supported research reached \$1,644,912. Appendix A-2 details these numbers and percentages of OMAFRA-funded technology results.

Germplasm royalty revenues increased by 21% over the previous fiscal year, surpassing \$1.1 million for the first time. This was primarily due to increased revenue derived from soybean varieties from the Guelph and Ridgetown soybean breeding programs and gains in sales of dry beans and asparagus.

Returns to the germplasm portfolio accounted for 45% of the total royalty revenues returned to the CC in 2014/15. Total returns generated from plant technologies since the inception of the technology transfer program in 1977 reached over \$13.3 million in royalties. These royalties are re-invested back into U of G crop research. The wider economic impact of these discoveries is striking with an economic impact estimated to be nearly \$10 billion dollars of seed, crop and market sales.

Returns from non-germplasm OMAFRA-supported technologies remained steady, down less than 1% to \$528,429. The most notable of these relate to sales of Immunity+ dairy semen and to sales of DHA-enhanced milk. Both of these technologies are licensed to Ontario-based companies and are having a direct impact on Ontario's agriculture and agri-food industries.

During 2014/15, the CC's OMAFRA-supported Industry Liaison program underwent a staffing change. Highlights of industry-supported research projects that benefited from the assistance of the IL program include Eric Lyons' project to develop turf grass suitable for Rogers Centre and Zvonimir Poljak's work toward understanding PRRS and swine flu.

Management of the Gryphon's LAAIR research commercialization program was brought inside the Catalyst Centre for 2015 and was successful, funding 15 projects for a total of \$812,000. Funding projects included a range of research from greenhouse robotics to control of honeybee pathogens and development of new strains of brewing yeast.

OMAFRA's [Proof-of-Principle \(POP\) Fund](#) operates outside of the Agreement, however it is directed toward University inventions that support OMAFRA's research objectives, most of which have been developed through Agreement funding. The CC has responsibility to distribute funds to the most promising projects. In 2014/15, one new project received funding – a project from Ian Tetlow to develop yield enhancing phenotypes in oilseed crops.

Highly Qualified Personnel (HQP)

Skilled workers are essential at all points along the innovation spectrum, in the same way they are needed along a successful value chain. The Agreement's HQP Graduate Program provides scholarships to masters and doctoral students at the U of G to enhance their 'market readiness' and intellectual capital for the sector. It does this by offering experiential learning opportunities beyond those normally available to graduate students undertaking agri-food research.

Students complete a mandatory business course focused on Ontario's agri-food industry and participate in at least one semester of job shadowing/work experience. Over the last seven years, students have selected private companies, OMAFRA, and other local, provincial or federal government agencies for their work placements.

The HQP program has been considered highly successful both by graduates and employers, but because of budget realignments, only one competition for applicants is held annually. In the 2014/15 round, 6 MSc students and 3 PhD students accepted HQP scholarships. Currently, there is a total of 11 PhD and 11 MSc students active in the scholarship program. Four students are on a temporary leave or deferred acceptance of the scholarship.

Anne Laarman, an HQP scholar, graduated in June with his PhD from Animal and Poultry Science, OAC. During his work term, Anne worked with the OMAFRA Dairy Specialist in the area of dairy nutrition. Anne was active with Graduate Student Associations and also served as a student representative on the Board of Governors and the Program Prioritization Process. He has accepted a faculty position at the University of Idaho.

Emily Moeller, an HQP scholar, finished her MSc degree in August 2015 in the Department of Plant Agriculture. Emily completed her work term with the Agri-Food and Rural Link (the partnership KTT Program). Along with Tylar Meeks she produced a publication entitled 'Food for Health – Nutritional Fact Sheet Series' on fruits and vegetables. It was favorably received by the industry who plan to distribute it widely to their members. Emily is currently employed as a lead plant grower in the enclosed environment industry.

*** Note:** Although most of the KTT, and HQP initiatives occurred within the Agreement's Research Program, the Animal Health Lab and Veterinary Clinical Education programs also included KTT and HQP components. See the financial tables of this report where they are listed under 'Growing Forward 2 (Fund 112)'. GF2 is a federal-provincial-municipal initiative.

Veterinary Clinical Education Program (VCEP)

On July 14, 2014, OMAFRA confirmed total annual funding for VCEP for the remainder of the current Agreement, and funding changes made within VCEP to better align with OMAFRA priorities and research themes. The realignment reflects OMAFRA's interests in development of highly qualified personnel (HQP) through experiential learning, research priorities that capitalize on OVC's research strengths to support industry prosperity and animal, public and environmental health, and in effective mobilization of research results.

A summary of changes is shown below:

- ▶ Allocate all VCEP funded faculty to OMAFRA priority areas
- ▶ Increase experiential opportunities for students in rural communities, animal production, zoonoses, public health and food safety
- ▶ Allocate 0.5 FTE Staff to VCEP to develop and lead the rural community veterinary stream for fourth year students (\$80,000)
- ▶ Broaden HQP program which previously funded only DVSc positions into a doctoral program for PhD and DVSc positions and require research focused on OMAFRA priorities.
- ▶ Reallocate \$100k funding from Hospital Staff into Centre for Public Health and Zoonoses (CPHAZ) for program sustainability and outreach
- ▶ Broaden Post-Graduate Clinical Training program to include both interns and residents in OMAFRA priority areas

VCEP activities were realigned under OMAFRA research priorities:

a) Production Systems (animal health, animal welfare and impact on environmental ecosystem)

Faculty allocations (4 FTEs total; 2.5 in animal health, 0.5 in animal welfare and 1 related to ecosystem impact - \$697K).

There are currently several faculty engaged in research, teaching and clinical service in these areas. Examples of their activities include;

- Collaboration with the dairy industry to create a Dairy Cattle Health Research Chair providing expertise and research to support the Provincial Johne's disease program and implementation of the National "Proaction" program. This National Health and Management study involves dairy cattle and dairy farms across Canada. The study will be similar to the National Animal Health Monitoring Study (NAHMS) conducted every seven years in the United States, and will have parts that are identical in focus and methodology to the upcoming US dairy study.

This Canadian study, the first of its kind, will produce nationally relevant prevalence estimates of important diseases of dairy cattle, identify regional/provincial differences in the density of these diseases, measure the economic impact of these diseases and detail management practices on these farms that will help to identify important causes of these diseases. It will provide accurate descriptive information that can be used to compare Canadian dairy herds to those in the USA and elsewhere in the world, and produce health and productivity benchmarks against which progress made by many of the Dairy Research Cluster 2 funded activities could be measured.

- On-going investigations and collaboration with the Animal Health Laboratory to support the industry in developing best management practices for the prevention and control of the Porcine Epidemic Diarrhea (PED) virus that caused an outbreak Ontario in swine.
- Development of best practices for the animal welfare of beef cattle transport to feedlots in Ontario from the West.

- Research and community outreach focusing on climate change impacts on waterborne disease, vector borne disease, foodborne disease, and food security in the Canadian Arctic (Inuit).

Highly Qualified Personal (HQP) Doctoral positions - DVSc or PhD (10 stipends allocated to support research in areas of large animal health, ecosystem impact or animal welfare - \$330K).

Example areas of research include;

- Improvements to disbudding and dehorning practices in Ontario dairy calves by producers and veterinarians.
- Management through the peripartum period for improvement of metabolic and reproductive health in dairy cows.
- Investigation of immune response of sheep to gastrointestinal nematode infection under Ontario grazing conditions for purposes of identifying genetically resistant animals.
- Environmental toxicants and stress: Failure of innate immunity in development of pneumonia in cetaceans.
- Characterization of the fecal bacterial microbiome of commercial mink.
- Stimulation of the innate immune system as a means to reduce the impact of bovine respiratory disease.
- Diagnostic aspects and proteomic analysis of uterine flush fluid from mares with endometritis
- Understanding the diagnosis and risk factors for respiratory disease in dairy calves
- Characterization of the equine airway microbiome using high throughput sequencing
- In vivo measurement of pulmonary artery pulse wave velocity in horses

Post-graduate Clinical training (6 FTEs for Interns and Residents – \$170K).

These HQP positions provide support for the advanced clinical training of large animal specialists in areas such as internal medicine, surgery and anesthesia and pain management. These graduates will become the next generation of expertise for practicing veterinarians and the animal owning public.

Health Sciences Centre (HSC) Clinical support (1.2 FTE field service veterinarians and 26 FTE HSC staff - \$2.17M).

The OVC Health Sciences Centre is a referral hospital for Ontario's private veterinarians and animal owning public, which provides a comprehensive and innovative clinical environment for experiential learning and discovery through excellent patient care and client experience.

Focused on delivering advanced veterinary medical care, the veterinarians (in a wide range of specialties) and support staff operate on a service team concept. Each clinical service team consists of a faculty member, a DVSc student working toward an advanced degree in a clinical specialty, an intern, and during the academic year, a number of final year DVM students completing their clinical rotations.

VCEP funding provide support for the clinical service and teaching responsibilities of the faculty to ensure continuity of veterinary service for OVC clients and allow the faculty to focus their time on educating the students. They are also critical to meeting the client expectations for the level of expertise in veterinary services delivered by the clinicians and staff in the Health Sciences Centre (HSC).

b) Emergency Management (zoonoses / public health, foreign animal disease, food safety)

Faculty Allocations (6.9 FTEs total; 1.4 in public health, 2 in FAD, 3.5 in Food Safety - \$1.2M).

Activities of faculty engaged in research, teaching and clinical service include;

- Epidemiology of zoonotic and animal diseases and enhanced disease surveillance using quantitative methods designed for the analysis of spatial and molecular data investigating a variety of pathogens, such as *E. coli* O157:H7, Salmonella, Campylobacter and antimicrobial resistant organisms, in a number of host species including humans, cattle, dogs, poultry, swine, and wildlife.
- Spread of infectious diseases in swine populations, such as Influenza A virus, including animals within herds, and herds within areas.
- Epidemiology of foodborne and waterborne infections in animal and human populations to better understand the dynamics of these infections in animals and humans, to determine risk factors for infection, and to evaluate methods of control.
- Poultry food safety, zoonotic diseases and environmental issues related to poultry management, for example risk factors associated with the colonization of broiler flocks with *Campylobacter* spp.
- Qualitative analysis of food safety issues and information needs of public health inspectors responsible for food safety.
- Food safety through the on-farm control of Salmonella, prevalence of MRSA and *Clostridium difficile* and other zoonotic pathogens on pig farms.
- Applied research for the development of more effective vaccine strategies in poultry for diseases such as avian influenza virus (AIV).

Centre for Public Health and Zoonoses support (CPHAZ) – (1 staff FTE – \$100K).

The Centre for Public Health and Zoonoses (<http://ovc.uoguelph.ca/cphaz>) was established in 2006 to coordinate existing public health research and promote new collaborative research activities. Aimed at enhancing capacity to solve problems and implement solutions in public health at the human-animal-environmental interface, CPHAZ works to expand the pool of educated personnel addressing the public health needs of the population. The CPHAZ mobilizes research results and provides a bridge between researchers at the University and the public seeking validated information on areas related to public health and zoonoses. An excellent example of this is the “Worms and Germs” blog (<http://www.wormsandgermsblog.com/>).

HQP Doctoral positions - DVSc or PhD. (5 stipends allocated to support research in areas of zoonoses, public health, foreign animal disease and food safety - \$165K). Examples include;

- Dynamics of Influenza A virus in swine herds.
- Disease states, other than West Nile virus infection, in crows found dead in Ontario.
- Characterization of the fecal microbiota and an evaluation and analysis of antimicrobial resistance in commercial rabbits.
- Characterization of epitheliocystis in fish.
- Investigating early host immune response to intestinal *Mycobacterium avium* subspecies paratuberculosis (MAP) infection in young cattle.

c) Rural Policy and Economic Development (rural business and communities)

Summer Leadership and Research Programs (\$49K)

Each year approximately 50 students from both DVM and BSc degree programs participate in a summer leadership experience in which they are actively engaged in the research project of their faculty mentor. Through a series of seminars they are exposed to a variety of leadership and career opportunities. At the end of the summer the students prepare and present a poster on their summer research. Examples of projects included;

- Validation of point of care clinical tests for dairy cattle
- Evaluation of analgesia efficacy in piglets undergoing castration
- Comparison and development of on farm euthanasia techniques in Ontario meat rabbits
- Development of a vaccine to protect against *Toxoplasma gondii* infection in sheep

As the VCEP funding for this area was new in summer 2014/15, funding was only allocated to a few student summer research projects. With funding allocation changes, this will be addressed in the next fiscal year.

Veterinary Externship (0.5 staff FTE- \$80K; plus experiential learning for 4th year DVM students - \$200K)

As part of the final (4th) year of the veterinary program, all 120 students in the class are placed in a private, multi-species veterinary practice that exposes them to practice in a rural community and allows them to consolidate their knowledge and skills in a hands-on, real-world setting. The externship course started in the mid-1980s to provide practical experience to DVM students entering their final year. More than 40 of the practices that host these students have been involved for more than 20 years – their support is critical. Not only do practitioners provide their expertise, they evaluate the students' clinical, diagnostic and communication skills covering a set list of criteria.

A blog of first-hand student experiences can be found at:

<https://externship.ovc.uoguelph.ca/blog>

The blogs provide an opportunity for future students, DVM students, OVC faculty, staff and alumni, government funding agencies and the community to discover what student veterinarians are learning, as well as providing an opportunity for student veterinarians to develop communication and social media skills for use in their future veterinary careers.

FINANCIAL REPORT

The financial reporting included in this Annual Report 2014/15 for the OMAFRA-U of G Agreement consists of two sections, as follows:

1. The “Audited Statement of Revenues and Expenses for the fiscal year May 1, 2014 to April 30, 2015” included here in its entirety in Appendix B.
2. Summary of Revenues and Expenses (Fully Allocated)

This summary shows the actual revenues and expenses (fully allocated) for May 1, 2014 to April 30, 2015 for each of the four programs (Research, VCEP, AFL and AHL) as well as for the Agriculture Research Institute of Ontario (ARIO) Minor Capital Fund (see Note*) funded, as applicable, through:

- The Base Agreement,
- The New Initiatives Fund (the special one-time funding of \$56 million received in March 2008, which the University planned to spend over five years in support of specific new initiatives in the overall partnership. Note: remaining funds shown for 2014/15 are carry forwards),
- The Growing Forward 2 fund, and
- The Total Partnership (Agreement + New Initiatives + Growing Forward 2).

“Fully allocated” refers to the fact that ‘indirect costs’ (such as providing program support services, administrative services such as budget management and human resources functions, and physical plant infrastructure) have been allocated to each individual program using a consistent methodology. This ‘fully allocated’ presentation of costs has been utilized beginning in the 2004/05 Annual Report, at the request of OMAFRA. This format provides a much more informative arrangement of the financial data, and is not subject to the same problems in interpretation of program costs as presented in the years previous to 2004/05. Nevertheless, it is not advisable to use these data for making decisions about incremental allocations/reductions in budget, since such decisions may have variable impact on the direct versus indirect cost bases. For example, reducing ‘Production Systems (PS) Research Theme’ expenditures may have less impact than intended, unless the continuing cost of operating the research stations on which the PS program is built is also part of the decision process.

The second page of this summary shows the revenues and expenses for the Research Program itemized for each of seven themes, as well as for the Research Stations (broken down by “Operations” and “Utilities, Repairs and Maintenance” see note *) and the HQP (Highly Qualified Personnel) and KTT (Knowledge Translation and Transfer) programs. This summary also shows the research stations costs allocated across the seven Research Themes, thus providing fully allocated totals for expenses by theme.

Note*: Financial support for upkeep and maintenance of the ARIO-owned lands and facilities (referred to in the Agreement as ARIO-Locations, and consisting of the three regional campuses and 14 other research stations, all 17 of which are managed and operated by the University) is provided for the “Utilities, Repairs and Maintenance” program (generally referred to as O&M, funded within the Agreement) and the “ARIO Capital Fund” (funded outside of the Agreement). This O&M and Capital funding is in addition to the normal day-to-day operation of the livestock and crops research stations (station staffing, inputs such as feed, bedding, fertilizer, seed, etc.) at these 17 locations, which is termed Research Station “Operations” (funded within the Agreement, as shown in the broken out costs within the Research Program summary).

The OMAFRA - U of G Partnership Financial Report - Row Definitions	
Revenue	
OMAFRA Agreement	That portion of the total Agreement funding recognized for eligible expenses in the reported fiscal year (May 1, 2014 - April 30, 2015).
OMAFRA – Other	These revenues include OMAFRA funding designated for specific activities as well as the “ARIO Minor Capital” funds received.
Sales of Goods and Services	Sales of services or goods from the Agreement operations provided to external organizations and clients. This category records revenue for testing services provided to external clients by the two Lab Services divisions, as well as sales of milk, eggs, crops and other farm products from the research stations.
Other Revenue and Interest	Includes interest earned on the net cash flow in accordance with section 14.6 of the Agreement as well as miscellaneous revenues generated within the Agreement operations. The major component of this category is facility rental income for space managed within the O and M budget. Other Revenue may also include sponsorship revenues, recoveries from the disposal of surplus equipment or other miscellaneous program revenues.
Expenses	
Personnel	All salary and employee benefit costs excluding transfers for Research and VCEP faculty costs. (refer to Faculty Pool Costs definition)
Faculty Pool Costs	Agreement funds transferred to the University in support of the salary and benefits costs of University faculty effort toward Agreement priorities. Two “pools” have been established for the Research and VCEP Programs.
Operating	Expenses for all costs other than salary and benefit costs.
Internal Sales & Recoveries	Sales of goods and services or recovery of costs between units <u>within the University</u> , such as Lab Testing performed by Lab Services or research station recoveries for researchers or departments. In addition, the agreement recovers costs where OMAFRA funded operations provide shared support for other activities such as MTCU-funded Diploma Teaching. The charges for these recoveries are normally approved as ‘invoices’ for services between the specific unit requisitioners and providers within the University. Internal Charges are recorded under “Operating”.
Indirect Costs	Includes costs of program support services, administrative services such as budget management and human resources functions, and physical plant infrastructure, which support the overall Agreement or New Initiatives programs, but cannot be attributed as direct costs to specific programs.

Summary 2014/15 Actuals - Revenue & Expenses of <u>Entire Agreement</u> by Program (in thousands of dollars)									
Base Agreement (Fund 110): All Programs									
	Object Category	Research	Vet Clinical Education	Agri-Food Lab	Animal Health Lab	ARIO Minor Capital	Total Agreement		
Revenue	OMAFRA Agreement	(44,292)	(4,789)	(6,417)	(6,185)	-	(61,683)		
	OMAFRA Other	-	-	(250)	(250)	(4,313)	(4,813)		
	Sales Goods & Services	(5,257)	-	(7,751)	(5,358)	-	(18,366)		
	Other Revenue & Interest	(1,721)	-	(5)	-	(6)	(1,732)		
	Total Revenue	(51,270)	(4,789)	(14,423)	(11,793)	(4,319)	(86,594)		
Expenses	Personnel	20,798	94	9,954	8,448	15	39,309		
	Faculty Pool Costs	8,900	1,900	-	-	-	10,800		
	Operating	15,335	2,710	4,642	4,473	4,304	31,464		
	Internal Sales & Recoveries	(3,593)	(35)	(460)	(1,391)	-	(5,479)		
	Indirect Costs	9,830	120	287	263	-	10,500		
	Total Expense	51,270	4,789	14,423	11,793	4,319	86,594		
	Net Expense (Revenue)	-	-	-	-	-	-		
New Initiatives (Fund 111): All Programs									
	Object Category	Total Research	Vet Clinical Education	Agri-Food Lab	Animal Health Lab	ARIO Minor Capital	Total New Initiatives		
Revenue	OMAFRA Agreement	(2,396)	(26)	-	(56)	-	(2,478)		
	OMAFRA Other	-	-	-	-	-	-		
	Sales Goods & Services	-	-	-	-	-	-		
	Other Revenue & Interest	-	-	-	-	-	-		
	Total Revenue	(2,396)	(26)	-	(56)	-	(2,478)		
Expenses	Personnel	2,225	16	-	7	-	2,248		
	Faculty Pool Costs	-	-	-	-	-	-		
	Operating	202	10	-	49	-	261		
	Internal Sales & Recoveries	(31)	-	-	-	-	(31)		
	Indirect Costs	-	-	-	-	-	-		
	Total Expense	2,396	26	-	56	-	2,478		
	Net Expense (Revenue)	-	-	-	-	-	-		

Growing Forward 2 – Additional Base (Fund 112): All Programs								
	Object Category	Total Research	Vet Clinical Education	Agri-Food Lab	Animal Health Lab	ARIO Minor Capital	Total New Initiatives	
Revenue	OMAFRA Agreement	(1,023)	(495)	-	(1,588)	-	(3,106)	
	OMAFRA Other	-	-	-	-	-	-	
	Sales Goods & Services	-	-	-	-	-	-	
	Other Revenue & Interest	(1)	(18)	-	2	-	(17)	
	Total Revenue	(1,024)	(513)	-	(1,586)	-	(3,123)	
Expenses	Personnel	373	80	-	497	-	950	
	Faculty Pool Costs	-	-	-	-	-	-	
	Operating	651	399	-	1,093	-	2,143	
	Internal Sales & Recoveries	-	34	-	(4)	-	30	
	Indirect Costs	-	-	-	-	-	-	
	Total Expense	1,024	513	-	1,586	-	3,123	
	Net Expense (Revenue)	-	-	-	-	-	-	
Total Partnership (Renewed Agreement, New Initiatives & Growing Forward 2): All Programs								
	Object Category	Total Research ¹	Vet Clinical Education	Agri-Food Lab	Animal Health Lab	ARIO Minor Capital	Total Partnership	
Revenue	OMAFRA Agreement	(47,711)	(5,310)	(6,417)	(7,829)	-	(67,267)	
	OMAFRA Other	-	-	(250)	(250)	(4,813)	(4,813)	
	Sales Goods & Services	(5,257)	-	(7,751)	(5,358)	-	(18,366)	
	Other Revenue & Interest	(1,722)	(18)	(5)	2	(6)	(1,749)	
	Total Revenue	(54,690)	(5,328)	(14,423)	(13,435)	(4,819)	(92,195)	
Expenses	Personnel	23,396	190	9,954	8,952	15	42,507	
	Faculty Pool Costs	8,900	1,900	-	-	-	10,800	
	Operating	16,188	3,119	4,642	5,615	4,804	33,868	
	Internal Sales & Recoveries	(3,624)	(1)	(460)	(1,395)	-	(5,480)	
	Indirect Costs	9,830	120	287	263	-	10,500	
	Total Expense	54,690	5,328	14,423	13,435	4,819	92,195	
	Net Expense (Revenue)	-	-	-	-	-	-	

Note 1: See the following pages for the breakout of Research Program finances by priority / theme area.

Summary 2014/15 Actuals – Revenue and Expenses by Research Sub- Program or Theme (in thousands of dollars)

Base Agreement: Research

		Research							ARIO Research Stations		Research			Total
	Object Category	Prod Sys	Prod Dev	Food for Health	Env Sust	Bio-economy	Ag Rural Policy	Emg Mgmt	Operations	Utilities / R&M	HQP	KTT	Comm	Research
Revenue	OMAFRA Agreement	(17,686)	(840)	(2,556)	(1,985)	(1,333)	(1,910)	(1,511)	(8,496)	(7,913)	(16)	-	(46)	(44,292)
	OMAFRA Other	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sales Goods & Services	(257)	-	-	(3)	(1)	-	-	(4,889)	(107)	-	-	-	(5,257)
	Other Revenue & Interest	(385)	(8)	(31)	(18)	(9)	(22)	(22)	(340)	(885)	(1)	-	-	(1,721)
Total Revenue		(18,328)	(848)	(2,587)	(2,006)	(1,343)	(1,932)	(1,533)	(13,725)	(8,905)	(17)	-	(46)	(51,270)
Expense	Personnel	7,073	29	425	326	122	333	255	9,073	3,147	15	-	-	20,798
	Faculty Pool Costs	4,349	393	950	1,171	850	778	409	-	-	-	-	-	8,900
	Operating	1,927	193	365	136	129	225	293	5,448	6,571	2	-	46	15,335
	Internal Sales & Recoveries	(810)	-	-	(23)	(4)	-	-	(1,678)	(1,078)	-	-	-	(3,593)
	Indirect Costs	5,789	233	847	396	246	596	576	882	265	-	-	-	9,830
	Total Expense	18,328	848	2,587	2,006	1,343	1,932	1,533	13,725	8,905	17	-	46	51,270
Net Expense (Revenue)		-	-	-	-	-	-	-	-	-	-	-	-	-

New Initiatives: Research

		Research							ARIO Research Stations		Research			Total
	Object Category	Prod Sys	Prod Dev	Food for Health	Env Sust	Bio-economy	Ag Rural Policy	Emg Mgmt	Operations	Utilities / R&M	HQP	KTT	Comm	Research
Revenue	OMAFRA Agreement	298	(399)	(291)	(297)	(504)	(285)	(251)	-	-	(526)	(141)	-	(2,396)
	OMAFRA Other	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sales Goods & Services	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other Revenue & Interest	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Revenue		(996)	(660)	(291)	(297)	(504)	(285)	(251)	-	-	(526)	(141)	-	(2,396)
Expense	Personnel	397	297	222	273	326	357	329	-	-	-	24	-	2,225
	Faculty Pool Costs	-	-	-	-	-	-	-	-	-	-	-	-	-
	Operating	(682)	103	69	34	178	(72)	(71)	-	-	526	117	-	202
	Internal Sales & Recoveries	(13)	(1)	-	(10)	-	-	(7)	-	-	-	-	-	(31)
	Indirect Costs	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Expense	(298)	399	291	297	504	285	251	-	-	526	141	-	2,396
Net Expense (Revenue)		-	-	-	-	-	-	-	-	-	-	-	-	-

Continued: Summary 2014/15 Actuals Revenue and Expenses by **Research** Sub-Program or Theme *(in thousands of dollars)*

Growing Forward 2: Research

		Research							ARIO Research Stations		Research			Total
	Object Category	Prod Sys	Prod Dev	Food for Health	Env Sust	Bio-economy	Ag Rural Policy	Emg Mgmt	Operations	Utilities / R&M	HQP	KTT	Comm	Research
Revenue	OMAFRA Agreement	-	-	-	-	-	-	-	-	-	(405)	(214)	(404)	(1,023)
	OMAFRA Other	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sales Goods & Services	-	-	-	-	-	-	-	-	-	-	-	-	-
	Other Revenue & Interest	-	-	-	-	-	-	-	-	-	-	-	(1)	(1)
	Total Revenue	-	-	-	-	-	-	-	-	-	(405)	(214)	(405)	(1,024)
Expense	Personnel	-	-	-	-	-	-	-	-	-	3	141	229	373
	Faculty Pool Costs	-	-	-	-	-	-	-	-	-	-	-	-	-
	Operating	-	-	-	-	-	-	-	-	-	402	73	176	651
	Internal Sales & Recoveries	-	-	-	-	-	-	-	-	-	-	-	-	-
	Indirect Costs	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Expense	-	-	-	-	-	-	-	-	-	405	214	405	1,024
	Net Expense (Revenue)	-	-	-	-	-	-	-	-	-	-	-	-	-

Continued: Summary 2014/15 Actuals Revenue and Expenses by **Research** Sub-Program or Theme *(in thousands of dollars)*

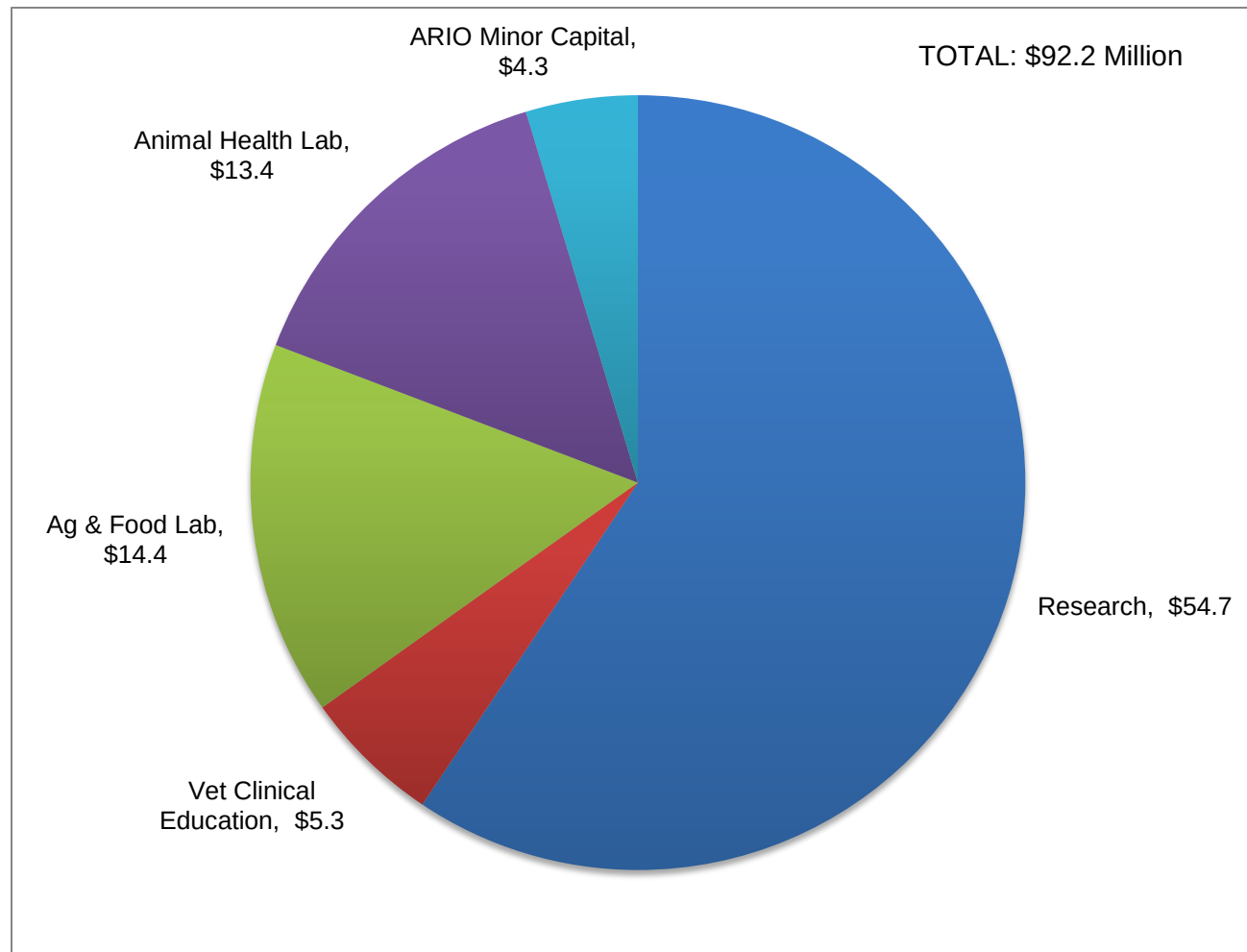
Total Partnership (Base Agreement, New Initiatives & Growing Forward 2): Research

		Research							ARIO Research Stations		Research			Total
	Object Category	Prod Sys	Prod Dev	Food for Health	Env Sust	Bio-economy	Ag Rural Policy	Emg Mgmt	Operations	Utilities / R&M	HQP	KTT	Comm	Research
Revenue	OMAFRA Agreement	(17,388)	(1,239)	(2,847)	(2,282)	(1,837)	(2,195)	(1,762)	(8,496)	(7,913)	(947)	(355)	(450)	(47,711)
	OMAFRA Other	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sales Goods & Services	(257)	-	-	(3)	(1)	-	-	(4,889)	(107)	-	-	-	(5,257)
	Other Revenue & Interest	(385)	(8)	(31)	(18)	(9)	(22)	(22)	(304)	(885)	(1)	-	(1)	(1,722)
Total Revenue		(18,030)	(1,247)	(2,878)	(2,303)	(1,847)	(2,217)	(1,784)	(13,725)	(8,905)	(948)	(355)	(451)	(54,690)
Expenses	Personnel	7,470	326	647	599	448	690	584	9,073	3,147	18	18	229	23,396
	Faculty Pool Costs	4,349	393	950	1,171	850	778	409	-	-	-	-	-	8,900
	Operating	1,245	296	434	170	307	153	222	5,448	6,571	930	190	222	16,188
	Internal Sales & Recoveries	(823)	(1)	-	(33)	(4)	-	(7)	(1,678)	(1,078)	-	-	-	(3,624)
	Indirect Costs	5,789	233	847	396	246	596	576	882	265	-	-	-	9,830
	Total Expense	18,030	1,247	2,878	2,303	1,847	2,217	1,784	13,725	8,905	948	355	451	54,690
Net Expense (Revenue)		-	-	-	-	-	-	-	-	-	-	-	-	-

Summary 2014/15 Actuals - Fully Allocated Research Program Expenses by **Research** Sub-Program or Theme *(in thousands of dollars)*

		Research							ARIO Research Stations		Research			Total
		Prod Sys	Prod Dev	Food for Health	Env Sust	Bio-economy	Ag Rural Policy	Emg Mgmt	Operations	Utilities / R&M	HQP	KTT	Comm	Research
Total Theme Expenses as above:		18,030	1,247	2,878	2,303	1,847	2,217	1,784	13,725	8,905	948	355	451	54,690
Allocation of ARIO Research Station Costs		16,334	380	1,357	2,254	400	959	939	(13,725)	(8,905)	-	-	-	(7)
Fully Allocated Theme Expenses		34,364	1,627	4,235	4,557	2,247	3,176	2,723	-	-	948	355	451	52,856

Summary 2014/2015 Actuals – Revenue and Expenses of Entire Agreement by Program (\$millions)



PROGRAM PERFORMANCE REPORTS

Overall Agreement

Performance Indicators

Data collection for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The table below summarizes the Overall Agreement performance according to the six PIs in the 'Overall' Agreement.

Key Outcome	A world class cluster of agriculture, food, bioproduct and rural community resources including academic, government, industry and supplier organizations.	
Performance Indicator OA1	Recognition of the University of Guelph as a world leader in agri-food, veterinary and associated sciences.	
	Metric (a)	Overall University ranking. Same as metric R3 (b).
	Baseline:	Ranking as per 2008 results. U of G ranked 2 nd in the 'comprehensive' university category.
	Target:	Maintenance or improvement of university standing (2nd) according to the Research Money Inc. ranking of Canadian universities.
	Results (2014/15):	In the most current (2015) Research Infosource Inc. (formerly Research Money) report of Canadian universities' standings ranks U of G as the #2 university in the comprehensive category. Research Infosource advises their methodology changed for 2014, when U of G did not place in the top 5.
	Metric (b)	Total number of scientific and technical FTEs, and faculty supported or leveraged by the Partnership.
	Baseline:	Scientific and technical FTEs as per 2008/09 results. Research: 171.9 VCEP: 45.9 AFL: 53.0 AHL: 71.0

	Target:	Maintain total number of scientific and technical FTEs and faculty supported or leveraged by the Agreement at 2008/09 levels. May decline due to inflation.
	Results (2014/15):	Number of faculty, scientific and technical FTEs supported or leveraged by the Partnership Agreement research projects: Research: 316.9 VCEP: 45.9* AFL: 53.0* AHL: 71.0*
		*Note: Number of FTEs in VCEP, AFL, and AHL were determined at the time that the 2008-2018 Agreement was negotiated and have not been updated since. The 2013/14 Consolidated Annual Report over reported the FTEs for AFL and AHL in error. (Additional information: Number of faculty FTEs engaged in projects supportive of OMAFRA priorities, but not allocated to approved OMAFRA Agreement projects is estimated at 183 'Research' FTEs. When these 'Research FTEs' are 'converted' to full faculty FTEs, this represents 91.5 full faculty FTEs devoted to research related to theme priorities).
	Metric (c)	Number of faculty/researchers/staff related to the research theme areas, recognized by their peers, for example through research chairs, awards of recognition, appointment to prestigious positions such as international panels, and leadership of national and international research initiatives etc.. Same as metric R3 (a).
	Baseline:	2008/09 results are the baseline. 25 faculty members were Canada Research Chairs, of which 10 had active Partnership Agreement research projects.
	Target:	Number of faculty/researchers/staff recognized by their peers, and significance of awards, appointments etc. to be $\geq$ baseline.
	Results (2014/15):	During 2014/15, 29 faculty members at the U of G were Canada Research Chair holders, of which 10 had active OMAFRA research projects.

Key Outcome	Broader stakeholder community contributing research funding to building capacity for developing solutions to relevant issues and opportunities	
Performance Indicator OA2	Contribution of the Agreement towards leveraging industry and other government funding and collaboration for building capacity to address sector needs, opportunities and issues.	
	Metric (a)	Total dollars invested/generated from third-party sources, by program
	Baseline:	For 2008/09, total dollars invested from third-party sources were reported below as: - Research (operating): \$9.2 million (excluding all Provincial government funding). This is funding secured for research projects from third-party sources. - AHL: \$3.6 million - AFL: \$9.8 million - VCEP: no revenue generation
	Target:	Total dollars invested/generated from third-party sources $\geq$ 2008/09 baselines.
	Results (2014/15):	Research (operating): \$11.4 million AHL: \$5.4 million AFL: \$7.75 million VCEP: no revenue generation
	Metric (b)	Total non-OMAFRA program revenue
	Baseline:	2008/09, total non-OMAFRA program revenue Research: \$6.4 million AHL: \$3.7 million AFL: \$9.5 million , \$0.3 million from OMAFRA, not related to the Agreement VCEP: no revenue generation
	Target:	Total non-OMAFRA revenue $\geq$ 2008/09 Baseline.
	Results (2014/15):	Research: \$5.26 million AHL: \$5.4 million AFL: \$7.75 million

		VCEP: no revenue generation This category records revenues for testing services provided to external clients by the Lab Services division (AFL and AHL), as well as sales of milk, eggs, crops and other farm products from the research stations.
Key Outcome	Partnership seen as integrative and collaborative	
Performance Indicator OA3	OMAFRA and University staff engagement with the Agreement	
	Metric	Level of overall OMAFRA - U of G staff engagement/satisfaction with overall Agreement
	Baseline:	Joint staff engagement survey distributed to all OMAFRA and U of G personnel involved with the Agreement.
	Target:	Maintenance or improvement of 2008/09 survey results.
	Results (2014/15):	This PI was addressed in a 2012/13 study undertaken as part of the five year review of the Agreement, (Stoddard, 2012). It indicated positive levels of staff engagement / satisfaction with the overall Agreement. The findings are detailed in OA3 of the 2012/13 Annual Report. In, 2014/15 OMAFRA and U of G staff continued to work closely and collaboratively as co-chairs for the four program areas of the Agreement, and co-leads for each of the seven research areas.
Key Outcome	Leading edge solutions to agriculture, food, bioproduct, animal health and rural community issues and opportunities	
Performance Indicator OA4	Revenue generated from solutions, products and services developed through the Agreement	
	Metric	Outcomes and PIs outlined for OA4, 5 and 6 will be assessed as part of the overall five year evaluation of the Agreement, to be conducted by an external third party.
	Baseline:	PIs OA4, 5 and 6 will be achieved through a 2012 midterm study similar to the Deloitte report of 2007 (U of G / OMAFRA Impact Study).

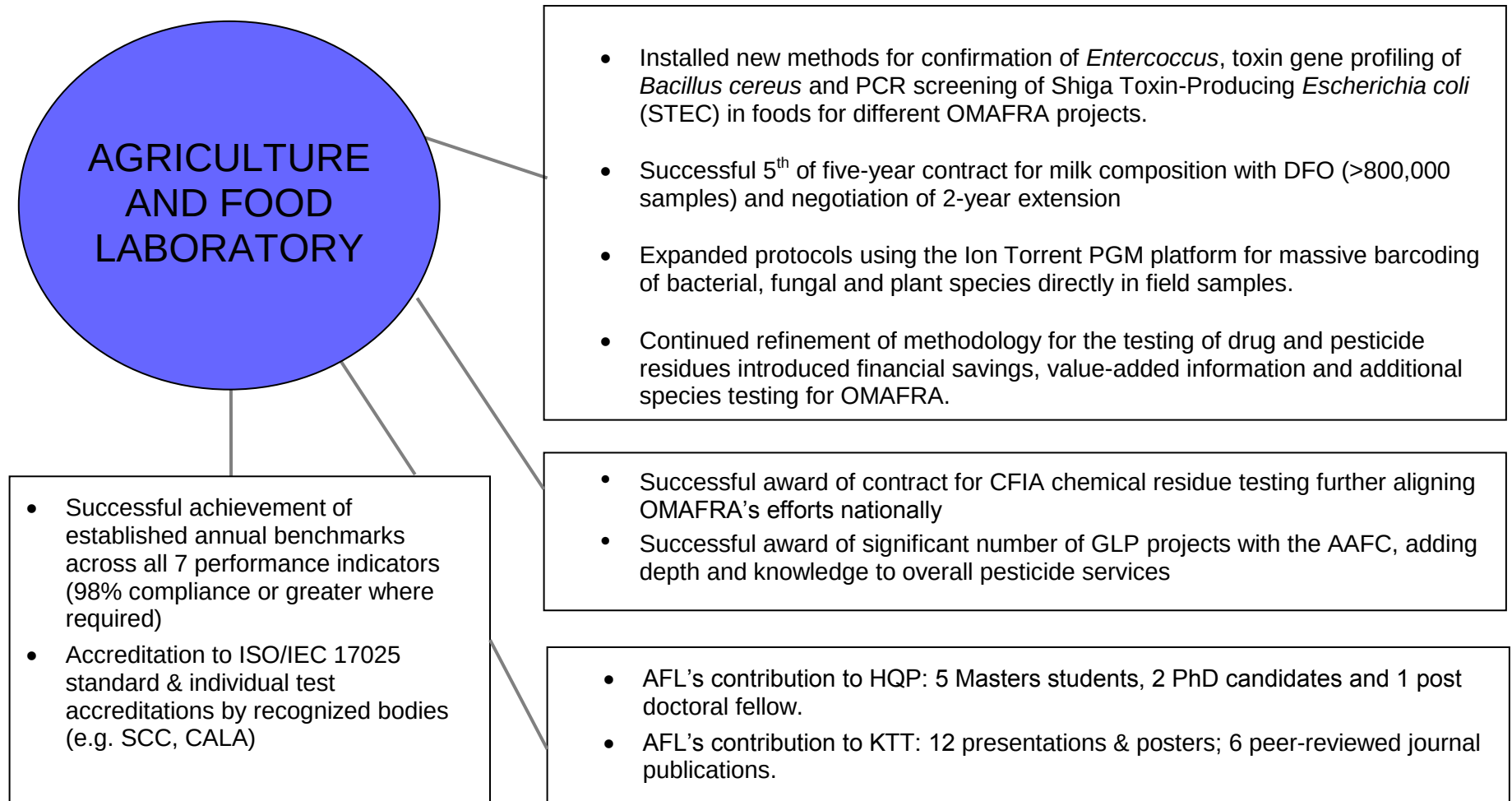
	Target:	Evaluation plan for year five to be undertaken and approved in 2009/10, describing content and format of 2012/13 report. Report was completed in 2012.
	Results (2014/15):	This PI was addressed in a 2012/13 study undertaken as part of the five year review of the Partnership Agreement (Price Waterhouse Coopers, Dec. 2012). The findings are detailed in OA4 of the 2012/13 Annual Report . Many examples of revenue-generating solutions, products and services developed through the Agreement can be accessed in the Agri-food Yearbook posted annually on the U of G website. Further information concerning revenues is also described in Research PI #1b: third party investment in research operating funding and PI #8b and c: number of licenses and patents applied for.
Key Outcome	Economic and health benefits generated from adoption, utilization and commercialization of knowledge and capacity	
Performance Indicator OA5	Economic and health benefits from solutions, products and services developed through the Agreement	
	Metric	Outcomes and PIs outlined for OA4, 5 and 6, will be assessed as part of the overall 5-year evaluation of the Agreement, to be conducted by an external third party.
	Baseline:	PIs OA4, 5 and 6 will be achieved through a 2012 midterm study similar to the Deloitte report of 2007 (U of G / OMAFRA Impact Study).
	Target:	Evaluation plan for year five to be undertaken and approved in 2009/10, describing content and format of 2012/13 report. Report was completed in 2012.
	Results (2014/15):	This PI was addressed in a 2012/13 study undertaken as part of the five year review of the Agreement (Price Waterhouse Coopers, Dec 2012). The findings are detailed in OA5 of the 2012/13 Annual Report . Current examples of economic and health benefits developed through the Agreement are shown in the 2015 Agri-Food Yearbook posted annually on the U of G website.
Key Outcome	Key stakeholders aware of economic and social benefits of solutions led by the Partnership Agreement	
Performance Indicator	External stakeholder satisfaction with benefits and accomplishments of the OMAFRA - U of G Agreement.	

OA6		
	Metric	Outcomes and PIs outlined for OA4, 5 and 6 will be assessed as part of the overall 5-year evaluation of the Agreement, to be conducted by an external third party.
	Baseline:	PIs OA4, 5 and 6 will be achieved through a 2012 midterm study similar to the Deloitte report of 2007 (U of G / OMAFRA Impact Study).
	Target:	Evaluation plan for year five to be undertaken and approved in 2009/10, describing content and format of 2012/13 report. Report was completed in 2012.
	Results (2014/15):	This PI was addressed in a 2012/13 study undertaken as part of the mid-term review of the Agreement (Stoddard, Sept 2012). The study findings were very positive and are detailed in OA6 of the 2012/13 Annual Report. External stakeholder satisfaction continues to drive the research priority setting, funding and mobilization of research results so that maximum benefits accrue to the Ontario public.

AGRICULTURE AND FOOD LABORATORY

Selected Performance Indicators and Accomplishments

Program Objective: Scientific, diagnostic and analytical capacity to detect risks and enable effective response to support the health and wellbeing of the province and its citizens.



Laboratory Services Division

Agriculture and Food Laboratory

Performance Indicators

Data collection for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The table below summarizes AFL's performance according to the seven PIs in the Agreement.

Key Outcome	Highly qualified & skilled lab personnel & equipment supported by required accreditation. Improved lab and food safety technology & practices.	
Performance Indicator AFL1	Maintain required accreditations, proficiency testing and ISO registration to ensure a continuous quality improvement program is applied to laboratory operations.	
	Metric	Summary reports of accreditation and proficiency reports
	Baseline:	Accreditation to the ISO/IEC 17025 standard. Individual test method accreditation by recognized bodies E.g. Standards Council of Canada (SCC), Canadian Association for Laboratory Accreditation (CALA). Maintenance of proficiency for individual test methods per program availability.
	Target:	2014 – 2015: Maintenance of accreditation
	Results (2014/15):	ISO/IEC 17025 Accreditation Laboratory Services Division (LSD), including the Agriculture and Food Laboratory (AFL), is accredited by both of Canada's internationally recognized accrediting bodies, the Standard Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA) to the ISO/IEC 17025 standard, for specific tests listed on our scopes of accreditation. LSD is accredited by SCC in two program specialty areas: Agriculture Inputs, Food, Animal Health and Plant Protection (AFAP) and Test Method Development and Evaluation and Non-routine Testing (TMDENRT). As of June 3 2015, LSD has 109 tests listed on their SCC scope, 95 AFL tests and 14 AHL tests. In addition, the Animal Health Laboratory (AHL) is accredited for 5 laboratory techniques listed under the Medical – Veterinary flexible scope.

	As of Jan. 19, 2015, LSD is accredited by CALA for 13 environmental tests. 10 AFL tests and 3 AHL tests. The CALA accredited tests include 3 AFL microbiology tests licensed under the Ontario Safe Drinking Water Act (OSDWA). On March 23, 2015 LSD added three AFL tests to their SCC scope of accreditation. 1. <i>CHEM-069 Acidic herbicides (Phenoxy) in environmental and food matrices by LC-ESI/MS/MS</i> 1. <i>TOPS-120 Glyphosate and AMPA</i> 2. <i>TOPS-142 Multi-residue pesticide determination by Liquid Chromatography/Electrospray Ionization-Tandem Mass Spectrometry (LC/ESI-MS/MS) and gas chromatography-tandem mass spectrometry (GC-MS/MS) (Modified CFIA PMR-006-V1.0) - this was a scope extension to accredit the GC method as the LC part of the method was already accredited.</i> Since May 2014 LSD has streamlined its scope by withdrawing the accreditation of 23 SCC-accredited tests because 12 tests were discontinued, 7 tests no longer require accreditation, and 4 tests were moved to AHL flexible scope. Accreditations were dropped during the fiscal year with 6 tests (#1-6) on May 29, 2014; 4 tests July 4, 2014 (#7-10); 6 tests (#11-16) on Aug 25, 2014, 6 tests (#17-22) on Dec 22, 2014 and 1 test (#23) on June 3, 2015 (technically in 2015/2016 fiscal year) as listed below: 1. <i>DRUGS-230 Determination of residues of Desoxycarbadox and other carbadox and Olaquinox-related metabolites in animal tissues by LC-MS/MS (Modified CFIA-DOX-SP04)</i> 2. <i>DRUGS-124 Tylosin Microbial Agar Diffusion Test in Feed (Modified CFIA FD_BIO_TYL)</i> 3. <i>PDC-117 Detection of Phytophthora species ELISA (CFIA PQ-PR083 & PQ-PR100)</i> 4. <i>TOXI-023 Fluorometric Determination of Selenium in Biological Material (Modified AOAC 974.15)</i> 5. <i>DRUGS-002 SOS: Sulfonamide Screening in Swine Urine</i> 6. <i>CHEM-001 Quantitative determination of mycotoxins in cereals by LC-MS/MS</i> 7. <i>MMV-214 Bovine viral diarrhea virus antigen ELISA</i> 8. <i>MMV-310 TGEV-Ab & PRCV-Ab ELISA differentiating test kit</i> 9. <i>MMV-345 PRRSV X3 & SIV (H1N1 and H3N2) antibody ELISA test kit</i> 10. <i>MMV-348 Anaplasma antibody competitive ELISA</i> 11. <i>DA-202 Screening bovine milks for inhibitor residues by microbial inhibition test</i> 12. <i>MID-114 Verocytotoxin-producing Escherichia coli</i> 13. <i>MFLP-58B Enumeration of Aeromonas hydrophila in prepackaged ice and water in sealed containers by the Hydrophobic Grid-Membrane Filter (HGMF) Technique (MID-184)</i> 14. <i>MFLP-61B Enumeration of Pseudomonas aeruginosa in prepackaged ice and water in</i>
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		sealed containers by the Hydrophobic Grid-Membrane Filter (HGMF) Technique (MID-255) 15. METALS-002 Mercury in soils & tissues by cold vapor AAS (Modified MOE HGSSV-E3059) 16. MFHPB-18 Determination of the aerobic colony count in foods (MID-101) 17. MFLP-25 Isolation and Identification of <i>Shigella</i> spp. from Foods (MID-172) 18. MFHPB-27 Enumeration of <i>Escherichia coli</i> in foods by a direct plating (DP) method (MID-258) 19. TOXI-061 Determination of trichothecene mycotoxins by gas chromatography with ion-trap mass spectrometer detection using acetonitrile chemical ionization (Modified CFIA FD-TOXINS-TRICO) 20. MOL-196 PRRSV Tetracore NA-EU real-time RT-PCR Assays 21. MOL-206 Swine influenza virus matrix real-time RT-PCR 22. MYC-117 <i>Mycoplasma hyopneumoniae</i> ELISA 23. TOXI-047 Determination of Lasalocid in Animal Feeds and Premixes By Reverse Phase Liquid Chromatography (Modified CFIA FD-DRUGS-LAS-RP) LSD's CALA scope of testing has been revised since May 1, 2014 LSD as follows: - Aug. 5, 2014 addition: <i>CHEM-069 Acidic herbicides (Phenoxy) in environmental and food matrices by LC-ESI-MS/MS</i> was added Aug 5, 2014 as a replacement for method TOPS-116. - Jan. 15, 2015 deletions: <i>TOPS-116 Acidic herbicides in soil, vegetation and water by GC-MSD (Phenoxy) and</i> <i>MID-145 Membrane filter method for enumeration of total coliform and Escherichia in water using MI agar.</i> Method MID-145 was also removed from LSD's drinking water license (OSDWA). The next CALA/SCC audit will be this fall 2015. SCC and CALA are gathering their assessment team and LSD expects the audit date to be set soon.
Key Outcome	Scientific & statistical integrity of routine analytical test data to ensure quality, reliable results.	
Performance Indicator AFL2	Proportion of completed tests that meet quality, sample integrity and service level standards.	
	Metric	Percentage / Level of compliance with service level standards, reported by program, related to:

		• Turnaround times for screening and confirmation • Correct reports • Non-conforming samples
	Baseline:	98% compliance met.
	Target:	2014 – 2015: maintain 98% compliance with service level standard
	Results (2014/15):	The Agriculture and Food Laboratory has met or exceeded the requirement: • Turnaround time for test results was met 99.5% of the time over the full fiscal year 2014/15. • Correct reports – 99.5% of sample results were correct when delivered to OMAFRA • Non-conforming samples – 98.8% of samples received met the requirements for conforming samples.
Key Outcome	Strong linkages built to ensure effective, timely sharing of information and to communicate violative / actionable test results to stakeholders in a timely manner.	
Performance Indicator AFL3	Track and review incident reports (CAPA) and report all non-conformances, resolution and continuous improvement initiatives.	
	Metric	(a) CAPA reporting of all non-conformances (b) Level of customer satisfaction with services provided by AFL. Given that this survey is aimed at all external AFL clients, and is not relevant information to report to OMAFRA, it was therefore agreed by the AFL PMC that 3b) should be deleted from the AFL performance indicators.
	Baseline:	Service level standard is to continually improve through the process of documenting and reviewing incident reports (CAPA) and associated follow-up and resolution initiatives
	Target:	2014 – 2015: To manage the incidents every year with demonstration of continuous improvements.
	Results (2014/15):	AFL understands that the focus of this performance measure is to demonstrate the AFL's ability to address those results required for OMAFRA actionable response. The significant decrease in medium to high risk incident reports continued through 2014/2015. A total of 14 incident reports (versus 24 in 2013/14) were identified during the processing /testing /reporting of 54,232 tests reported for OMAFRA Schedule "F" samples, excluding the raw milk

		testing program. There is equal distribution of the incidents between administrative and technical related issues. A total of 54,232 tests (excluding raw milk testing program) were performed for OMAFRA in the Schedule "F" programs. Over 99.5% of these tests reported met the performance standards of the agreement. Improvements installed over the past year are aimed at eliminating recurrence of specific non-conformances and preventing future ones. Specifically: • Customization of submission documents in collaboration with OMAFRA Programs continues to improve sample information consistency. • New Sample Preparation tracking procedure implemented to provide increased information for Chemistry Unit samples. • Enhancement of Microbiology lab processes including replacing manual with automated steps and use of rapid methods. • Implementation of additional Program Specific quarterly meetings to allow open exchange of information and ideas to shape future program services.
Key Outcome	Ability and capacity to detect and confirm positive test results to provide effective response to food contamination incidents and other serious plant and environmental hazards with severe human health or economic consequence.	
Performance Indicator AFL4	Level of compliance with communication requirements in the lab testing and sampling protocols.	
	Metric	CAPA reporting of all non-conformances in reporting of adverse results (SOP 95S-028)
	Baseline:	Baseline is service level standard of 98%.
	Target:	2014 – 2015: maintain 98% compliance with service level standard

	Results (2014/15):	100% compliance met: AFL's adherence to 95S-028 continues to be monitored through the IT Adverse Reporting Initiative and Regulatory Partnerships. There were <u>no</u> incidents related to reporting of adverse results in Schedule F programs during 2014/2015. The AFL LIMS adverse result alert program reported 801 adverse or presumptive positive test results during this fiscal year. These test results were reported to OMAFRA per 95S-028.
Key Outcome	Capacity and capability to support coordinated and effective emergency management, and the ability and capacity to detect and confirm positive test results to provide effective response to unanticipated / urgent testing requirements and food safety, environmental health and plant health / pest emergencies.	
Performance Indicator AFL5	Effective response to food safety, environmental health and plant health/pest emergencies & unanticipated urgent incidents / requirements in a reasonable timeframe using existing or new methodologies / tests.	
	Metric	Evaluation / case study of AFL's response to and management of significant / unanticipated / urgent situations / events of environmental, health and plant / pest emergencies including any requirement for the development of new AFL tests / methodologies.
	Baseline:	Case study approach.
	Target:	Completion of case study.
	Results (2014/15):	There was one incident in 2014/15 requiring urgent and effective response. The Dairy Food Safety Program required confirmation of the content of a sample. The OMAFRA Program was satisfied and appreciative of the level of response and diligence provided by the AFL.
Key Outcome	Ability to detect contamination of the food supply and other testing projects through the implementation of statistically valid sampling plans and ensure the cost effective use of available resources.	
Performance Indicator AFL6	Level of compliance with sampling schedule as described in the annual sampling and testing plan agreements and documented in-year changes.	
	Metric	Percentage compliance with annual testing and sampling plans, by program (Schedule F).
	Baseline:	Baseline is service level standard of 98%.
	Target:	2014 – 2015: maintain 98% compliance with service level standard

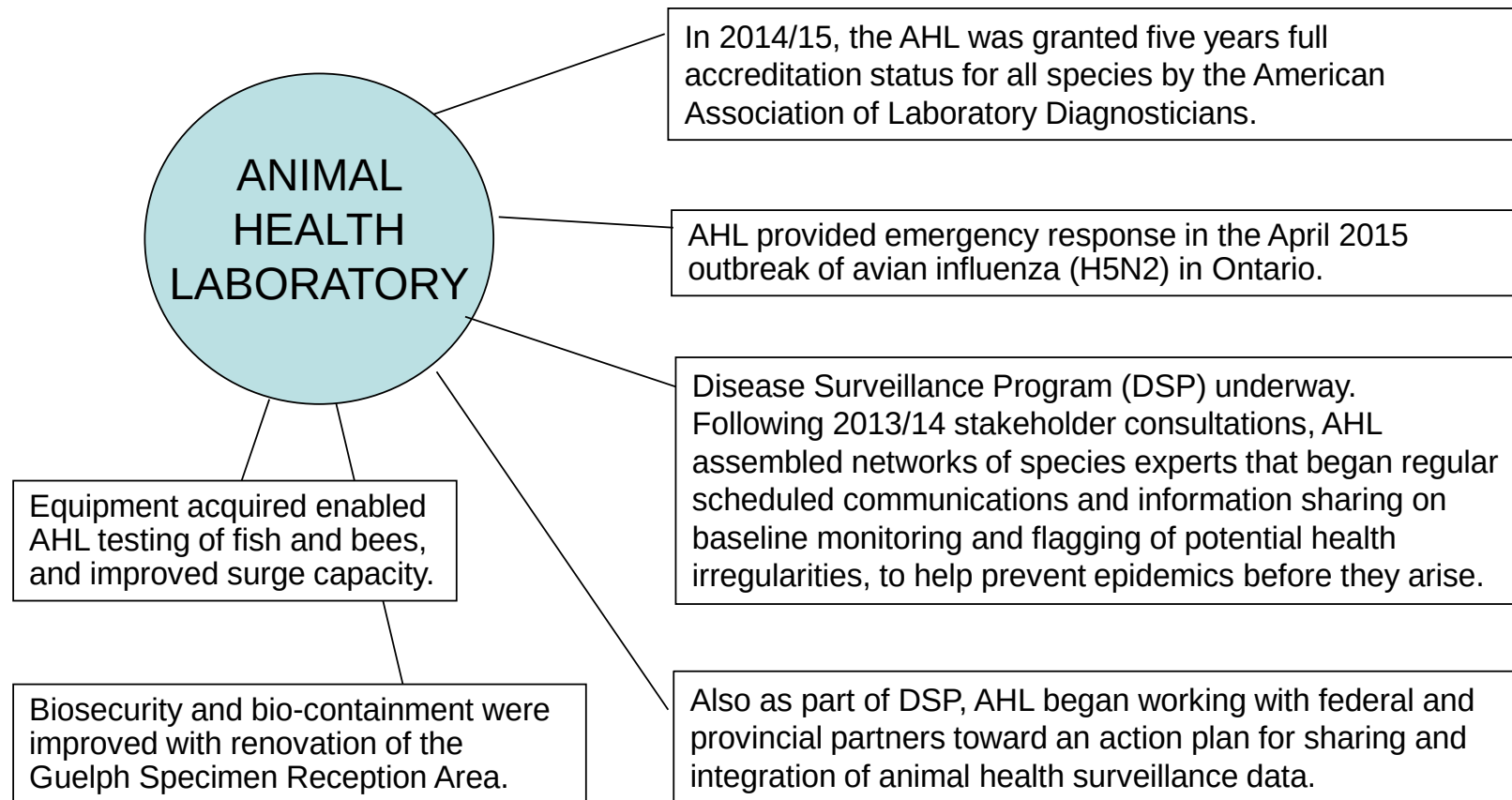
	Results (2014/15):	The AFL met and exceeded the required 98% service level standard [99.8% correct reports; 99.7% turnaround time achieved], achieving the testing requirements as specified in the annual testing and sampling plans for the full list of requested parameters across all programs. OMAFRA Sampling Plan Request: 17,423 individual test samples (excluding 108,750 raw milk testing program contract samples) AFL Tested: 16,005 individual test samples (per OMAFRA Sample Reconciliation Report for (2014/15)) The AFL found that 95.25% of the samples submitted by OMAFRA in the Food Safety Programs (Dairy, Foods of Plant Origin and Meat) were suitable for testing; 100% of the samples submitted by OMAFRA in the Crop Technology Branch & other Programs were suitable for testing. OMAFRA strives to reach 100% with its annual sampling and testing plans. Several factors develop throughout the testing year that can affect the ability to meet this compliance goal. They include factors such as: sample collection issues; logistical and resource issues; and various other issues that OMAFRA works diligently to adapt and overcome. Some factors are however outside the control of OMAFRA such as: weather and seasonal issues; licensing issues; processing facilities going out of business; new facilities coming online; and other factors that can affect OMAFRA's ability to collect the agreed upon number of samples.
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Key Outcome	Improved U of G research through laboratory-based expertise.	
Performance Indicator AFL7	Contribution of AFL / U of G students to articles, posters and final project reports presented/published.	
	Metric (a)	Total number of publications in peer reviewed journals and / or final project reports presented, related to OMAFRA strategic research themes.
	Baseline:	There is no existing baseline. Producing more publications year over year does not provide an accurate measure of performance. Continuous improvement and measuring beneficial impacts of contributions is more in line with the intent of this measure
	Target:	Demonstration of continued contribution by the AFL; year-to-year fluctuation expected.
	Results (2014/15):	• 9 publications in peer-reviewed journals/book chapters and 5 research grant awards. • 1 Post-Doctoral Fellow trained under OMAFRA, OCE, MITACS and MOE research grants • 5 Masters students trained under Food Safety and Quality Assurance program of Department of Food Science, University of Guelph • 2 PhD candidates hosted under the Department of Food Science, University of Guelph
	Metric (b)	Summary of knowledge transfer events re new practices, including number of attendees.
	Baseline:	There is no existing baseline. Conducting more events year over year does not provide an accurate measure of performance. Continuous improvement and measuring beneficial impacts of contributions is more in line with the intent of this measure.
	Target:	Demonstration of continued contribution by the AFL to knowledge transfer.
	Results (2014/15):	Nineteen 19 knowledge transfer events: • 13 oral presentations (50 – 150 attendees) • 6 poster presentations at scientific conferences (20 -100+ attendees)

ANIMAL HEALTH LABORATORY

Selected Performance Indicators and Accomplishments

Program Objective: Surveillance, method development and emergency response and surge capacity in place to support Ontario's animal health system and the health and well-being of the province and its citizens



Animal Health Laboratory

Performance Indicators

Data collection for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The table below summarizes AHL's 2014/15 **newly revised PIs** (May 2015). To the extent possible, data collection and analysis were used to develop numeric performance metrics. While most of these PIs have supporting documentation, some include narratives, which provide additional information and perspective on the PI results. This supporting documentation is available upon request.

Key Outcome	Contributes effectively to developing and implementing an animal health strategy for Ontario/Canada	
Performance Indicator AHL1	Doing Things Right	
	Key Outcome	a) Contributes effectively to developing and implementing an animal health strategy for Ontario/Canada b) Acts as a critical resource effectively contributing to animal health policy development and in ongoing program delivery for OMAFRA
	Performance Indicator	- Participation in and contribution of surveillance information to relevant national and provincial bodies or committees that inform Federal/Provincial animal health strategies - Diagnostic services offered by the AHL are appropriate to detect animal hazards present in Ontario
	Results (2014/15):	a) 17 of 18 AHL vets/supervisors participated in 87 meetings of 33 international and national organizations (total 688 hrs). 18 of 18 AHL vets/supervisors participated in 203 meetings of 28 provincial organizations (total 717 hrs). In total, all 18 AHL vets/supervisors participated on federal and/or provincial animal health strategy committees and 12 attended meetings or conferences for these committees in 2014/15. b) Average per staff member: 82.6 meeting hours per year spent on relevant committees, equivalent to 4.7% of available

		working time. *The value presented this year is 4.7% vs. 3.7% in previous years. This is a result of revising the total possible working hours to include 50 weeks/year vs. 52 weeks/year, to account for at least 2 week vacation.
		This PI is supported by a table of AHL staff participation in national and provincial committees and scientific meetings. The table also includes information regarding AHL staff holding officer roles in these organizations. Two international organizations are included (AAVLD and ACVP), as participating in this capacity contributes to international and thus national policy. As requested, this tabulation has otherwise been limited to national and provincial bodies or committees to which AHL veterinary staff members belong. Many AHL staff are also ordinary members of various international organizations and local organizations, which have not been included. Participation in the large number of provincial and national veterinary organizations provides an opportunity to interact with both private practitioner colleagues as well as industry, and brings a laboratory perspective on issues of the day that impact or inform policy development. Participation in the Canadian Animal Health Surveillance Network (CAHSN) has been most useful in helping to train and equip the AHL staff to deal with a foreign animal disease at an enhanced level of preparedness – also a key feature of the OMAFRA / U of G Agreement. As core members of the Ontario Animal Health Surveillance Network (OAHSN), the AHL and OMAFRA exchange and integrate information from many sources such that OAHSN serves as a cornerstone of the larger Ontario Animal Health System and related public health bodies. Cross-Canada representation is gained through attendance at the Canadian Animal Health Laboratorians Network (CAHLN) annual meeting, which includes provincial, university and federal laboratorians. Other annual meetings held concurrently are the Canadian Association of Veterinary Pathologists (CAVP), the Canadian Animal Health Surveillance Network (CAHSN), and the TSE Lab Network.

		Notifiable Tests Ordered (May 1, 2014 to April 30, 2015)	
	Work item	No. of Cases	
	CFIA African swine fever	3	
	CFIA BSE	7	
	CFIA Bluetongue	2	
	CFIA Classical swine fever	3	
	CFIA Foot mouth disease	1	
	CFIA Pseudorabies	3	
	CFIA Scrapie ELISA	1	
	CFIA Vesicular stomatitis	1	
		Notifiable Tests Completed	
	Work item	No. of Cases	
	CFIA African swine fever	3	
	CFIA BSE	6	
	CFIA Bluetongue	2	
	CFIA Classical swine fever	3	
	CFIA Foot mouth disease	1	
	CFIA Pseudorabies	3	
	CFIA Scrapie ELISA	1	
	CFIA Vesicular stomatitis	1	
	Rabies FA	43	
	Salmonella Serotyping	646	
		Notifiable Ecode Cases	
	TME Code	No. of Cases	
	Chlamydia psittaci	1	
	Coxiella burnetii	17	
	Eastern equine encephalitis (EEE)	2	

		Listeria monocytogenes	12
		Avian herpesvirus 1 (AHV-1)/ ILT	4
		Notifiable Alerts	
		Work item	No. of Cases
		1Por coronavirus PEDV	426
		APMV-1m rt-RT-PCR	1
		Botulism MIT (Serum)	1
		C burnetii PCR	53
		C. burnetii ELISA	4
		C. psittaci RT-PCR	1
		Cell Culture Isolation	1
		Culture Bact	28
		EEEV IgM ELISA	22
		EEEV rRt-PCR	4
		EHV-1 Neuropathogenic	9
		HSFP Environmental Culture	13
		IHC Influenza A Virus	12
		ILV rt-RT-PCR	4
		Influenza A virus MultiS-sc	23
		Influenza A matrix PCR	59
		L mono Isolation	2
		Modified Acid Fast Stain	1
		PDCoV PCR	1
		Public Health Report	1
		S pullorum-typhoid tube	15
		SIF Virus Typing	1
		VTEC PCR Geno	9
		WNV IGM ELISA-Iowa	1
		WNV rRT-PCR	5
		Reportable Diseases	
		Disease	No. of Cases

		Avian infectious laryngotracheitis 3 Equine encephalomyelitis eastern western Venezuelan 20 Fowl cholera 6 Highly pathogenic avian influenza (and low path H5/H7) 2 Influenza A virus (all) 1 Listeriosis (<i>Listeria monocytogenes</i>) 2 Scrapie 1 Theileriasis 1 Verocytotoxicogenic E.coli (VTEC) 1 West Nile fever 1
		A compilation of emerging hazards and first-diagnoses in Ontario is maintained and updated frequently by Dr. Beverly McEwen as the “<i>Impact of the AHL diagnostic system on issues of animal health, public health and trade related to Ontario’s livestock and poultry industries</i>”. This 12-page document is shared with OMAFRA. Examples of events in 2014-15 include: Highly pathogenic <i>Influenza A</i> H5N2 in turkeys, <i>Salmonella typhimurium</i> DT104 in bovine (milk), <i>Encephalitozoon cuniculi</i> stain III in canine, <i>Chrysosporium</i> anamorph of <i>Nannizziopsis vriesii</i> (CANV) in reptile, Lead toxicity in a large group of grower-feeder cattle, <i>Theileria buffeli</i> in bovine, <i>C. jejuni</i> in bovine, <i>Nocardia farcinica</i>, <i>Nocardia otitidiscaviarum</i> in turkey, <i>Brucella canis</i> in canine, <i>Mycobacterium shimoidei</i> in turaco, and <i>Batrachochytrium dendrobatidis</i> in pet frog.

Key Outcome	Test results and diagnoses provided by the AHL meet best practices standards. Capacity and capability in place to provide coordinated and effective surge capacity.	
Performance Indicator AHL2	Doing the Right Things	
	Key Outcome:	• Test results and diagnoses provided by the AHL meet best practices standards • Capacity and capability in place to provide coordinated and effective surge capacity.
	Performance Indicator	The University maintains an appropriate range of diagnostic specialties, current technology, accreditations, certifications and service standards at the Animal Health Laboratory.
	Results (2014/15):	By agreement with OMAFRA, the AHL Client Satisfaction Survey is conducted biennially, rather than annually. This survey was conducted in fall 2013, and will be again in fall 2015. As an additional documented form of feedback on client service, minutes of the bi-monthly AHL/OVC-HSC/PB liaison meetings (AHL, OVC Health Sciences Center, and Pathobiology) and the annual AHL Feedback Group meeting (a range of AHL clients attend) were reviewed. Meeting minutes are available upon request. Satisfaction is high with the timeliness of communications; however we do not have a numerical satisfaction rating. The University maintains appropriate accreditations at the Animal Health Laboratory (AHL), including ISO/IEC 17025, AAVLD and CFIA. American Association of Veterinary Laboratory Diagnosticians (AAVLD) accreditation The AHL was audited June 15-19, 2014 against the AAVLD standard by 4 external auditors, and AHL received another 5-year full AAVLD accreditation, all species, until Dec 2019. The next AAVLD audit will be spring-summer 2019. ISO/IEC 17025 accreditation LSD, including AHL, is accredited by both of Canada's internationally recognized accrediting bodies, the Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA) to the ISO/IEC 17025 standard, for specific tests listed on our scopes of accreditation. LSD/AHL is accredited by SCC in the program specialty areas (PSAs): Agriculture Inputs, Food, Animal Health and Plant Protection (AFAP) and Test Method Development and Evaluation and Non-routine Testing (TMNENRT). As of June 3, 2015, LSD has 109 tests listed on their SCC scope, 95 AFL tests and 14 AHL tests. In addition, the Animal Health Laboratory (AHL) is

accredited for 5 laboratory techniques listed under the Medical – Veterinary flexible scope.

In the past fiscal AHL implemented the flexible scope. In the past fiscal year, the AHL has focused on adding tests to the flexible scope rather than the SCC fixed scope. . AHL moved 4 tests to the flexible scope and removed accreditation for the following 3 tests:

24. *TOXI-023 Fluorometric Determination of Selenium in Biological Material (Modified AOAC 974.15)*
25. *TOXI-061 Determination of trichothecene mycotoxins by gas chromatography with ion-trap mass spectrometer detection using acetonitrile chemical ionization (Modified CFIA FD-TOXINS-TRICO)*
26. *TOXI-047 Determination of Lasalocid in Animal Feeds and Premixes By Reverse Phase Liquid Chromatography (Modified CFIA FD-DRUGS-LAS-RP)*

Since July 2014, the following 4 tests have been added to the AHL flexible scope under the technique Polymerase chain reaction:

1. MOL-249 PCR detection of fish viruses – specific agent:
 - a. viral hemorrhagic septicemia virus (VHSV)
2. V-005 Polymerase chain reaction - specific agents:
 - a. Porcine coronavirus (porcine epidemic diarrhea virus, transmissible gastroenteritis virus, porcine deltacoronavirus)
 - b. Porcine reproductive and respiratory syndrome virus
 - c. Porcine respiratory coronavirus (PRCV)

The Animal Health Laboratory (AHL) of Laboratory Services (LS), University of Guelph is accredited for veterinary laboratory testing techniques (flexible scope) as listed on LS' SCC scope of accreditation http://palcan.scc.ca/specs/pdf/826_e.pdf . The test methods listed below are under AHL flexible scope.

MEDICAL – Veterinary (flexible scope)

Description of Activities:

The Animal Health Laboratory identifies unknown hazards in a range of matrices, for example, animal samples, feed, soil and plants. Hazards include infectious agents (bacteria, mycoplasmas, yeast, molds, viruses, and parasites), organic and inorganic elements and compounds. Infectious agents are detected directly or indirectly through various technologies, for example, culture, ELISA and PCR.

Techniques for which the laboratory is accredited are listed below:

1. Culture detection of microorganisms

Method code	Method name	Agent
MYC-100	Mycoplasma and Ureaplasma isolation	<i>Mycoplasma</i> , <i>Ureaplasma</i> , <i>Acholeplasma</i>

2. Inorganic analysis by Inductively Coupled Plasma spectroscopy (ICP)

Method code	Method name	Elements
CHEM-162	ICP-MS analysis of trace metals in serum, plasma and blood	Manganese, iron, cobalt, copper, zinc, selenium, molybdenum, lead

3. Enzyme Linked Immunosorbent Assay (ELISA)

Method code	Method name	Agent
V-002	ELISA	Anaplasma Bovine viral diarrhea virus Equine infectious anemia virus Porcine reproductive & respiratory syndrome virus Transmissible gastroenteritis virus

4. Agglutination

Method code	Method name	Agent
V-008 (was IAV-CIS-180)	Leptospira Microscopic Agglutination Test (MAT)	<i>Leptospira</i> spp.

5. Polymerase chain reaction

Method code	Name	Agent
MOL-197	<i>Mycoplasma iowae</i> real-time PCR	<i>Mycoplasma iowae</i>
MOL-249	PCR detection of fish viruses	Viral hemorrhagic septicemia virus (VHSV)
V-005	Polymerase chain reaction (PCR)	Avian paramyxovirus-1/Newcastle disease virus Classical swine fever virus Foot-and-mouth disease virus Infectious laryngotracheitis virus Influenza A virus Porcine coronavirus (porcine epidemic diarrhea virus, transmissible gastroenteritis virus, porcine deltacoronavirus) Porcine reproductive and respiratory syndrome virus Porcine respiratory coronavirus (PRCV)

As of January 19, 2015, LSD is accredited by CALA for 13 environmental tests - 10 AFL tests and 3 AHL tests.

Canadian Food Inspection Agency (CFIA) accreditation

The AHL is accredited by the CFIA – Retrovirology Centre for Expertise (RCE) for, Equine Infectious Anemia (EIA) ELISA. In 2014/2015, AHL maintained accreditation for EIA.

The actual adherence to published turnaround times from the AHL Laboratory Information Management Systems (LIMS) was **96.1%**.

Turnaround time is one of the most critical measures of a laboratory's effectiveness and efficiency.

Customer loyalty is often based on this one aspect of service. Given that there are a large number of tests and services provided, it is often a challenge to maintain TAT and manage clients' expectations.

The AHL has done this by proactively measuring and analyzing their TAT performance to identify areas needing continuous improvement. A component of the AHL's AAVLD accreditation is an analysis of the adherence to quoted TAT expectations as published in the AHL User's Guide and Fee Schedule.

A detailed explanation of the 2014/15 TAT statistics report is available upon request.

Report: AHL-Kemptville Emergency FAD Exercise Oct 24 2014

Background: On October 24, 2014, the 4th annual Foreign Animal Disease (FAD) simulation was held at AHL-Kemptville (AHL-Kv). The simulated disease was foot-and-mouth disease (FMD) in a calf.

AHL-Kv participants:

Dr. Andrew Brooks (Pathologist/Lab head)

Dr. Jan Shapiro (Pathologist)

Tom McLean (Client Service Representative (CSR)/PM Technician)

Debbie Scissons (Client Service Representative/PM Technician, observer – in training).

CFIA-Ottawa District Office participants:

Dr. Erica Wylie and staff

External evaluators:

Claudine Séguin (Multi-Program Specialist Inspector), CFIA, Port Perry

Dr. Rachel McPhie, CFIA, Ottawa District Office

Dr. Gord Mitchell (TSE diagnosis and Research), CFIA Ottawa Laboratory – Fallowfield

Objective: To evaluate the ability of AHL-Kv personnel to conduct the appropriate sampling, decontamination and reporting following SOP *AHL-K-016- Post mortem room and general*

laboratory procedures for handling a foreign animal disease (FAD) suspect, and to identify areas for improvement of the protocol.

The session began at 9:00 AM with a pre-exercise meeting and ended at approximately 12:30PM. Evaluators were distributed in the office, reception and postmortem areas to observe the various activities over the course of the exercise. Debriefing occurred at lunch following conclusion of the exercise and the evaluators provided detailed feedback by email.

The CFIA Ottawa District Office conducted a parallel exercise which involved responding to the notification of the FAD suspect. AHL-Kv staff (A. Brooks) played the role of animal owner in the parallel exercise.

Overall assessment: The exercise was successful and most objectives were fully completed. The exercise was a valuable training experience for AHL-Kv staff and several action items were generated to improve the protocol. The evaluators provided detailed and useful feedback.

No emergency exercise was performed in Guelph for 2014/15. Reasons: delayed due to Specimen Reception renovations, then, as soon as renovations completed, highly pathogenic avian influenza (HPAI) surge testing began. The next Guelph exercise will be conducted in the fall of 2015.

With the conduct of the notifiable exercise and the participation in a full disease outbreak simulation, the Milestones as defined in Schedule G of the Agreement were achieved.

The AHL participated in 51 different proficiency test (PT) programs in 2014/ 2015. PT programs are divided into 2 main categories:

1. Biological programs – a panel of samples is tested, or identification agrees with consensus ID and results are usually pass / fail.
2. Chemical programs that produce numerical results and the results are usually categorized as satisfactory, questionable, or unsatisfactory.

When a PT result is identified as questionable or unsatisfactory, the problem is investigated and for unsatisfactory results corrective action is applied and documented.

Chemical PT programs

In 2014/15 the chemical sections of AHL, Clinical Pathology and Toxicology/ Soil & Nutrient, participated in 29 different PT programs. Note that multiple sets of samples were tested within each PT program.

In 2014/15, AHL reported over 1700 chemical PT results. The OMAFRA soil PT program results are not included in these totals since the OMAFRA soil PT program is based on NAPT proficiency sample results and including both programs double counts results. A summary of chemical PT results is available for onsite review.

Overall the chemistry results are as follows:

1. Satisfactory 98.2% (Satisfactory = 95.0% acceptable and 3.2% questionable)
2. Unsatisfactory 1.8%

Biological PT programs

In 2014/15 AHL reported 121 biological results or panels in 27 programs. The programs are listed in Table 1 (next page).

Overall the biology results are as follows:

1. Satisfactory: 97.5% (satisfactory = 95.0% acceptable and 2.5% questionable)
2. Unsatisfactory: 2.5%

Key Outcome	Early detection and effective response to foreign animal diseases and/or other diseases with human/animal health and economic consequences	
Performance Indicator AHL3	Being Prepared	
	Key Outcome:	• Early detection and effective response to foreign animal diseases and/or other diseases with human/animal health and economic consequences
	Performance Indicator:	• Effective and timely testing and reporting of laboratory tests to OMAFRA, to support investigation and response to suspected foreign animal and other serious human/animal diseases
	Results (2014/15):	The AHL selected 3 cases from their 2014/15 caseload, with potential significance to animal health and/or public health. The 3 cases were: 1. HPAI Case Study Comments "I commend the staff of the Animal Health Lab (AHL) for their professionalism in diagnosing this Highly Pathogenic Avian Influenza (HPAI) case. In my opinion the AHL implemented effectively its emergency testing protocol during a holiday. Moreover, all lines of communications were followed effectively by notifying the CFIA, OCVO and the submitting veterinarian. The AHL was also involved in discussions and dissemination of HPAI information through the Ontario Animal Health Network (OAHN). This current HPAI outbreak allowed the AHL to implement and refine its existing foreign animal disease response protocols, which well prepares the lab for future foreign animal disease emergencies. Finally, I would recommend that during high risk seasons of HPAI (e.g., fall and spring) all avian submissions with a history of high mortality should be tested routinely for Avian Influenza." Dr. Csaba Varga DVM, MSc, PhD, Diplomate ACVPM 2. EEE Case Study Comments

		“The early warning from AHL with respect to horses with fatal neurological disease in the Ottawa area and consultation with the attending veterinarian proved useful in helping with differential diagnoses. The diagnostic plan developed by AHL was well thought out and communicated effectively with the veterinary specialists at OMAFRA. Because of the ability to perform EEEv PCR testing with brain tissue of the first submitted case, the diagnosis of EEE was expedient. After the initial diagnosis of EEE, serum samples were regularly submitted from acutely neurological horses and 23 more cases of EEE were diagnosed over the remainder of the summer. The rapid testing with respect to the first case enabled OMAFRA to promptly issue a disease advisory to the industry so that they could institute biosecurity practices such as vaccination. Due to AHL’s quick and thorough reporting of EEE cases, OMAFRA was able to share some of that geographical information with Public Health Ontario to enable them to inform the appropriate public health units and subsequently the medical community in those areas. Overall it was a very rapid and effective process with respect to testing and information dissemination”. Dr. Alison Moore DVM, DVSc, DACVIM, DACVSMR 3. <i>Salmonella typhimurium</i> isolated in a bulk tank Case Study Comments “The initial history mentioned human illness as the reason for the culture. AHL staff contacted the referring vet to verify details about the case. This was a good idea before commencing diagnostics, as human illness is not a common reason for a diagnostic sample to be submitted to a veterinary diagnostic lab. Suitable diagnostics were performed using the ISO accredited methodology. As this case had verified human involvement, there was too large of a time delay between the initial submission and when AHL notified OMAFRA. In such instances, OMAFRA may work with the referring vet and the relevant public health authority to assess the risk to animal and human health. More timely notification could be important in preventing additional cases of human and animal exposure, and allowing for timelier sampling on the farm to determine the source of the <i>Salmonella</i>, especially in cases with confirmed human illness. Identification of this issue led to a corrective action request being opened at AHL. OMAFRA will now be notified directly when <i>Salmonella</i> is diagnosed in correlation to a public health case submission. A follow-up culture of a milk filter from the farm was done (at OMAFRA’s suggestion and via the referring vet). This sample was also positive. At the owner’s request, further cow sampling was conducted. All testing was done in a timely manner and using accredited methodology. One
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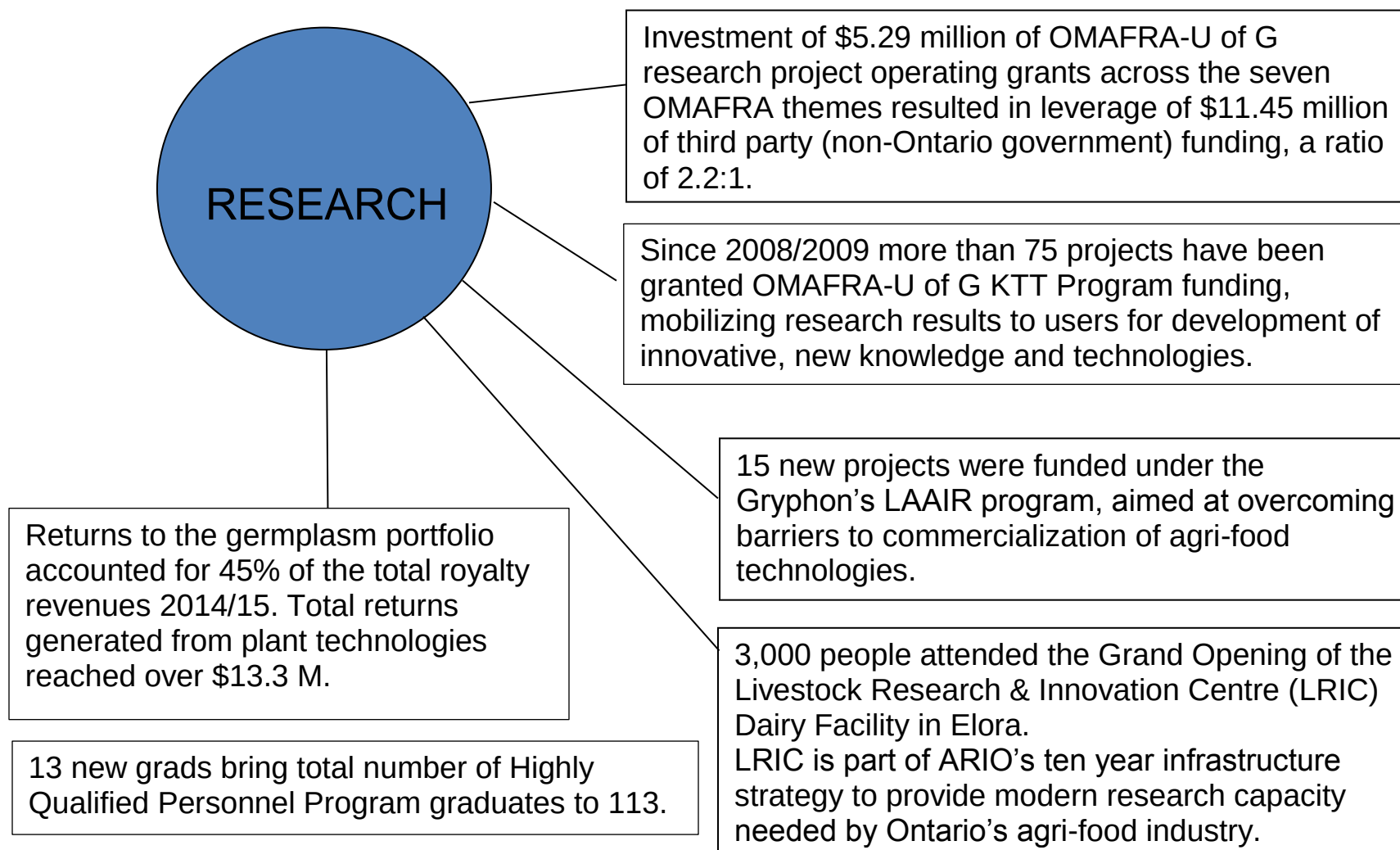
		positive cow was detected; however, it is not possible to establish if this was the only infected cow at the time of the original bulk tank sample submission. The information about the human isolate is unknown, so a direct link to the positive milk sample cannot currently be made, nor is it known if there were additional human cases.” Dr. Ann Godkin
Key Outcome	Laboratory expertise and advice on animal health issues available to veterinary and stakeholder organizations	
Performance Indicator AHL4	Knowledge Transfer	
	Key Outcome:	Laboratory expertise and advice on animal health issues available to veterinary and stakeholder organizations
	Performance Indicator:	Effective knowledge transfer and consultation opportunities available to veterinary practitioners and other stakeholders
	Results (2014/15):	By agreement with OMAFRA, the AHL Client Satisfaction Survey will be conducted biennially, rather than annually. This survey was conducted in the fall of 2013. As an alternative documented form of feedback on client service, minutes of the bi-monthly AHL/OVC-HSC/PBI liaison meetings (AHL, OVC Health Sciences Center -Veterinary Teaching Hospital and Pathobiology) and the annual AHL Feedback Group meeting (a range of AHL clients attend) were reviewed. Meeting minutes are available upon request. Many clients are aware of and use the AHL Newsletter, LabNotes and/or the AHL website. Knowledge transfer from the AHL to clients and partners occurs via in-person discussions, newsletters, contributions of scientific articles, and peer-reviewed publications. Additional outlets for knowledge transfer have now been opened with the initiation of the Ontario Animal Health Network and its communication tools of a new website, Facebook, Twitter, podcasts, Infographics, newsletter updates, and veterinary and producer reports. Articles from the AHL and OAHN are often re-broadcast through Ceptor, the Ontario Farmer, Pork News and Views, and other farm outlets. The 17 veterinarians/supervisors in the AHL are typically involved in numerous conversations with

		private practitioners daily, concerning individual case details, test selection, test interpretation, and technology updates. AHL staff members also attend practitioner meetings on a regular basis. For example, Dr. Jim Fairles, who is AHL's Client Services Veterinarian, provides frequent updates to the Ontario Association of Swine Veterinarians and the Ontario Association of Bovine Practitioners. More broadly, the AHL provides a wealth of information with emphasis on disease trend updates in the quarterly AHL Newsletter, which is distributed widely as well as being posted on the AHL website, and is well regarded. As well, AHL staff occasionally submits contributions to OMAFRA's newsletter, "Ceptor". AHL staff members are regular participants at numerous conferences, e.g., the OVMA and OAVT annual conference, both as exhibitors, and as guest speakers or expert panel members. Dr. Fairles (supported by Ms. Josie Given), actively markets the services of the AHL, and is in regular contact with AHL clients. As a matter of course, the AHL has added many new testing methodologies and tests; such, as the PEDV-TGEV-PDCoV triplex PCR test, which are presented in the AHL Newsletter. The AHL also produces a series of "LabNotes" for more in-depth analysis of current topics, e.g., concerns surrounding chicken jerky products for dogs, testing of undifferentiated diarrhea in pigs. Finally, AHL staff contributes to a number of peer-reviewed scientific publications every year. From the analysis of survey questions related to knowledge transfer effectiveness, there are some areas for potential improvement which should be considered. While, in general, client responses show a good level of satisfaction in the area of AHL knowledge provision, there remains a significant gap in accessing and using this information by a proportion of clients. Graphed results provided by the AHL point to the significant opportunity to improve access to scientific information and knowledge transfer. The planned expert networks within the DSP should help to address this opportunity for improvement. Annual Feedback Group meeting, November 18, 2014. Meeting update from Jim Fairles, Client Services Veterinarian, AHL "We received very good satisfaction ratings from the 11 veterinarian clients who attended this meeting. A common thread in discussions was the request for ongoing analysis and reporting on antimicrobial susceptibility and resistance, which we have worked on and have draft reports available."
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RESEARCH PROGRAM

Selected Performance Indicators & Accomplishments

Program Objective: High quality, high impact research results that strengthen Ontario's agriculture, food and bio-products sectors, and rural communities



Research Programs

Performance Indicators

Data collection for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The following table summarizes the Research Program's performance according to the 10 PIs in the Agreement. The majority of the data within this table was collected and summarized from annual and final project reports submitted each year by lead researchers of OMAFRA funded projects. Other information has been provided by OMAFRA, the U of G's Catalyst Centre and Budget Office.

Key Outcome	Research programs reflect OMAFRA strategic needs, coordinate U of G's capacity and mobilize the province's unique competitive strengths.	
Performance Indicator R1	Comparison of actual versus planned OMAFRA - U of G Research Program spending, in total, and in each of the research theme areas.	
	Metric R1 (a-i)	Annual actual dollars in the OMAFRA - U of G Partnership Agreement research program spent on research versus planned, in total by research theme.
	Baseline:	Baseline is the allocation of project planned \$ for 2008/09 by theme.
	Target:	Ratio of actual to planned dollars spent of 1:1 .
	Results (2014/15):	The table below outlines the total amount of research funds, by theme, committed to projects and the amount of funds available for the Fall 2014 Call. It shows the total committed to projects approved for 2014/15 (\$7.4M), and the total budgeted (\$6.5M), a ratio of 0.9:1 .

Research Program Project Operating Funds

Research Themes	Total Committed to Projects (April 1/08 - April 30/14)	Total Committed to Projects Approved for 2014/15*	Budget for 2014/15	Total Commitments for 7-Year Theme Budget	Overall 7-Year Theme Budget
Ag Policy & Rural Dev	4,015,585	1,624,131	1,726,631	5,639,716	5,726,631
Bioeconomy	5,000,000	839,600	750,000	5,839,600	5,750,000
Emergency Mgmt	2,854,465	499,530	500,000	3,352,995	3,300,000
Environmental Sust.	4,983,648	296,400	900,000	5,280,048	5,900,000
Food for Health	5,465,993	1,136,292	1,000,000	6,602,285	6,700,000
Product Development	4,293,420	586,710	650,000	4,880,130	5,150,000
Production Systems	14,290,087	2,547,618	2,636,965	16,837,705	16,636,965
Total	40,903,198	7,530,281	8,163,596**	48,432,497	49,163,596
* includes commitments to 2nd & 3rd year projects approved to start in fiscal 2014/15 & 2015/16 **\$7.4 Million, plus \$763,596 allocated to “out-of-cycle” projects.					

	Metric R1 (a-ii)	Total number of projects funded in each theme area through peer review and advisory committee, compared to the number of letters of intent and proposals received (i.e., level of demand for funding) in each theme area.
	Baseline:	The number of letters of intent (LOIs) and projects submitted, and projects funded for each of the seven research theme areas in the call of 2008/09.
	Target:	An adequate number of quality research proposals submitted in each research theme area, from which to select projects to be funded in each call for proposals.
	Results (2014/15):	See table below, which indicates the number of research proposals submitted in each research theme area.

	Metric R1(c)	Total external research dollars attracted each year by the University related to the research program areas in total.
	Baseline:	The baseline for 2008/09 of leveraged dollars to OMAFRA funding is \$54.6 million of external research dollars relative to \$51.4 million OMAFRA – U of G Agreement Research expenditures, or a ratio of approx. 1.1:1. This was determined by recalculating the actual leverage of “total external research dollars related to the OMAFRA research programs” in 2007/08 relative to the new \$7.6 million base of project operating funding.
	Target:	Total external dollars leveraged is to be $\geq$ 2008/09 baseline of \$54.6 million .
	Results (2014/15):	2014/15 results: \$37.6 million of external funds were leveraged from OMAFRA’s \$52M investment. See notes following the tables below for explanations.

Fiscal Year	Total U of G Research Funding (' 000s) (Note 1)	Total OMAFRA Partnership Research Funding ('000s)	Funding Leveraged from OMAFRA Agreement					Ratio
			Total Funding from All Sources (Est. ' 000s)	Breakdown by Source (Note 2)				
				Federal	OMAFRA	Other Provincial	Business / Industry / Private / Other	
2014/2015	139,365	52,856	37,605	15,231	775	4,192	17,407	(37.6:52.9) 0.7:1
2013/2014	127,687	52,856	35,149	17,069	2,411	891	14,778	(35.2:52.9) 0.7:1
2012/2013	127,089	57,665	31,847	19,923	1,783	1,754	8,387	(31.9:57.7) 0.6:1
2011/2012	141,748	56,958	37,129	24,740	1,253	418	10,718	(37.1:57.0) 0.7:1
2010/2011	141,494	52,309	49,525	23,206	1,668	7,783	16,868	(49.5:52.3) 0.9:1
2009/2010	158,954	50,604	59,326	27,765	3,354	10,190	18,018	(59.3:50.6) 1.2:1
2008/2009	159,093	51,388	54,651	35,400	3,428	3,007	12,816	(54.6 : 51.4) 1.1:1

Note 1: "Funding Leveraged from OMAFRA Contract" (thousands of \$) is the total of all individual research project awards from all sources other than the OMAFRA - U of G Agreement for projects (across all U of G Departments/researchers), which support the objectives of OMAFRA's research priorities. "Total U of G Research Funding" is the total of all research projects (including OMAFRA - U of G Agreement projects), regardless of whether or not they support OMAFRA's priorities.

Note 2: "Breakdown by Source" shows the "Funding Leveraged from the OMAFRA Agreement" by the source of the funding ("Federal" includes NSERC, SSHRC, CIHR, CFI, all federal departments, etc.; "OMAFRA" includes OMAFRA's 'competitive research programs' such as New Directions, Food Safety, etc.; "Other Provincial" includes funding from all other provincial ministries or agencies; and "business/industry/private/other" includes all other sources.

Explanation of Results: Total funding 'Leveraged from the OMAFRA Partnership' from all sources (including OMAFRA outside the Partnership and other provincial ministries, as well as federal, and business/industry/private/other sources) increased by ~\$2.5M in 2014/15 compared to 2013/14. The leveraged funding from federal sources drops by nearly \$2M, but this was offset by an increase of ~\$2.6M from business/Industry/Private and other sources of leveraged funding.

Total funding leveraged from the OMAFRA Partnership from all sources (including OMAFRA outside the Partnership Agreement and other provincial ministries) remains below the 6-year average for the 2008/09 to 2013/14 period, with funding in 2013/14 from federal and other provincial sources being substantially lower than the 5-year average for these sources. It is encouraging to see leveraged funding from business/industry/private and other sources reach their highest point in 5 years.

	Metric R1 (d)	Number and list of active research projects funded, by program area.																													
	Baseline:	Number of active research projects established as per performance indicator 1(a-ii), above.																													
	Target:	Targets for number of projects funded in each area to be ≥ 2008/09 levels .																													
	Results (2014/15):	In 2014/15, the total number of projects funded was nearly double the number funded in 2008/09. <table> <tr> <th><u>Number of Active Projects by Theme</u></th><th><u>2014/15*</u></th><th><u>2008/2009*</u></th></tr> <tr> <td>Agricultural and Rural Policy:</td><td>14</td><td>14</td></tr> <tr> <td>Bioeconomy – Industrial Uses:</td><td>8</td><td>5</td></tr> <tr> <td>Emergency Management:</td><td>18</td><td>2</td></tr> <tr> <td>Environmental Sustainability:</td><td>13</td><td>15</td></tr> <tr> <td>Food for Health:</td><td>16</td><td>9</td></tr> <tr> <td>Product Development:</td><td>8</td><td>5</td></tr> <tr> <td>Production Systems Tier I:</td><td>66</td><td>13</td></tr> <tr> <td>Production Systems Tier II:</td><td><u>33</u></td><td><u>43</u></td></tr> <tr> <td>Total number of Active Projects:</td><td>176</td><td>92</td></tr> </table> * several projects are funded in more than 1 theme Go to http://www.uoguelph.ca/omafra_partnership/research/en/researchresult/FundedProjects.asp for a complete listing of 2014/15 projects.	<u>Number of Active Projects by Theme</u>	<u>2014/15*</u>	<u>2008/2009*</u>	Agricultural and Rural Policy:	14	14	Bioeconomy – Industrial Uses:	8	5	Emergency Management:	18	2	Environmental Sustainability:	13	15	Food for Health:	16	9	Product Development:	8	5	Production Systems Tier I:	66	13	Production Systems Tier II:	<u>33</u>	<u>43</u>	Total number of Active Projects:	176
<u>Number of Active Projects by Theme</u>	<u>2014/15*</u>	<u>2008/2009*</u>																													
Agricultural and Rural Policy:	14	14																													
Bioeconomy – Industrial Uses:	8	5																													
Emergency Management:	18	2																													
Environmental Sustainability:	13	15																													
Food for Health:	16	9																													
Product Development:	8	5																													
Production Systems Tier I:	66	13																													
Production Systems Tier II:	<u>33</u>	<u>43</u>																													
Total number of Active Projects:	176	92																													
	Metric R1 (e)	Level of utilization of research stations.																													
	Baseline:	Established based on 2008/09 data. Utilization to be reported in three ways: i) number of projects using each station, ii) percentage of utilization and iii) dollar value of research station usage																													
	Target:	Research station utilization to be ≥ 2008/09 levels .																													
	Results (2014/15):	See table below.																													

Animal Research Stations		Number of OMAFRA - U of G Projects		Percentage of Utilization- (Note #1)		Value of Research Station Utilization (Note #2)	
	Units	2014/15	Average of 5 years (2010/11 - 2014/15)	2014/15	Average of 5 years (2010/11 - 2014/15)	2014/15	Average of 5 years (2010/11 - 2014/15)
Alma Aquaculture (see Note #3)	tanks	9	6.8	38%	26%	\$ 565,780	n/a
Arkell Poultry	animals	10	9.4	77%	60%	\$737,685	n/a
Arkell Swine	animals	12	8.4	36%	45%	\$1,096,915	n/a
Arkell Equine	animals	6	7.4	84%	101%	\$484,643	n/a
Elora / Ponsonby Dairy (see Note #4)	animals	4	7	30%	52%	\$1,173,740	n/a
Elora Beef	animals	3	2.6	83%	88%	\$660,520	n/a
Ponsonby Sheep	animals	1	1.4	91%	84%	\$293,030	n/a
Ponsonby General Animal Facility (see Note #5)	animals	5	6.4	115%	101%	\$287,280	n/a
Alfred Dairy (Note #6)	animals	2	2	27%	42%	\$109,620	n/a
Kemptville Dairy (Note #7)	animals	2	1.3	21%	23%	\$302,909	n/a
New Liskeard Beef (Note #7)	animals	1	1.6	14%	26%	\$416,703	n/a
Ridgetown Swine	animals	Ridgetown swine facility was closed for use in January 2013					
Crop Research Stations	Units	Number of OMAFRA - U of G Projects		Percentage of Utilization (Note #1)		Value of Research Station Utilization (Note #2)	

		2014/15	Average of 5 years (2010/11 - 2014/15)	2014/15	Average of 5 years (2010/11 - 2014/15)	2014/15	Average of 5 years (2010/11 - 2014/15)
Bradford (Muck Crops)	acres	5	5.2	29%	64%	\$249,800	n/a
Elora (Field Crops)	acres	12	26.6	34%	45%	\$433,630	n/a
Guelph (turf, agroforestry)	acres	26	16.4	76%	83%	\$235,645	n/a
Simcoe (horticultural crops)	acres	16	14.6	27%	40%	\$602,400	n/a
Vineland (horticultural crops)	acres	7	4.6	40%	35%	\$1,023,400	n/a
Woodstock (field Crops)	acres	8	8.4	29%	19%	\$129,600	n/a
Kemptville/Winchester (field crops)	acres	33	19.6	44%	43%	Note #8	n/a
New Liskeard (field crops)	acres	32	14.4	80%	82%	\$75,605	n/a
Emo (field crops)	acres	26	10.4	43%	70%	\$101,341	n/a
Ridgetown (see note #9)	acres	55	58.0	87%	85%	\$178,250	n/a
Huron	acres	20	24.5	97%	97%	Included with Ridgetown	
Cedar Springs	acres	7	6.5	95%	95%	Included with Ridgetown	

Note #1: "Percentage of Research Station Utilization":

Livestock Research Stations (Poultry, Swine, Equine, Beef, Sheep, Dairy),

Starting with the 2013/2014 Annual Report, the methodology for calculating Research Station Utilization statistics was modified for most of the livestock stations (Poultry, Swine, Equine, Beef, Sheep, Dairy), in order to produce data that presents a much more realistic snapshot of station utilization than was given by the methodology used in previous years (2008 - 2013). Most of these stations have 'breeding' herds/flocks, where herd/flock replacement animals are generated within the herd/flock and grown to maturity. Also, many researchers tend to focus their research efforts on particular demographic segments of the overall herd/flock (i.e., calves; transition and lactating cows; mature laying hens; weaner or grower pigs, etc.), and consequently, there are often large segments of the overall breeding herd/flock demographics that may see little or no use (but nevertheless these animals must be maintained, in order to generate the required replacement stock for the herd/flock).

The previously used calculation methodology expressed the '% station utilization' as the "total no. of research animal-days utilized in the year" divided by the "overall total number of animal-days available" in the year. In that scenario, use of, say, 90 animals on a research trial for a period of 50 days out of the year would be utilization of 4500 (=90x50) research animal days, out of an overall total days available of 32,850 (=90x365), or a 13.7% utilization rate (assuming none of the animals were utilized for another period within the same year). As noted above, since

researchers tend to heavily utilize certain demographic segments of a herd/flock, but other segments are often utilized relatively little, this previous methodology generally grossly underestimated the true utilization of the herds/flocks (i.e., utilized research demographics were greatly diluted by animals needed to be maintained for herd/flock replacement purposes).

In the modified method adopted for 2013 / 2014 and used in subsequent years, the utilization rate (for Arkell Poultry, Arkell Swine, Arkell Equine, Elora Beef, Ponsonby Sheep, and the Elora/Ponsonby, Alfred and Kemptville dairy herds) is now presented as "Average % of Animals in Use for Research" and is calculated as the "total no. of animals utilized for research at any point in time within the year" as a percentage of the "average number of animals in the herd/flock for that year". This methodology provides a much better recognition of the fact that certain demographic segments of the herd/flocks are very heavily (perhaps 100%) utilized for varying (short or longer) portions of the year, but avoids the often very substantial 'diluting' effect of the often large portion of a year (i.e., large number of days) some of these animals may not be 'on-trial' and also from other demographic segments having no utilization for research during the year (i.e., necessary to be kept as herd/flock replacement animals).

Given the diversity of the livestock herd/flocks at the research stations, no single 'utilization rate' calculation can give a perfect picture of the true utilization of herd/flock animals for research. The modified methodology for calculating "% Research Station Utilization" was, as noted above, applied to Arkell Poultry, Arkell Swine, Arkell Equine, Elora Beef, Ponsonby Sheep, and the Elora/Ponsonby, Alfred and Kemptville dairy herds. This modified methodology was not utilized for calculating the "% Station Utilization" for the Alma Aquaculture or the Ponsonby General Facility as detailed in the respective notes below.

Crops Research Stations (Bradford; Elora; Guelph; Simcoe; Vineland; Woodstock; Kemptville/Winchester; New Liskeard; Emo; Ridgetown),

For the Crops Research Stations (Bradford; Elora; Guelph; Simcoe; Vineland; Woodstock; Kemptville/Winchester; New Liskeard; Emo; Ridgetown), the methodology used to calculate "% Research Station utilization" remains unchanged from previous years, calculated as "total acreage in research studies as a percentage of the total station acreage available for research studies in the year". Given that crops research typically requires a 3-year rotation cycle (one year in research trials followed by two years out of trials, to allow assessment of residual effects and preparing for optimized uniformity of land going into new trials) this would generally suggest utilization rates of ~33% if research land is 'fully utilized'. This can be affected, however, by rotations which can may be as short as 2 years or may need to be extended to 4 years depending on the nature of the research), and there are situations, such as the long-term cropping systems research plots at Elora and Ridgetown, where these are in-use as research trials every year (thus raising the average effective utilization rate for the station).

Note #2: "\$ Value of Research Station Utilization": The methodology for reporting these values was altered for the 2013/2014 Annual Report. The values now shown are the actual values for full operation of the specified station. (In previous years, comparable values would have been pro-rated by the "% research station utilization" values, which resulted in artificially low values for station utilization costs.) As a result of the new methodology, the 5-year average station costs have been omitted. (However, a fair assumption is that station operation costs in previous years closely approximated the values shown for the current reporting year.)

Note #3: Alma Aquaculture: There was no change made in how utilization rate was calculated for the Alma Aquaculture Research Station, as the previously used method (based on the number of tanks utilized for research relative to the total number of tanks available, rather than on the numbers of fish utilized and for how long) actually closely approximates the new methodology adopted for most of the other livestock stations.

Note #4: Elora & Ponsonby Dairy: All research projects being conducted in the old dairy research facilities at Elora and Ponsonby were brought to completion on or before September/October 2014, in preparation for commissioning and moving animals into the new Elora dairy research facility. Consequently, the utilization numbers for dairy are reduced due to reduced research activity for several months leading up to September 2014, and essentially no research activity after October, 2014 to April 30, 2015 (end of fiscal year).

Note #5: Ponsonby General Animal Facility (PGAF): There is no resident herd or flock in the Ponsonby General Animal facility. Rather, groups of animals are moved into the facility for a period of time, either for conducting specific research trials, or to hold animals in preparation for research trials. Animals are generally moved out of the General Facility soon after the research trials are completed. Consequently, the "% Station utilization" rate for this facility was retained as "total no. of research animal-days utilized in the year" divided by the "overall total number of animal-days available", since neither of the two 'dilution effects' (portions of demographics not utilized for research; year-round resident research animals only used for a portion of the year) are applicable to animals housed at PGAF.

Note #6: Alfred Dairy Herd: no data available for 2014-2015 fiscal year (due to closures and staff departures), therefore data reported is unchanged from previous year.

Note #7: Kemptville and New Liskeard Livestock herds: Due to the nature of data records at these three locations, the multi-year averages for these locations were restricted to 4-years at New Liskeard Beef, and 3 years at Kemptville Dairy.

Note #8: Research station operating costs for the Kemptville and Winchester crops research areas are not segregated out from the financial records for the overall Kemptville research operations (which includes the dairy research facility).

Note #9: Ridgetown, Huron and Cedar Springs Crops Research Stations: The data for these three stations was segregated out for each station beginning in 2013/2014. (In prior years the data was reported as combined values for all 3 stations together.) Consequently, the multi-year averages reported here are 2-year averages for 2013/14 and 2014/15.

Key Outcome	A critical mass of world class faculty, technical staff and graduate students addressing OMAFRA critical challenges and opportunities.		
Performance Indicator R2	Total faculty and research personnel employed by the University related to OMAFRA research themes, and the proportion funded through the OMAFRA - U of G Research Program.		
	Metric (a)	Total number of faculty full time equivalents (FTEs) and list of faculty and CARG researchers showing area of expertise, employed at the university related to theme areas.	
	Baseline:	Established at 128 Faculty Research FTEs	
	Target:	Number of FTEs to be ≥ 2008/09 baseline of 128 Faculty Research FTEs	
	Results (2014/15):	110 Faculty Research FTEs See notes below for explanation of results.	
	<u>Research / Researcher Awards Supportive of OMAFRA Priorities</u>		
	No. of Researchers engaged in research supportive of OMAFRA priorities	"Faculty Research FTEs" focused on OMAFRA-related priorities (Note 1)	No. of OMAFRA-Supportive Research Awards (outside the OMAFRA - U of G Partnership)
2014/15 Total	206	92	484
2013/14	222	98	514
2012/13	218	100	505
2011/12	236	105	593
2010/11	224	102	654
2009/10	265	115	737
2008/09 Total	280	128	852

"Research FTE" (Research Full Time Equivalent) should not be confused with faculty FTE. Each faculty member has a defined "Distribution of Effort (DOE)" apportioning their full FTE to 'research', 'teaching' and 'service'. In some departments (i.e., CA, CSAHS) the majority of faculty may have a relatively low 'Research DOE' (therefore low Research FTE, say 0.25), whereas in some other Colleges/Departments (i.e., OAC, OVC) a greater number of faculty may have a much higher 'Research DOE' (therefore a higher Research FTE, perhaps 0.5 or 0.6).

Note 1: 'Portion of "Research FTE" focused on OMAFRA-related priorities' is estimated for each researcher based on the value of their OMAFRA-supportive research awards received as a portion of their total research awards received within the specified fiscal year. These individual research FTE portions were averaged across those faculty with some portion of their research time engaged on OMAFRA Supportive Research project(s).

Note 2: 'Portion of "Departmental Research FTE" supportive of OMAFRA-related priorities' is estimated by averaging the individual researcher FTE portions focused on OMAFRA-related priorities (see Note 1) across all researchers in the department (receiving any awards in the specified fiscal year).

Explanation of Results: (for Research Performance Indicator R#2 a) Total number of U of G Faculty FTEs and list of faculty and CARG researchers showing area of expertise related to Theme areas).

For 2014-2015 it is estimated that the "Total number of Faculty FTEs showing expertise related to Theme areas" (i.e., engaged in research supportive of OMAFRA priorities) is approximately 183 'Research FTEs' (compared to ~195 in 2013/2014 and an average of 198 over the 5-year period 2010/2011 to 2014/2015). This reduction in total Research FTEs engaged in research supportive of OMAFRA priorities resulted from a combination of a reduction in the total number of researchers involved in OMAFRA-supportive research, and those that were engaged in OMAFRA-supportive research having a slightly lower level of engagement, on average. These 183 'Research FTEs' would equate to approximately 91.5 full person FTEs of time devoted to research, if one were to assume, reasonably, that on average (across all U of G faculty) a 'research FTE' represents 0.5 of each faculty member's full FTE (see note above explaining 'Research FTE' and diversity across Colleges).

As in previous years, there was a broad diversity between departments, with 116 out of 124 researchers in OAC (94%) receiving funding in 2014/2015 for research related to OMAFRA priorities (for 326 out of 372, or 88% of all OAC research projects). By comparison, in the College of Biological Sciences (CBS) only 25 out of 99 researchers (25%) received funding for research related to OMAFRA priorities (for 34 out of 204 or 17% of CBS research projects) and in the College of Business and Economics (CME) only 7 out of 35 researchers (20%) received funding for research related to OMAFRA priorities (for 8 out of 64 or 13% of CME research projects). For added context, the 206 researchers across all U of G Colleges that received funding awards for research supportive of OMAFRA priorities represented 41% of all 484 researchers receiving awards for any research in 2014/2015.

A listing of faculty engaged in research supportive of OMAFRA priorities, along with their area of expertise and relation to the OMAFRA Themes has been compiled and is available to OMAFRA.

	Metric R2 (b-i)	Number of faculty FTEs funded by OMAFRA partnership							
	Baseline:	65 faculty FTEs as of 2008/09, compared to ~52 faculty FTEs as of 2007/08							
	Target:	Retain the number of faculty FTEs to the 2008/09 level (65) , but may erode due to inflation & other financial pressures.							
	Results (2014/15):	Number of faculty FTEs specifically allocated to OMAFRA Partnership research projects: Total: 72.22 plus an HQP Director at 0.20 (this is not included below).							
		Research Theme	2014/15	2013/14	2012/13	2011/12	2010/11	2009/10	2008/09
		Ag Policy & Rural Devel:	5.69	5.00	6.69	5.98	4.31	3.31	2.10
		Bioeconomy – Industrial Uses:	5.84	3.19	4.79	3.31	2.86	1.79	1.20
		Emergency Management:	4.96	6.18	4.85	3.74	3.22	2.32	0.80
		Environmental Sustainability:	4.27	5.76	8.82	9.57	9.37	5.20	5.10
		Food for Health:	7.67	8.96	10.10	8.63	6.60	3.69	2.20
		Product Development:	3.11	3.28	4.31	2.76	2.94	3.37	2.50
		Production Systems Tier I:	23.00	21.12	19.98	19.09	17.87	22.81	25.20
		Production Systems Tier II:	17.08	11.65	13.17	15.71	15.82	12.38	13.00
	Production Systems Tier III & IV	0.6	0.90						

	Baseline:	2008/09: Established at 172 faculty and CARG researchers funded through the partnership in total.							
	Target:	To retain the number of FTEs as close to the 2008/09 level (172) , but may erode due to inflation & other financial pressures.							
	Results (2014/15):	Total number of faculty, CARG & research personnel FTEs: 316.9							
		Total FTEs by Theme	2014/15	2013/14	2012/13	2011/12	2010/11	2009/10	2008/09
		Ag Policy & Rural Devel:	22.69	28.20	22.80	20.78	18.86	20.89	6.24
		Bioeconomy:	15.99	14.94	20.14	18.93	19.04	7.69	2.10
		Emergency Management:	38.68	23.88	32.12	25.58	26.61	9.82	2.65
		Environ Sustainability:	22.47	34.65	25.34	25.42	24.61	19.59	19.59
		Food for Health:	29.87	54.13	50.76	43.82	30.41	7.34	7.34
		Product Development:	52.34	16.78	27.63	22.91	16.15	2.79	2.79
		Production Systems Tier I:	95.60	118.98	87.27	77.15	60.87	84.74	84.74
		Production Systems Tier II:	39.26	50.69	49.10	52.32	48.19	46.52	46.52
		Total All Themes:	316.90	342.25	315.16	286.91	244.74	181.98	171.97

Key Outcome	A critical mass of world class faculty, technical staff and graduate students addressing OMAFRA critical challenges and opportunities	
Performance Indicator R3	Level of recognition of faculty and students by their peers.	
	Metric R3 (a)	Number of faculty/researchers/staff related to the research theme areas, recognized by their peers through research chairs, awards of recognition, appointment to prestigious positions (international panels) and leadership of national and international research initiatives
	Baseline:	In 2008/09, 25 U of G faculty members were Canada Research Chair holders, of which 10 had active OMAFRA research projects. Same as performance indicator OA1 (c).
	Target:	Recognition as indicated by awards, appointments etc. to be $\geq$ 2008/09 of 25 faculty members.
	Results (2014/15):	During 2014/15, 28 faculty members at the U of G were Canada Research Chair holders, of which 10 had active OMAFRA research projects.
	Metric R3 (b)	U of G's position compared to other Canadian universities, and their ranking in the previous year in the comprehensive category as published annually by Research Money Inc.
	Baseline:	Research Money Inc.'s 2009 rankings put U of G in second place among Canadian 'comprehensive' universities. Same as metric OA1 (a).
	Target:	U of G's ranking to be second or better among comprehensive universities in Canada.
	Results (2014/15):	In the most current (2015) Research Infosource Inc. (formerly Research Money) report of Canadian universities' standings ranks U of G as the #2 University in the comprehensive category. *Research Infosource advises their methodology changed for 2014, when U of G did not place in the top 5.
	Metric R3 (c)	Number of faculty who publish in high impact journals.
	Baseline:	91 faculty published in high impact journals in 2008/09. 'High impact' journals were identified by the OMAFRA - U of G Research Program Directors.
	Target:	Number of faculty publishing in high impact journals to be $\geq$ 2008/09 baseline of 91 .
	Results:	Total number of faculty published in high impact journals: 56

	(2014/15):	No. of Faculty by Theme	2014/15	2013/14	2012/13	2011/12	2010/11	2009/10	2008/09									
		Ag Policy & Rural Policy:	4	5	8	8	3	2	3									
		Bioeconomy – Industrial Uses:	2	1	6	2	1	3	3									
		Emergency Management:	5	1	5	0	0	2	0									
		Environmental Sustainability:	2	2	4	12	8	5	5									
		Food for Health:	9	4	11	13	2	1	7									
		Product Development:	4	0	4	6	4	0	6									
		Production Systems I & II:	30	18	42	44	44	75	67									
		Totals	56	33	80	85	62	88	91									
Key Outcome	High quality research focused on OMAFRA priorities																	
Performance Indicator R4	Scientific merit and relevance of research projects in each research theme area supported through the Agreement.																	
	Metric R4 (a)	Report how composition of advisory committee is representative of stakeholders in each theme																
	Baseline:	2008/09 baseline for stakeholder representation is described in ‘Theme Research Proposal Review’.																
	Target:	Adequate representation of stakeholders on advisory committees, as achieved in 2008/09																
	Results (2014/15):	See table below that indicates representation of stakeholders in 2014/15, with representation from research/scientific, OMAFRA/other government, and user community/industry/non-government.																
Theme		Ag Policy & Rural Devel		Bioeconomy		Emerg Mgmt		Env Sust		Food		Prod Dev		Prod Syst – Livestock		Prod Syst - Plants		
		LOI	FP	LOI	FP	LOI	FP	LOI	FP	LOI	FP	LOI	FP	LOI	FP	LOI	FP	
Research /Scientific		5	5	2	2	5	5	3	3	3	3	3	3	3	4	3	2	
OMAFRA / Gov’t		7	8	4	4	4	3	5	4	5	5	3	3	3	3	4	4	
User Community /		3	4	4	4	2	3	2	2	1	1	3	3	5	5	3	4	

Industry / Non-Gov't																
Total	15	17	10	10	11	11	10	9	9	9	9	9	11	12	10	10
LOI – Letters of Intent FP – Full Proposals																

	Metric R4 (b)	Total number of publications in peer reviewed journals and % of those appearing in high impact journals (as identified by U of G Research Program Directors).																											
	Baseline:	2008/09 baseline of 265 publications, 57% of which were in 'high impact' journals.																											
	Target:	Number of publications and % in high impact journals to be $\geq$ 2008/09 baseline of 265 and 57% respectively.																											
	Results (2014/15):	Total number published in peer reviewed journals: 97; total percentage in high impact journals: 58%. No explanation is available concerning these results in comparison to the target. <u>Total number of publications in peer reviewed journals (by theme), & ratio in high impact journals</u> <table> <tr> <th>Research Theme</th><th>2014/15</th><th>2013/14</th></tr> <tr> <td>Ag Policy & Rural Devel:</td><td>6 – 67%</td><td>5 – 100%</td></tr> <tr> <td>Bioeconomy – Industrial Uses:</td><td>12 – 17%</td><td>7 – 14%</td></tr> <tr> <td>Emergency Management:</td><td>9 – 56%</td><td>8 – 13%</td></tr> <tr> <td>Environmental Sustainability:</td><td>5 – 40%</td><td>4 – 50%</td></tr> <tr> <td>Food for Health:</td><td>13 – 70%</td><td>17 – 24%</td></tr> <tr> <td>Product Development:</td><td>9 – 40%</td><td>2 – 0%</td></tr> <tr> <td>Production Systems I & II:</td><td>43 – 70%</td><td>69 – 26%</td></tr> <tr> <td>Totals</td><td>97 – 58%</td><td>112 – 30%</td></tr> </table>	Research Theme	2014/15	2013/14	Ag Policy & Rural Devel:	6 – 67%	5 – 100%	Bioeconomy – Industrial Uses:	12 – 17%	7 – 14%	Emergency Management:	9 – 56%	8 – 13%	Environmental Sustainability:	5 – 40%	4 – 50%	Food for Health:	13 – 70%	17 – 24%	Product Development:	9 – 40%	2 – 0%	Production Systems I & II:	43 – 70%	69 – 26%	Totals	97 – 58%	112 – 30%
Research Theme	2014/15	2013/14																											
Ag Policy & Rural Devel:	6 – 67%	5 – 100%																											
Bioeconomy – Industrial Uses:	12 – 17%	7 – 14%																											
Emergency Management:	9 – 56%	8 – 13%																											
Environmental Sustainability:	5 – 40%	4 – 50%																											
Food for Health:	13 – 70%	17 – 24%																											
Product Development:	9 – 40%	2 – 0%																											
Production Systems I & II:	43 – 70%	69 – 26%																											
Totals	97 – 58%	112 – 30%																											
	Metric R4 (c)	Number of collaborations and/or partnerships with external institutions.																											
	Baseline:	Number of collaborators in 2008/09 (265) will be the baseline.																											

Target:	Number and significance of collaborations and/or partnerships targeted to be ≥ 2008/09 baseline of 265 .		
Results (2014/15):	i) Total number of collaborators for continuing projects in 2014/15: 244		
	ii) Total number of collaborators for new projects approved for 2014/15: 138		
	<u>Research Theme</u>	<u># of Collaborators by Theme</u>	<u># of Collaborators by Theme*</u>
		<u>Continuing Projects in 2014/15</u>	<u>New Projects for 2014/15</u>
	Ag Policy & Rural Devel:	10 (includes 1 OMAFRA staff)	13 (includes 9 OMAFRA staff)
	Bioeconomy – Industrial Uses:	27 (includes 3 OMAFRA staff)	4 (includes 2 OMAFRA staff)
	Emergency Management:	33 (includes 14 OMAFRA staff)	12 (includes 7 OMAFRA staff)
	Environmental Sustainability:	19 (includes 9 OMAFRA staff)	24 (includes 12 OMAFRA staff)
	Food for Health:	18 (includes 6 OMAFRA staff)	17 (includes 1 OMAFRA staff)
	Product Development:	18 (includes 0 OMAFRA staff)	11 (includes 0 OMAFRA staff)
Production Systems I & II:	119 (includes 46 OMAFRA staff)	57 (includes 21 OMAFRA staff)	
	Total All Themes:	244 (includes 79 OMAFRA staff)	138 (includes 52 OMAFRA staff)
Results (2013/14)	i) Total number of collaborators for continuing projects in 2013/14: 476 ii) Total number of collaborators for new projects approved for 2013/14: 53		
Results (2012/13)	i) Total number of collaborators for continuing projects in 2012/13: 326 ii) Total number of collaborators for new projects approved for 2012/13: 146		
Results (2011/12)	i) Total number of collaborators for continuing projects in 2011/12: 345 ii) Total number of collaborators for new projects approved for 2011/12: 124		
Results (2010/11)	i) Total number of collaborators for continuing projects in 2010/11: 168 ii) Total number of collaborators for new projects approved for 2010/11: 269		
Results (2009/10)	i) Total number of collaborators for continuing projects in 2009/10: 203 ii) Total number of collaborators for new projects approved for 2009/10:167		
Results (2008/09)	i) Total number of collaborators for continuing projects in 2008/09: 230 ii) Total number of collaborators for new projects approved for 2008/09: 47		

Key Outcome	High quality research focused on OMAFRA priorities								
Performance Indicator R5	Benefits to the economy, the environment and the health and well-being of the province, generated from the Research Program.								
	Metric	One case study completed annually of initiatives undertaken related to each research theme that impacted Ontario. This outcome would also be assessed by the expert review of each research theme area scheduled at the end of five years.							
	Results (2014/15):	The benefits to the economy, environment and health and well-being of Ontarions, generated from the Research Program are described in case studies presented in the 2015 Agri-Food Yearbook .							
Key Outcome	Highly skilled U of G graduates meet changing workforce demands								
Performance Indicator R6	Level of engagement of University graduate students in OMAFRA - U of G research projects.								
	Metric R6 (a)	Total number of graduate students working on research projects related to each Agreement theme areas							
	Baseline:	140 grad students in 2008/09.							
	Target:	Number of grad students to be maintained at 2008/09 level (140) , but may decline due to inflation.							
	Results (2014/15):	Graduate Students by Research Theme	2014/15	'13/'14	'12/'13	'11/'12	'10/'11	'09/'10	2008/09
		Agricultural and Rural Policy:	14.75	19.05	19.10	15.00	12.60	21.00	4.00
		Bioeconomy – Industrial Uses:	5.60	9.30	12.90	7.50	8.45	0.50	5.00
	Emergency Management:	8.82	15.68	12.41	15.80	9.00	5.00	3.00	
	Environmental Sustainability:	12.50	21.24	17.27	19.55	11.05	4.50	8.00	

Key Outcome	Industry and other stakeholders adopt state of the art practices and systems	
Performance Indicator R7	Transfer of new knowledge and utilization by industry and other stakeholders, related to OMAFRA research theme areas.	
	Metric R7 (a)	Total number of knowledge transfer (KTT) events related to new practices and technologies in each theme area.
	Baseline:	See table below for 2008/09 baseline of knowledge transfer events. Note: 2008/09 results have been incorporated into average for past five years.
	Target:	Number of knowledge transfer events $\geq$ 2008/09 baseline. Note: 2008/09 results have been incorporated into average for past five years.
	Results (2014/15):	The table below shows knowledge transfer events for 2013/14 in each research theme area, compared to average of past five years.

Knowledge Transfer (KTT) Events by Research Theme

	Ag & Rural Policy		Bioeconomy		Emerg Mgmt		Env Sust		Food for Health		Prod Dev		Prod Syst Tiers I & II		Total	Total
	2014 /15	Avg of past 5 years	2014/ 15	Avg of past 5 years	2014/ 15	Avg of past 5 years	2014/ 15	Avg of past 5 years	2014 /15	Avg of past 5 years	2014/ 15	Avg of past 5 years	2014/ 15	Avg of past 5 years	2014/15	Avg of past 5 years
Peer-reviewed publications	6	6.6	12	10.2	9	4.4	1	10.2	13	11.4	9	10.4	43	87.2	97	140.4
Presentations at scientific conferences	10	19.6	12	20.2	18	14.6	11	24.2	12	16.6	23	8.6	65	138.0	151	241.8
Media citations	7	14.0	2	9.6	8	11.4	2	9.6	3	6.0	15	2.8	41	85.4	78	138.8
Presentations posted on the internet	4	7.0	1	12.8	1	4.2	6	13.80	2	7.6	3	5.0	15	36.4	32	86.8
Presentations to stakeholder or industry	16	27.4	12	21.2	24	17.8	18	44.8	12	24.8	14	13.0	87	170.4	183	319.4

	Metric R7 (b)	Examples of utilization of new knowledge by stakeholders
	Baseline:	Anecdotal reports of utilization of new knowledge by stakeholders
	Target:	Annual reports of utilization of new knowledge by stakeholders
	Results (2014/15):	Examples in 2014/15 included: Sunghwan Yi - Consumers' perceptions, purchasing, and consumption of vegetables in Ontario In general, the majority of professionals in the Ontario Agri-food sector have used an "undifferentiated" approach to promoting vegetables (strategies that worked for one type of vegetable would work for another because they are all produce). This project found that there is need for different marketing strategies to market different vegetables to different consumer segments. These findings were communicated to relevant stakeholders, such as Ontario Produce Marketing Association, Ontario Fruit and Vegetable Convention, and OMAF-Foodland Ontario whom are in the process of deliberating about future marketing campaigns that reflect consumer different segments. Jan Sargeant - A functional prioritization tool for the prioritization of zoonotic diseases in Ontario Making priority decisions relating to zoonotic diseases in Ontario is very complex for OMAFRA decision-makers, agri-food and rural stakeholders, and public health representatives. This project saw the development of an interactive prioritization tool to guide the decision making process which has now been passed along to stakeholders. In addition, with support from the Catalyst Centre regarding licensing there has been interest outside of the province including the American Veterinary Medical Association. Read more examples of stakeholder utilization of new knowledge in the 2015 Agri-Food Yearbook.
	Metric R7 (c)	Total number of licenses and patents and those applied for. Same metric as R8 (b) & (c)
	Baseline:	9 patents filed in 2008/09 17 licenses granted in 2008/09
	Target:	No. of patent applications $\geq$ 2008/09, which was 9 No. of licenses granted $\geq$ 2008/09, which was 17
	Results (2014/15):	Total number of OMAFRA related patents filed: 17

		<u>Patents filed by research theme:</u>	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>
		Ag Policy & Rural Development:	0	0	0	0	0	0
		Bioeconomy – Industrial Uses:	6	3	3	3	4	5
		Emergency Management:	0	0	0	0	0	0
		Environmental Sustainability:	0	0	0	0	0	0
		Food for Health:	1	0	0	1	2	1
		Product Development:	10	11	7	3	1	0
		Production Systems (Animals):	0	1	0	1	4	3
		Production Systems (Crops):	0	1	3	0	4	1
		Totals:	17	16	13	8	15	10
		Note: Fluctuation in the number of patent applications is common. Applications are only made for technologies that have been evaluated to have strong patentability. On average most years, the CC has outperformed the baseline of 9 applications.						
		Total number of OMAFRA related licenses granted: 15						
		<u>License & amending agreements by research theme:</u>	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>
		Ag Policy & Rural Development:	0	0	0	0	0	0
		Bioeconomy – Industrial Uses:	0	3	2	3	0	1
		Emergency Management:	0	0	0	0	0	0
		Environmental Sustainability:	0	0	0	0	0	0
		Food for Health:	0	0	0	1	0	0
		Product Development:	3	1	4	0	1	1
		Production Systems (Animals):	1	0	2	2	1	1
		Production Systems (Crops):	11	45	6	27	13	18
		Totals:	15	49	14	32	15	20
		Note: Analysis of germplasm-related deals let to a more precise decision of which agreements to include as licenses. As a result, the 2013/14 year has an abnormally high result.						
	Metric	Ratio of third-party investment leveraged by OMAFRA research funding, in each theme area.						

	R7 (d)	Same metric as R1 (b), but this PI identifies the leveraging by research theme.							
	Baseline:	Third-party investment in 2008/09, the baseline year by each theme area (shown below):							
		2008/09 Theme	Ag Policy & Rural Devel	Bio-economy	Emergency Mgmt	Env Sust	Food	Prod Dev	Prod Syst Tiers I and II
		Cash and in-kind leveraged (\$000s)	283,900	323,626	500	1,037,475	782,324	734,324	5,990,994
		Ratio of 3 rd party leveraging to allocated operating budgets	1:1	0.7:1	0.1:1	1.8:1	2.2:1	1.1:1	4.1:1
	Target:	Ratio of third-party investment leveraged by OMAFRA research funding, by each theme area, ≥ 2008/09 which was 2.3:1 Total amount of third party investment - \$9,153,412.							
	Results (2014/15):	The 2014/15 ratio of third party investment to Agreement funding was 2.1:1. Total amount of third party investment – \$11.45M.							
		Ratio is based on total OMAFRA operating funds of \$5,290,883 committed to projects within fiscal 2014/15.							
		Same as results reported in Metric R1 (b)							

Key Outcome	Research results commercialized	
Performance Indicator R8	Patents, products (technologies, software, germplasm, registered trademarks, copyright), licenses granted to existing or start-up companies, existing businesses spun out and community-based service businesses created, and the economic impact. R8 is also a performance indicator for the Joint Intellectual Property Committee of the Partnership.	
	Metric R8 (a)	Number of disclosures and technology assessments, by research theme
	Baseline:	364 total disclosures and technology assessments in 2008/09
	Target:	Number of disclosures and technology assessments ≥ 2008/09 baseline of 364.

	Results (2014/15):	Total number of OMAFRA related disclosures: 82 <table><tr><td><u>Disclosures by theme:</u></td><td><u>2014/15</u></td><td><u>2013/14</u></td><td><u>2012/13</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td></tr><tr><td>Ag Policy & Rural Devel:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Bioeconomy:</td><td>6</td><td>3</td><td>2</td><td>3</td><td>3</td><td>1</td></tr><tr><td>Emergency Management:</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Environmental Sustainability:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>Food for Health:</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>2</td></tr><tr><td>Product Development:</td><td>3</td><td>6</td><td>6</td><td>5</td><td>2</td><td>1</td></tr><tr><td>Production Systems (Animals):</td><td>1</td><td>3</td><td>1</td><td>1</td><td>4</td><td>16</td></tr><tr><td>Production Systems (Plants):</td><td>71</td><td>155</td><td>258</td><td>68</td><td>151</td><td>100</td></tr><tr><td>Totals:</td><td>82</td><td>167</td><td>267</td><td>78</td><td>160</td><td>121</td></tr></table> Note: Fluctuation in disclosure numbers is due primarily to fluctuation in the number of seed varieties that have been disclosed in a particular year. For example, in the 2008/09 fiscal year, there was an inordinately large disclosure of 176 tomato varieties. A similar event also occurred in 2012/13, with the disclosure of 100 grape varieties, however the total disclosures fall short of the 2008/09 numbers. Despite fewer disclosures in recent years, royalty revenues have continued to increase on an annual basis.	<u>Disclosures by theme:</u>	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	Ag Policy & Rural Devel:	0	0	0	0	0	0	Bioeconomy:	6	3	2	3	3	1	Emergency Management:	1	0	0	0	0	0	Environmental Sustainability:	0	0	0	0	0	1	Food for Health:	0	0	0	1	0	2	Product Development:	3	6	6	5	2	1	Production Systems (Animals):	1	3	1	1	4	16	Production Systems (Plants):	71	155	258	68	151	100	Totals:	82	167	267	78	160	121
<u>Disclosures by theme:</u>	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>																																																																		
Ag Policy & Rural Devel:	0	0	0	0	0	0																																																																		
Bioeconomy:	6	3	2	3	3	1																																																																		
Emergency Management:	1	0	0	0	0	0																																																																		
Environmental Sustainability:	0	0	0	0	0	1																																																																		
Food for Health:	0	0	0	1	0	2																																																																		
Product Development:	3	6	6	5	2	1																																																																		
Production Systems (Animals):	1	3	1	1	4	16																																																																		
Production Systems (Plants):	71	155	258	68	151	100																																																																		
Totals:	82	167	267	78	160	121																																																																		
	Metric R8 (b)	Number of patent applications filed, by research theme																																																																						
	Baseline:	9 patents filed in 2008/09																																																																						
	Target:	2010-13: Number of patent applications to be ≥ 2008/09 baseline of 9 .																																																																						
	Results (2014/15):	Total number of OMAFRA related patents filed: 17 <table><tr><td><u>Patents filed by research theme:</u></td><td><u>2014/15</u></td><td><u>2013/14</u></td><td><u>2012/13</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td></tr><tr><td>Ag Policy & Rural Development:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>	<u>Patents filed by research theme:</u>	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	Ag Policy & Rural Development:	0	0	0	0	0	0																																																								
<u>Patents filed by research theme:</u>	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>																																																																		
Ag Policy & Rural Development:	0	0	0	0	0	0																																																																		

		Bioeconomy – Industrial Uses: 6 3 3 3 4 5 Emergency Management: 0 0 0 0 0 0 Environmental Sustainability: 0 0 0 0 0 0 Food for Health: 1 0 0 1 2 1 Product Development: 10 11 7 3 1 0 Production Systems (Animals): 0 1 0 1 4 3 Production Systems (Crops): 0 1 3 0 4 1 Totals: 17 16 13 8 15 10																																																																						
		Note: Fluctuation in the number of patent applications is common. Applications are only made for technologies that have been evaluated to have strong patentability. On average most years, the CC has outperformed the baseline of 9 applications.																																																																						
	Metric R8 (c)	Number of licenses granted by theme																																																																						
	Baseline:	17 licenses granted in 2008/09																																																																						
	Target:	Number of licenses granted to be ≥ 2008/09 baseline of 17.																																																																						
	Results (2014/15):	Total number of OMAFRA related licenses granted: 15 <u>License & amending agreements by research theme:</u> <table><tr><td></td><td><u>2014/15</u></td><td><u>2013/14</u></td><td><u>2012/13</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td></tr><tr><td>Ag Policy & Rural Development:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>0</td><td>3</td><td>2</td><td>3</td><td>0</td><td>1</td></tr><tr><td>Emergency Management:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Environmental Sustainability:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Food for Health:</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td></tr><tr><td>Product Development:</td><td>3</td><td>1</td><td>4</td><td>0</td><td>1</td><td>1</td></tr><tr><td>Production Systems (Animals):</td><td>1</td><td>0</td><td>2</td><td>2</td><td>1</td><td>1</td></tr><tr><td>Production Systems (Crops):</td><td>11</td><td>45</td><td>6</td><td>27</td><td>13</td><td>18</td></tr><tr><td>Totals:</td><td>15</td><td>49</td><td>14</td><td>32</td><td>15</td><td>20</td></tr></table>		<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	Ag Policy & Rural Development:	0	0	0	0	0	0	Bioeconomy – Industrial Uses:	0	3	2	3	0	1	Emergency Management:	0	0	0	0	0	0	Environmental Sustainability:	0	0	0	0	0	0	Food for Health:	0	0	0	1	0	0	Product Development:	3	1	4	0	1	1	Production Systems (Animals):	1	0	2	2	1	1	Production Systems (Crops):	11	45	6	27	13	18	Totals:	15	49	14	32	15	20
	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>																																																																		
Ag Policy & Rural Development:	0	0	0	0	0	0																																																																		
Bioeconomy – Industrial Uses:	0	3	2	3	0	1																																																																		
Emergency Management:	0	0	0	0	0	0																																																																		
Environmental Sustainability:	0	0	0	0	0	0																																																																		
Food for Health:	0	0	0	1	0	0																																																																		
Product Development:	3	1	4	0	1	1																																																																		
Production Systems (Animals):	1	0	2	2	1	1																																																																		
Production Systems (Crops):	11	45	6	27	13	18																																																																		
Totals:	15	49	14	32	15	20																																																																		

		Note: Analysis of germplasm-related deals let to a more precise decision of which agreements to include as licenses. As a result, the 2013/14 year has an abnormally high result.																																																																						
	Metric R8 (d)	Number of patents issued																																																																						
	Baseline:	Five patents issued, as per 2008/09																																																																						
	Target:	Number of patents issued to be ≥ 2008/09 baseline of 5 .																																																																						
	Results (2014/15):	Total number of OMAFRA related patents issued: 6																																																																						
		<table><tr><td>Patents issued by research theme:</td><td><u>2014/15</u></td><td><u>2013/14</u></td><td><u>2012/13</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td></tr><tr><td>Ag Policy & Rural Development:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Emergency Management:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Environmental Sustainability:</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Food for Health:</td><td>0</td><td>2</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Product Development:</td><td>3</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td></tr><tr><td>Production Systems (Animals):</td><td>0</td><td>0</td><td>0</td><td>0</td><td>2</td><td>0</td></tr><tr><td>Production Systems (Crops):</td><td>3</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Totals:</td><td>6</td><td>3</td><td>1</td><td>0</td><td>3</td><td>0</td></tr></table>	Patents issued by research theme:	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	Ag Policy & Rural Development:	0	0	0	0	0	0	Bioeconomy – Industrial Uses:	0	0	0	0	0	0	Emergency Management:	0	0	0	0	0	0	Environmental Sustainability:	0	0	0	0	0	0	Food for Health:	0	2	0	0	0	0	Product Development:	3	1	0	0	1	0	Production Systems (Animals):	0	0	0	0	2	0	Production Systems (Crops):	3	0	1	0	0	0	Totals:	6	3	1	0	3	0
	Patents issued by research theme:	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>																																																																	
	Ag Policy & Rural Development:	0	0	0	0	0	0																																																																	
	Bioeconomy – Industrial Uses:	0	0	0	0	0	0																																																																	
	Emergency Management:	0	0	0	0	0	0																																																																	
	Environmental Sustainability:	0	0	0	0	0	0																																																																	
	Food for Health:	0	2	0	0	0	0																																																																	
Product Development:	3	1	0	0	1	0																																																																		
Production Systems (Animals):	0	0	0	0	2	0																																																																		
Production Systems (Crops):	3	0	1	0	0	0																																																																		
Totals:	6	3	1	0	3	0																																																																		
		Note 1: Of the 6 issued patents in 2014/15, 3 were plant breeders’ rights.																																																																						
		Note 2: Patents are evaluated and issued by the Patent Office. The U of G’s Catalyst Centre does not have																																																																						

		control over the schedule of evaluations/issuances by CIPO or USPTO, or other patent offices around the world. The CC has a healthy pipeline of patent applications which are managed by the Technology Transfer team, and will eventually lead to issued patents.																												
	Metric R8 (e)	Total dollar value of revenue generated from licenses associated with OMAFRA-supported research																												
	Baseline:	\$1.3 million revenue generated as per 2008/09.																												
	Target:	Total dollar value to be ≥ 2008/09 baseline of \$1.3 million .																												
	Results (2014/15):	Total dollar value of revenue generated from licenses associated with OMAFRA-supported research: \$1.3 million Revenue from OMAFRA-supported non-seed research from fiscal year end April 30, 2014: Revenue from OMAFRA-supported seed research fiscal year-end March 31, 2014: <table><tr><td>License revenue generated</td><td><u>2014/15</u></td><td><u>2013/14</u></td><td><u>2012/13</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td></tr><tr><td>Non-seed research</td><td>\$528,429</td><td>\$417,038</td><td>\$494,156</td><td>\$666,490</td><td>\$893,551</td><td>\$590,258</td></tr><tr><td>Seed research</td><td>\$1,116,483</td><td>\$922,625</td><td>\$884,120</td><td>\$789,445</td><td>\$699,280</td><td><u>\$610,221</u></td></tr><tr><td>TOTAL:</td><td>\$1,644,912</td><td>\$1,339,664</td><td>\$1,378,276</td><td>\$1,455,935</td><td>\$1,592,832</td><td>\$1,200,480</td></tr></table>	License revenue generated	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	Non-seed research	\$528,429	\$417,038	\$494,156	\$666,490	\$893,551	\$590,258	Seed research	\$1,116,483	\$922,625	\$884,120	\$789,445	\$699,280	<u>\$610,221</u>	TOTAL:	\$1,644,912	\$1,339,664	\$1,378,276	\$1,455,935	\$1,592,832	\$1,200,480
License revenue generated	<u>2014/15</u>	<u>2013/14</u>	<u>2012/13</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>																								
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TOTAL:	\$1,644,912	\$1,339,664	\$1,378,276	\$1,455,935	\$1,592,832	\$1,200,480																								
	Metric R8 (f)	Three brief case studies of individual files from different themes and initiatives taken to advance commercialization																												
	Baseline	Three case studies as per 2008/09																												
	Target	Three case studies presented annually.																												
	Results	Examples of research projects advancing commercialization in 2014/15 include:																												

	(2014/15):	• SmartGreen Technologies is a start-up company founded by researchers Greg Yuristy and Youbin Zheng, based on technology developed in their lab and supported by OMAFRA and the POP program. For more information on the company, visit www.smartgreentechnologies.com • The Bioproducts Discovery and Development developed a product called BioblackR, which has been licensed to Competitive Green Technologies. The product is a bio-based replacement for carbon black and is being manufactured in Ontario. For more information, see the video at this link: http://www.farms.com/commentaries/video-oaft-bioblakr-86651.aspx • Researcher Eric Lyons has submitted a \$600,000 research project to collaborate with the Blue Jays on growing turf in the Rogers Centre. http://news.uoguelph.ca/2015/02/u-of-g-to-help-blue-jays-bring-natural-grass-to-rogers-centre/ Read about these case studies and many more in the 2015 Agri-Food Yearbook.
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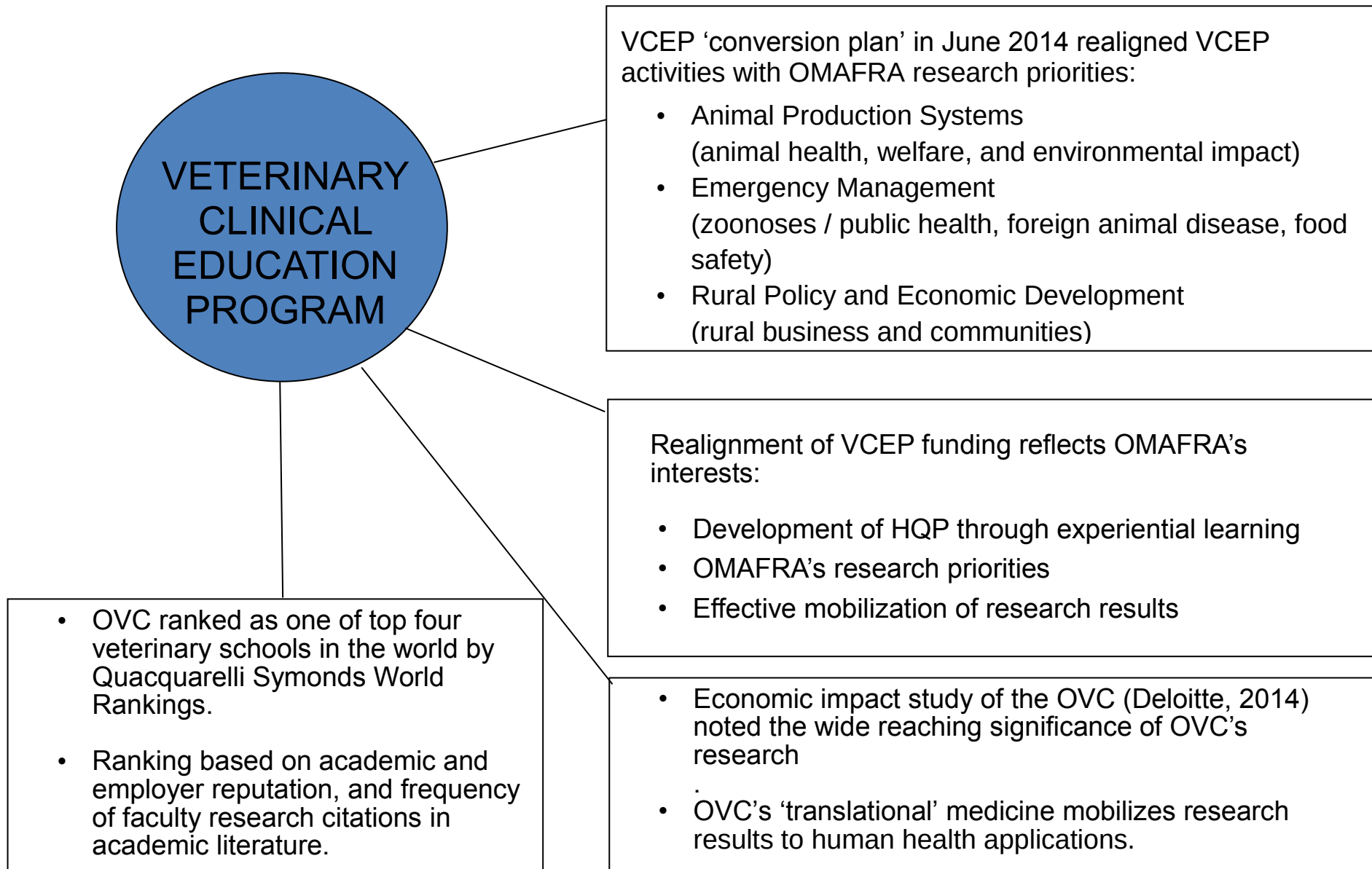
Key Outcome	Awareness of research outcomes and impacts among decision makers, staff and stakeholders	
Performance Indicator R9	Stakeholder assessment of OMAFRA / University research outcomes on industry, the economy and the health and well-being of Ontario citizens. Similar to metric OA6.	
	Metric	This outcome would also be assessed by the Expert Review of each theme area schedule at the end of five years.
	Baseline:	This performance indicator will be addressed through an assessment similar to the 'U of G / OMAFRA Impact Study' (Deloitte, 2007), to be conducted in 2012/13. An assessment was completed in 2012.
	Target:	A 2012/13 expert review of awareness of research outcomes and impacts among decision makers.
	Results (2014/15)	This PI was addressed in a 2012/13 study undertaken as part of the year five review of the Partnership Agreement (Stoddard, Sept 2012). The study findings were very positive and are detailed in OA6 of the 2012/13 Annual Report. In 2014/15, stakeholder awareness of research outcomes continued to be a priority. The Agreement's many 'knowledge translation and transfer' activities mobilize research knowledge directly to stakeholders, tailored to their sector's needs.
Key Outcome	Awareness of research outcomes and impacts among decision makers, staff and stakeholders	
Performance Indicator R10	Media citations related to research in OMAFRA research theme areas.	
	Metric (a)	Total number of media citations
	Baseline:	A total of 190 media citations were identified by researchers in their 2009 U of G annual and final reports. Additionally, 135 media articles were picked up by clipping services. This 2008/09 baseline is likely a significant underestimate of media pick-up but it represents the best available measure.
	Target:	Number of media citations to be $\geq$ 2008/09 baseline of 190 .

	Results (2014/15)	From researchers' 2013/14 annual and final research reports, number of media citations: <table><tr><td>Ag Policy & Rural Policy:</td><td>7</td></tr><tr><td>Bioeconomy:</td><td>2</td></tr><tr><td>Emergency Management:</td><td>8</td></tr><tr><td>Environmental Sustainability:</td><td>2</td></tr><tr><td>Food for Health:</td><td>3</td></tr><tr><td>Product Development:</td><td>15</td></tr><tr><td>Production Systems I & II:</td><td>41</td></tr></table> These media citations were identified by researchers in their 2014/15 U of G annual and final reports. This count is again, likely a significant underestimate of media pick-up.	Ag Policy & Rural Policy:	7	Bioeconomy:	2	Emergency Management:	8	Environmental Sustainability:	2	Food for Health:	3	Product Development:	15	Production Systems I & II:	41
Ag Policy & Rural Policy:	7															
Bioeconomy:	2															
Emergency Management:	8															
Environmental Sustainability:	2															
Food for Health:	3															
Product Development:	15															
Production Systems I & II:	41															

VETERINARY CLINICAL EDUCATION PROGRAM

Selected Performance Indicators and Accomplishments

Program Objective: Support the Ontario economy by training professionals skilled in maintaining the health and welfare of animals and their interrelationships with people and the environment



Veterinary Clinical Education Program

Performance Indicators

Data collection and establishment of baselines for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The following table summarizes the VCEP Program's performance according to the five PIs in the Agreement.

Key Outcome	Maintain American Veterinary Medical Association / Canadian Veterinary Medical Association accreditation.	
Performance Indicator VCEP1	Level of accreditation achieved - Maintain AVMA/CVMA accreditation	
	Metric	Review of accreditation reports in order to assess performance and maintenance of accreditation.
	Baseline:	AVMA/CVMA Full Accreditation
	Target:	Maintain AVMA/CVMA Accreditation
	Results (2014/15):	OVC continues to obtain full accreditation from the AVMA and CVMA (The American and Canadian Veterinary Medical Associations). The Associations' Council on Education annually reviews the updates provided by OVC, describing its progress towards objectives established at the full review conducted in 2009. The next on site accreditation will take place October 18th-22nd 2015 (in the 2015-2016 fiscal year). Veterinary colleges in Canada, the United States, and top colleges throughout the rest of the world are accredited by the Council on Education of the American and Canadian Veterinary Medical Associations (AVMA; CVMA). As an accredited veterinary school, graduates from OVC's Doctor of Veterinary Medicine (DVM) program can be licensed and employed worldwide as veterinarians without additional training or expense upon completion of the program. Continued accreditation is key to maintaining OVC's global reputation and ability to attract exceptional applicants, train highly qualified personnel, and retain world-renowned researchers, faculty and staff. It also supports Ontario's reputation for food safety and access to markets both domestically and internationally.

Key Outcome	Attracts and retains highly qualified clinical faculty from around the world as a source of new knowledge.	
Performance Indicator VCEP2	An appropriate number of high quality faculty.	
	Metric	Number of faculty provided by U of G OMAFRA Agreement funding
	Baseline:	Baseline established as the number of faculty positions supported through the Agreement in 2009/10, at 12.4 faculty FTEs.
	Target:	Maintain 2008 level (baseline level likely to decline due to flatlined budget) of faculty at 12.4 .
	Results (2014/15):	VCEP directly supports the following faculty: a) 4 FTEs in production systems: (2.5 in animal health, 0.5 in animal welfare and 1 related to ecosystem impact) b) 6.9 FTEs in emergency management: (1.4 in public health, 2 in foreign animal disease and 3.5 in food safety) c) 0.5 FTEs to develop and lead rural community veterinary stream for 4th year students VCEP funding helps ensure that the OVC faculty complement meets the standards addressed by the accreditation process. OVC is required to document an adequate number, breadth of discipline and post-graduate training of our faculty to be able to deliver the DVM program, conduct research and provide clinical service. Currently, there are about 44 faculty that teach and conduct research in areas of interest to OMAFRA. Specialties include: Food Animal Health Management, Food Animal Welfare, Large Animal Medicine and Surgery, Epidemiology, Public Health, Anatomic Pathology, Bacteriology, Pharmacology/Toxicology, Reproductive Biology, Theriogenology, Immunology, Virology, Parasitology, Laboratory Animal Medicine and Population Disease Modelling.

Key Outcome	Provide a comprehensive training program for undergraduate veterinary students.	
Performance Indicator VCEP3	Readiness of graduates for employment (Provide a comprehensive training program for undergraduate veterinary students)	
	Metric	Percentage level of students and employers satisfaction regarding readiness for employment.
	Baseline:	Baseline for agreement will be the results for the 2007/08 graduating class (2008/09 data were not used due to technical collection errors.)
	Target:	Maintain percentages from 2007/08 annual student and employer surveys 2007/08 Results: Of graduates who responded, 97% were satisfied Of the employers who responded 95% were satisfied
	Results (2014/15):	The 2014/15 percentages indicating student and employer satisfaction were higher than the baseline. Specifically: Of those graduates who responded in their first year following graduation (n = 34), 94% were satisfied (i.e. rated their performance as Superior, Very Good, or Good) with their overall performance/competence to do the job for which they were hired. Of the employers who responded (n = 17), 100% were satisfied (i.e. rated the new graduate as Superior, Very Good, or Good) with their employee's overall performance/competence to do the job for which they were hired. <u>2013/14 Results:</u> Of graduates who responded 99% were satisfied Of the employers who responded 100% were satisfied <u>2012/13 Results:</u> Of graduates who responded 98% were satisfied Of the employers who responded 100% were satisfied <u>2011/12 Results:</u> Of graduates who responded 100% were satisfied Of the employers who responded 96% were satisfied <u>2010/11 Results:</u>

		Of graduates who responded 100% were satisfied Of the employers who responded 95% were satisfied <u>2009/10 Results:</u> Of graduates who responded 98% were satisfied Of the employers who responded 92% were satisfied Results of a five-year post-graduation survey indicated that 100% of respondents (n=19) felt that their DVM training (very well, more than adequately, or adequately) prepared them for their first position of employment and the ability for the different/changing role(s) they have held since graduation.												
Key Outcome	Provide a comprehensive training program for undergraduate veterinary students.													
Performance Indicator VCEP4	Graduating students' performance in the North American Veterinary Licensing Exam (NAVLE).													
	Metric	Percentage of VCEP students who pass the North American Veterinary Licensing Exam (NAVLE), compared to the percentage average of other North American institutions.												
	Baseline:	Baseline is the 2008/09 pass rate for NAVLE students.												
	Target:	That OVC students continue to meet or exceed the mean pass rate for all students writing the NAVLE exam, which was 97% in the baseline year.												
	Results (2014/15):	The North American Veterinary Licensing Exam (NAVLE) is the standardized licensing test that graduates of accredited schools are allowed to take in the final year of their program. Success allows OVC graduates to essentially obtain licensure to practice anywhere in the world. As noted in the table below, OVC graduates continue to demonstrate a high success rate on the NAVLE, both in the passing rate and in the overall score obtained, which is consistently higher than the average of all other candidates. The comparison group is all other candidates who took the examination at all other veterinary schools. <table><tr><th>Graduation Year</th><th>OVC Students taking exam(s)</th><th>Students passing exams</th><th>OVC % Passing</th></tr><tr><td>2015</td><td>118</td><td>118</td><td>100</td></tr><tr><td>2014</td><td>122</td><td>118</td><td>97</td></tr></table>	Graduation Year	OVC Students taking exam(s)	Students passing exams	OVC % Passing	2015	118	118	100	2014	122	118	97
Graduation Year	OVC Students taking exam(s)	Students passing exams	OVC % Passing											
2015	118	118	100											
2014	122	118	97											

		<table><tr><td>2013</td><td>105</td><td>104</td><td>99</td></tr><tr><td>2012</td><td>109</td><td>107</td><td>98</td></tr><tr><td>2011</td><td>108</td><td>108</td><td>100</td></tr></table>	2013	105	104	99	2012	109	107	98	2011	108	108	100
2013	105	104	99											
2012	109	107	98											
2011	108	108	100											
Key Outcome	Graduate individuals highly qualified in relevant post-graduate specialties.													
Performance Indicator VCEP5	Number of students starting and completing post-graduate studies each year by area related to OMAFRA priorities.													
	Metric	Number of VCEP funded and non-VCEP funded students working on projects related to OMAFRA priorities. The metric would include both students beginning and completing post-graduate studies.												
	Baseline:	Baseline is 15.1 DVSc students.												
	Target:	Maintain funding for 15.1 DVSc or PhD students working in areas of priority to OMAFRA.												
	Results (2014/15):	a) Production Systems DVSc or PhD.: (10 stipends allocated to support research in areas of large animal health, ecosystem impact or animal welfare). Example areas of post graduate research include; • Improvements to disbudding and dehorning practices in Ontario dairy calves by producers and veterinarians. • Management through the peripartum period for improvement of metabolic and reproductive health in dairy cows. • Investigation of immune response of sheep to gastrointestinal nematode infection under Ontario grazing conditions for purposes of identifying genetically resistant animals. • Environmental toxicants and stress: Failure of innate immunity in development of pneumonia in cetaceans. • Characterization of the fecal bacterial microbiome of commercial mink • Stimulation of the innate immune system as a means to reduce the impact of bovine respiratory disease.												

		• Diagnostic aspects and proteomic analysis of uterine flush fluid from mares with endometritis • Understanding the diagnosis and risk factors for respiratory disease in dairy calves • Characterization of the equine airway microbiome using high throughput sequencing • In vivo measurement of pulmonary artery pulse wave velocity in horses Internship & Residents: (6 FTEs for Interns and Residents). These HQP positions provide support for the advanced clinical training of large animal specialists in areas such as internal medicine, surgery and anesthesia and pain management. These graduates will become the next generation of expertise for practicing veterinarians and the animal owning public. b) Emergency Management DVSc or PhD. (5 stipends allocated to support research in areas of zoonoses, public health, foreign animal disease and food safety). Example areas of research include; • Dynamics of Influenza A virus in swine herds. • Disease states, other than West Nile virus infection, in Crows found dead in Ontario. • Characterization of the fecal microbiota and an evaluation and analysis of antimicrobial resistance in commercial rabbits. • Characterization of epitheliocystis in fish. • Investigating early host immune response to intestinal Mycobacterium avium subspecies paratuberculosis (MAP) infection in young cattle. b) Rural Policy & Economic Development <u>Summer Leadership and Research Programs</u> Each year approximately 50 students from both DVM and BSc degree programs participate in a summer leadership experience in which they are actively engaged in the project of their faculty mentor. Through a series of seminars they are exposed to a variety of leadership and career opportunities. Examples of projects; • Validation of point of care clinical tests for dairy cattle • Evaluation of analgesia efficacy in piglets undergoing castration • Comparison and Development of on farm euthanasia techniques in Ontario meat rabbits
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		• Development of a vaccine to protect against <i>Toxoplasma gondii</i> infection in sheep • There were no research program participants. Due to funding allocation changes this will be addressed in the next fiscal year. <u>Veterinary Externship</u> As part of the final (4th) year of the veterinary program, all 120 students are placed in a private, multi-species veterinary practice that exposes them to practice in a rural community and allows them to consolidate their knowledge and skills in a hands-on, real-world setting. The Externship Course started in the mid-1980s to provide practical experience to DVM students entering their final year. More than 40 of the practices that host these students have been involved for more than 20 years – their support is critical. Not only do practitioners provide their expertise, they evaluate the students' clinical, diagnostic and communication skills covering a set list of criteria. A blog of first-hand student experiences can be found at: https://externship.ovc.uoguelph.ca/blog
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SCHEDULE G: BUSINESS CONTINUITY, EMERGENCY RESPONSE AND SURGE CAPACITY PLANNING

“After the Year 5 review, the Parties shall develop further milestones for the balance of the term of the Agreement.” (*Article 5.3, OMAFRA-U of G Partnership Agreement*)

Agriculture and Food Laboratory

During the 2014/15 fiscal year, the AFL maintained the Emergency Surge Capacity process. Additional yearly milestones have not been defined.

These Business Continuity communication plans were utilized on one occasion in 2014/15.

- One event of business interruption potential due to University-wide labour action that would require emergency and essential services protocol.

OMAFRA was notified of this potential event and the potential to impact receipt of OMAFRA samples or delivery of results to OMAFRA with established project requirements.

The AFL will continue to work in partnership with OMAFRA to test and to implement continuous improvements to the Business Continuity, Emergency Response and Surge Capacity Planning documents and processes. Schedule “G” activities consolidate our organizations’ efforts to address incidents and events of critical concern. The outcomes of these incidents and recovery activities influence our abilities to fulfill our collective mandate to protect the public health of Ontarians through food safety.

Animal Health Laboratory

After Year 5 of the Partnership Agreement (2012/13), the Schedule G milestones are determined by the AHL PMC annually. For 2014/15, the AHL Kemptville lab (AHL-Kv) participated in an emergency FAD simulation. See performance indicator AHL2 and below for details. Business Continuity and Emergency Response plans for AHL remain in place.

Schedule G related activities in fiscal 2014/15 included:

- The list of “**essential staff**” for LSD is updated every fall in order to define staff expected to report to work in the case of a weather event, e.g., snow day. The only significant event in 2014/15 was a snow day February 2, 2015, during which essential staff reported for work as expected at AHL-Guelph and AHL-Kv. As is usual during the customary University closure between Christmas and New Year’s, client service was maintained and provided with limited staffing.
- **Surge capacity** is maintained year-round, and has benefited from the acquisition of high-volume equipment funded by OMAFRA. The major high-volume emergency testing event that started in January 2014 as the result of the incursion of porcine epidemic diarrhea

(PED) continued at a diminished level through 2014/15. In March, 2014, porcine deltacoronavirus (PDCoV) replaced the generic porcine coronavirus (PCoV) in the triplex porcine coronavirus PCR test. Over 120,000 PCR reactions have been performed over the course of the PED outbreak.

- On October 24, 2014, the AHL-Kv conducted a **foreign animal disease (FAD) simulation** of a foot-and-mouth-like disease. The objectives were: to evaluate the ability of AHL-Kv personnel to conduct the appropriate sampling, decontamination and reporting following SOP AHL-K-016- *Post mortem room and general laboratory procedures for handling a foreign animal disease (FAD) suspect*, and to identify areas for improvement of the protocol. The exercise was observed by 3 evaluators from CFIA. The CFIA Ottawa District Office simultaneously conducted a parallel exercise that involved responding to the notification of the FAD suspect; AHL-Kv staff (A. Brooks) played the role of animal owner in the parallel exercise. The exercise was successful and objectives were realized. The exercise was a valuable training experience for AHL-Kv staff and several action items were generated to improve the protocol. The evaluators provided detailed and useful feedback.
- In view of the ongoing Specimen Reception renovations in AHL-Guelph over the fall and winter, a postmortem simulation was not conducted in 2014/15. However, a true test of the system was experienced in April, 2015, with the **outbreak of highly pathogenic avian influenza (HPAI) H5N2** in Ontario. Work instructions were revised to accommodate direct submissions from CFIA-London; testing for HPAI was conducted in our TSE/FAD lab 1822 in the Pathobiology-Animal Health Laboratory building; the south corridor of this building had restricted access instituted, with re-routing of deliveries. Fortunately, the outbreak did not extend beyond 3 affected farms, and testing was easily accommodated. Excellent collaboration was achieved with CFIA and OMAFRA during this event.
- The Ontario Livestock and Poultry Council (OLPC), in conjunction with Beef Farmers of Ontario (BFO), OMAFRA, and with financial support from the Animal Health Laboratory, held a **Beef Foreign Animal Disease Workshop** on November 19, 2014 in Guelph. Invitations were extended to a broad cross-section of industry stakeholders including producers, veterinarians, feed and service suppliers, processors, government, and emergency responders. The objective of the workshop was to improve the preparedness of the beef industry for a foreign animal disease (FAD) outbreak. The six key focus areas identified by attendees in descending order of priority were: communication; training and education; stakeholder engagement; financial resources; legislation and protocols; and research. The ratings and comments on the feedback sheets submitted by attendees were very good. Participants definitely found value in the day.
- As part of routine AHL surveillance and vigilance, samples were submitted to CFIA in 2014/15 for **confirmatory negative testing** for various federally reportable diseases, including African swine fever, BSE, bluetongue, classical swine fever, foot-and-mouth disease, pseudorabies, scrapie, vesicular stomatitis, and rabies.

SCHEDULE N: JOINT INTELLECTUAL PROPERTY (OMAFRA AND U OF G)

The Joint Intellectual Property Management Committee is a sub-group of the Research Committee. It is co-chaired by the OMAFRA Director of Research & Innovation Branch, and the U of G Director of the Catalyst Centre.

The Joint IP Committee uses Research Performance Indicator #8 as its metric:

Patents, products, licenses granted to existing or start-up companies, existing businesses spun out and community-based service businesses created and the economic impact.

For a description of 2014/15 highlights and updates in 'research commercialization' of joint intellectual property, please see Research Program sections of this report.

Appendices A-1 and A-2 below also provide further information regarding joint intellectual property of the Partnership Agreement.

APPENDIX A–1: LICENSE AGREEMENTS

Agreement ID	Type	Description
Prescott 20140507	Option and License for diagnostics for necrotic enteritis toxins from C perfringens	Option
OmegaNutrel 20140514	DHA milk	Option
Prescott 20141107	License Agreement to allow Lake Immunogenics to make hyperimmune C perfringens plasma for horses	Non-exclusive License
Mallard 20141231	High Immune Response (HIR) - genetic test - Testing female cattle (cows)	Exclusive License
ZZ Barley 20140401	Germplasm License - Exclusive	GB092001 (OAC Macton)
ZZ Soybean 20140520	Germplasm License - Exclusive	SeCan 12-205 RR2Y
ZZ Bean 20140723	Germplasm License - Exclusive	ACUG 12-5
ZZ Soybean 20140909	Germplasm License - Exclusive	2014 soybean germplasm access license agreement
ZZ Soybean 20140916	Germplasm License - Exclusive	OAC 10-40C soybean
ZZ Soybean 20140604a	Germplasm License - Exclusive	OAC 09-56C and SeCan 09-56C
ZZ Soybean 20140604b	Germplasm License - Exclusive	OAC 09-36C
ZZ Seed 20140603	Amending Agreement	Amend 3 - varieties - re. Variety License Option, Added schedules 1-5, Replaced all previous schedules
ZZ Soybean 20140709	Amending Agreement	Amend 2 - varieties - Added OAC 11-13C, OAC 11-22C, OAC 12-08C, OAC 12-31C, OAC 12-35C; Removed OAC 06-03, OAC 07-04, OAC 09-17, OAC 09-31, OAC 10-09C, OAC 10-10C, OAC 10-27C, OAC 10-40C, OAC 11-03C, OAC 11-04C, OAC 11-30C
ZZ Tomato 20140428	Amending Agreement	Amend 1 - new varieties (18) - 2014 Schedule 1
ZZ Fruit 20130725	Amending Agreement	Amend 3 - new varieties (15) - to the Tree fruit license agreement

APPENDIX A-2: PROOF OF PRINCIPAL (POP) FUNDED RESEARCH PROJECTS

(as of the end of 2014/15)

Project Title	Primary Investigator	Value	Result
Modification of starch metabolism in transgenic <i>Arabidopsis thaliana</i> increases plant biomass and doubles oil seed production	Ian Tetlow	\$25,000	Research is ongoing
Vegetated roofing system refinement and manufacturing	Youbin Zheng	\$49,410	Success – start up company Smart Green Technologies formed
Development of a vaccine for necrotizing enteritis of foals	John Prescott	\$35,000	Patents filed using research results generated & Option agreement secured
Optimization of a Serological Test for Johne's Disease	Lucy Mutharia	\$50,000	Patents filed – Collaboration formed. Seeking licensees
High rosmarinic acid mint to treat inflammation in horses	Laima Kott	\$18,500	Success – License issued
Boar taint solution	Jim Squires	\$24,000	Success – POP research lead to industry sponsored research project
Tomatoes with early red colouring	Steve Loewen	\$12,225	Research ongoing
Phosphopeptide-based interventions	Yoshi Mine	\$25,000	Marketing of technology to industry ongoing
Soy cheese (blend of soy & milk protein soft cheese)	Milena Corredig	\$5,500	Scientific success, but commercialization was unsuccessful
1,3-Diacylglycerols for hard fat applications	Rob Lencki	\$45,000	Scientific success, but commercialization was unsuccessful

APPENDIX B: OMAFRA - U of G AUDITED STATEMENT OF REVENUES AND EXPENSES

See separate attachment.