ANNUAL REPORT 2016 - 2017

Innovation • Education • Quality • Assessment • Continual Improvement

Released October 2017

Clinical Microbiology Proficiency Testing

— Established 1982 —

Michael A Noble MD FRCPC, Chair and Managing Director
Esther Kwok BSc, RT, CLQM, Coordinator

ISO 9001:2015 Registration 2002

ISO/IEC 17043:2010 Registration 2015

ISO 9001:2015 **ISO/IEC 17043:2010**

ISO 9001

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CMPT QUALITY POLICY AND MISSION STATEMENT

Innovation, Education, Quality Assessment, Continual Improvement

- We, at CMPT, are a university based, peer directed program, that provides Innovative External Quality Assessment for microbiology laboratories providing services for public and patient health.
- Our vision is to be recognized provincially, nationally, and internationally as a valued contributor of EQA innovation, education, and as passionate advocates for continued quality improvement in EQA for the benefit of healthcare, our participants, and our program.
- CMPT is committed to its Quality Management System, and regular review for continual improvement of its effectiveness.
- CMPT is committed to regulatory requirements of ISO 9001:2008 and ISO/IEC17043:2010.
- The CMPT Quality Policy is the framework for the regular establishment and review of quality objectives.
- CMPT is committed to regular review of the Quality Policy to ensure its suitability to the program.

Michael A. Noble, Chair
September 2017

CMPT STAFF

The CMPT staff is committed to the highest standards of quality and professionalism. This dedicated team of administrative and technical staff provides support through all phases of the program.

Michael A. Noble, MD FRCPC ……..……..Chair and Managing Director
Esther Kwok, BSc, RT, CLQM ……Coordinator
Caleb Lee, MHA, BMLSc, CLQM ……...Head Technologist
Veronica Restelli, MSc ……..…..Editor
Fion Sze On Yung, MLT BSc ……..……..……Technologist

As a program in the Department of Pathology and Laboratory Medicine, University of British Columbia, CMPT acknowledges and greatly appreciates the on-going support of the following individuals.

Mike Allard, MD, FRCPC, Professor and Acting Department Head.

Aileen To, Director, Human Resources and Administration.

CHAIRMAN'S ANNUAL REPORT

CMPT Program

First created in 1983, UBC's Clinical Microbiology Proficiency Testing program has enjoyed over 30 years of experience and expertise while consistently living its mission statement of Innovation, Education, Quality Assessment and Continual Improvement. This past year (April 2016-March 2017) CMPT continued in this long standing tradition. We again have the opportunity to look back with pride in our successes.

CMPT Staff

As the chair and managing director of CMPT, I am so impressed with the skill, talent and effort of our staff. CMPT exists and is able to shine because of them. CMPT is a sum greater than its parts because of the commitment to our program of Esther Kwok, our coordinator, Caleb Lee, our head technologist, Veronica Restelli, our web manager and editor and now safety officer, and Fion Yung, our research technologist.

CMPT Volunteers

CMPT is grateful for all the support we receive from our committee members and Chairs. Without the committee members, it would be impossible for us to maintain our challenge selection process, our assessment system, and the high quality of our critiques and newsletter.

As always CMPT recognizes the valuable role that our committee members contribute. We receive the benefit of their time, knowledge, and expertise. All is appreciated.

We have active committees for our Clinical Bacteriology, Mycology, and Enteric Parasitology programs, with all members being actively involved in programmatic review and critique development.

Our committee renewal process will continue on a more regular basis, keeping in mind the importance of maintaining the right balance between experience and fresh ideas.

I want to thank Brian Auk (Water Committee), Tara Bonham (Parasitology Committee), for all their years of service and contribution to making CMPT a successful program. I also would like to welcome Brad Jansen to the Mycology Committee and Pauline Tomlin to the Parasitology Committee.

Management of CMPT Quality Management

External Review

Once again, CMPT was successfully audited by SAI Global, and we maintained our certification to ISO 9001:2008 and granted our certification to ISO9001:2015.

Importantly this year, we completed our initial audit for compliance to the international standard ISO/IEC 17043:2010 (Conformity assessment -General requirements for proficiency testing) under the authority of the American Association for Laboratory Accreditation (A2LA). Next year we start our second cycle with an external A2LA audit with 2 external assessors.

In terms of international recognition and ability to attract opportunities, we have found that our decision to move forward with compliance with ISO17043:2010 was a positive step forward for CMPT. On balance, it has been a successful business and quality plan and a net financial benefit.

Internal Audits

Two internal audits were completed in February 2017 as part of our external certification and accreditation audits. One was done consistent with ISO9001 and the other consistent with ISO17043. No significant deficiencies were identified, but a number of minor issues required addressing and were successfully completed.

Review of Laboratory Safety

During the last 5 years CMPT has formalized its safety processes significantly. In addition to our planned Quality Management System internal audits, we also complete monthly safety audits which are performed and recorded using an on-line survey. There was also an external safety audit performed within our university department. During these surveys, we noted some issues with respect to chemical reagent labels and an outdated Material Safety Data Sheet. These were corrected.

We continue to meet all UBC and national requirements for safety.

In 2016, CMPT ensured that we are now in compliance with the new Canada's Human Pathogens and Toxins Act (HPTA). This was done under the umbrella of UBC Risk Management and in compliance with the Public Health Agency of Canada. Under the HPTA all laboratories that participate in CMPT programs must have a HPTA registration number.

Opportunities for Improvement reported during 2016-2017

Over the past 12 months (August 1016-July 2017), there were 39 Opportunities for Improvement (OFIs) recorded. Nine (23.1%) of these were classified as external errors requiring correction. Of note, 7 of the nine were clustered in August and September 2016, when CMPT was having personnel adjustment issues. The remaining two were at more stable times. Adjustments in work patterns has reduced our uneven distribution of work flow, and has reduced error associated with chronic overwork for some individuals.

Several of these errors can be attributed to the complexity of our preparation and packaging process which has to address the wide range of individuality in customer needs. In some respects, many errors would cease if we had only one sample choice and CMPT required that all participants accepted samples on an "all-or-none" basis. That would not be consistent with our focus on customer service. All the errors were addressed by introducing stricter final checks before samples are to be released.

Twelve (30.8%) were documentation issues picked up either in internal audits or during external accreditation or certification assessments.

Eleven (28.2%) were sample errors that were caught internally before any external damage was done. The most common cause was contamination issues which may have been due to procedure complexity. Efforts to refine the procedures have been introduced.

The remaining OFIs were recorded as "preventive actions."

Of significance, this recording of only 39 OFIs represents a substantial drop from 56 OFIs recorded in the previous year, despite continued (or augmented) diligence to find and record OFIs. I interpret this as an example of the effectiveness of our Quality Management System in reducing errors.

CMPT Resources

CMPT relies on the revenues generated through program registration for cost recovery. Over the past several years, as many Canadian provinces have undergone laboratory restructuring and consolidation, this has had an impact on some of our programs.

We have found alternate revenue streams, including active research and development to develop new and novel materials for our own programs and also through collaborating with other EQA programs and providing them with consultation assistance and, in some cases, samples. Our meeting the ISO17043:2010 standard has enhanced our ability to grow this additional resources arm, and allows us to support our growing staff, and to enhance our research and development programs.

Recently our needs and solutions for sterilization of reagents and waste have been redesigned. We no long have a need to use departmental resources for waste sterilization. We are now interested in finding an affordable desktop or portable autoclave that can be used to address reagent sterilization needs. We see this as a moderate need, and would prefer to find a solution in the next year or two.

Training, Competency, Proficiency

During the last year, we have gone through active training and competency assessment for Fion Yung. This process will continue on next year.

Review of Continuing Education

CMPT is committed to providing opportunities for our staff to participate in education opportunities. In part, this is covered through invited speakers at our Annual General Meeting, and, in part, through the open invitation to participate in our sister program the Program Office for Laboratory Quality Management fall conference. In addition, all CMPT staff are encouraged to take advantage of the programs that the university has to offer.

Review of CMPT Quality System

This year the review of our Strategic Quality Plan (SQP) and Quality Forms (SQF) resulted in some important changes.

Quality System

As part of our Strategic Quality Plan review, several changes were incorporated in 2016-2017. Our Quality Policy (SQP01) was revised to clarify the importance that we put on providing our best products and services because we know and understand the importance of Quality Assessment in ensuring best performance by medical laboratories which in turn, protects public health and patient safety.

We improved (clarified) the language around our CMPT Challenge Grade Appeal process. We clarified the importance of planning with respect to our research and development program to ensure that we can ensure that changes and innovations are done in an environment of financial support, customer support, and ensures that it is not done at the cost of overwork or overburden for our technologists.

The SQP has over time become a "hodge-podge" of discontinuous numbering. It will need to be redesigned for a better flow of policy development.

The SQF11 form has been developed which applies the severity-occurrence analysis to assist in the selection of suppliers.

Review of Programs Proficiency Testing

EQA is the core activity of CMPT. The changing landscape of medical laboratories in terms of size, number, and activity has stimulated us to be ever vigilant for opportunities in EQA innovation, to which we have responded with increased variety of samples and programs. We continue to extend research and development for new assays, with the view to improve products and extend the variety of clinically relevant challenges.

CHAIRMAN'S ANNUAL REPORT

International Training

CMPT has long recognized the importance of ensuring EQA proficiency based on realistic samples not only in Canada, but also in developing regions around the world. Over the last decade we have provided educational PT training for delegates from more than 10 countries.

In 2016-2017 we did not have any visitors for extended training, but plans are underway for 2017-2018.

Proficiency Testing Assistance

CMPT regularly receives requests to provide benefit and experience to other programs. Some of these are provision of administrative expertise or provision of specialized samples that are stable and can travel for extended time and distances.

CMPT views the landscape of EQA, both national and international as an opportunity for collaboration for the betterment of healthcare and patient safety.

Dr. Noble has been appointed as the Chair of the Microbiology Working Group for the European Committee for External Quality Assessment for Laboratory Medicine (EQALM) for 2015-2019. In 2016, EQALM was held in Barcelona Spain. (Note: While EQALM is a European based international organization, EQA programs throughout Europe, North America, South America, and southern Africa participate in EQALM).

Currently, Dr. Noble is also providing assistance to two EQA programs, one in North America and one in Eastern Africa, that are progressing towards compliance to ISO17043:2010.

Discussions are currently being held on the subject of assisting a large number of other international EQA programs. This may get clarified in the course of 2017-2018.

CMPT Professional Development Course

In 2014, CMPT proposed a program where laboratorians could receive continuing education credits for reading the critiques in our Clinical Bacteriology, Mycology, and Enteric Parasitology programs and answering an on-line quiz. The program was trialed during 2015 with about 50 people participating. A post program survey indicated a very positive response rating the program as Excellent or Very Good and both Educational and Informative.

Following the survey a decision was made to open the Professional Development Course in 2016. During the first year, the course had 156 registered participants. 98/156 completed at least one quiz. 52 participants completed at least one category (Clinical Bacteriology, Mycology, or Enteric Parasitology) obtaining a certificate for it.

In 2017, CMPT decided to open the registration to Microbiology residents and other individuals that might be interested which included 5 Microbiology residents, and 1 participant from Belgium. In addition, we were reached by Dr. Makeda Semret from McGill University in Montreal, QC. Dr. Semret was involved in a capacity building project in Ethiopia and saw our course as a potential benefit for continuing education for laboratory technologists. The course was slightly modified to fit the needs of these participants: every week, a new small quiz would be released followed by a general quiz at the end of each module. 5 participants from Ethiopia have been taking advantage of this opportunity and actively answering the quizzes.

We considered the CMPT Professional Development Course an early success.

CMPT Quality Indicators

Clinical Bacteriology Appeal Resolution

This year, CMPT had 3992 graded challenges in the Clinical Bacteriology surveys. Significantly, CMPT received only 1(!) request for committee appeal of the assigned grade. This was a dramatic change from previous years, and was thought to be related to a more relevant sample selection process by making the samples more mainstream. Committee discussed the single requests and rejected it as an invalid request.

Appeal Requested Clinical Bacteriology Surveys

Year	Graded Challenges	Appeal	Support request	Affirm committee
2004-5	6378	11		
2005-6	6378	21		
2006-7	x	20		
2007-8	x	31		
2008-9	x	15		
2009-10	x	13		
2010-11	6067	15	6	9
2011-12	6726	13	2	11
2012-13	6325	x	x	x
2013-14	6300	17	6	11
2014-15	6013	17	6	1
2015-16	6013	9	4	5
2016-17	5008	1 (!)	0	1

Ungraded samples

Over the years, CMPT sample grading has become increasingly complex. Of 6013 challenges samples sent, 5008 (72.5%) were graded. This was a decrease both in total number of samples sent out and in the percent graded compared to the previous year. The most common reason that a challenge is not graded is because the laboratory reports that it did not process the type of sample presented.

Individual antimicrobial susceptibilities may have been ungraded because of disparities between reference laboratories. In 2016-2017, there were no rejected samples for Quality Control reasons.

Year	Ungraded samples
2000-2001	0
2001-2002	3
2002-2003	3
2003-2004	3
2004-2005	3
2005-2006	3
2006-2007	4
2007-2008	3
2008-2009	1
2009-2010	2
2010-2011	0
2011-2012	0
2012-2013	3
2013-2014	0
2014-2015	0
2015-2016	0
2016-2017	0

Customer Satisfaction Surveys.

In 2016-2017 CMPT performed several satisfaction surveys. Two were reported in the previous annual report. One in 2017 was focused on the CMPT Water Bacteriology program which has become an important part of CMPT.

Previous surveys of our Water Bacteriology program in 2007 and 2010 indicated that our samples and our instruction sheets were easy to work with and our approach to grading was useful. This survey was focused on these same issues as well as timeliness, packaging integrity, and overall satisfaction.

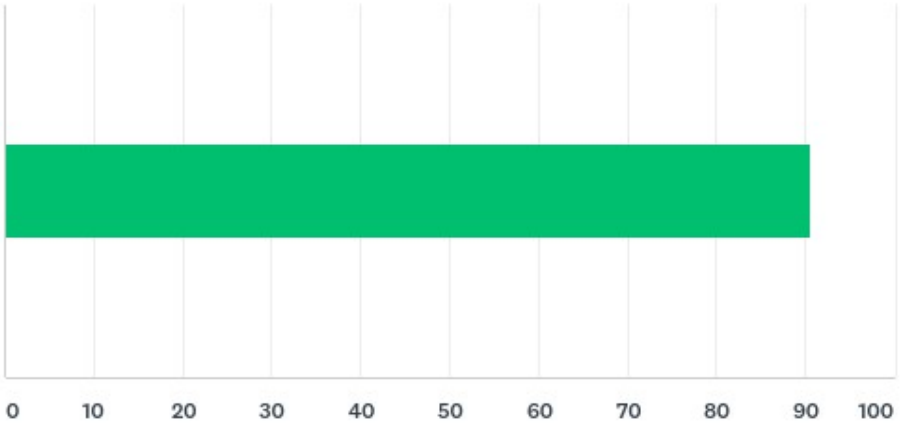
Both on individual issues and on overall evaluation, the participants in our water program rated CMPT highly.

We concluded that our efforts to provide samples and services that impact on the quality of their role and impact on public health are appreciated.

Q5 Thinking about when you receive the package of CMPT samples in your laboratory, please rate the timeliness, the sample and container integrity, the instructions, and the complexity of required handling Use the 1 to 5 scale where 1 is "not very good' and 5 is "excellent-no problems"

	1	2	3	4	5	TOTAL	WEIGHTED AVERAGE
Timeliness	5.26% 1	5.26% 1	0.00% 0	10.53% 2	78.95% 15	19	4.53
Packaging integrity	0.00% 0	0.00% 0	0.00% 0	5.26% 1	94.74% 18	19	4.95
The clarity of accompanying instructions	0.00% 0	0.00% 0	5.26% 1	21.05% 4	73.68% 14	19	4.68
The complexity of preparing samples for testing	0.00% 0	0.00% 0	5.26% 1	36.84% 7	57.89% 11	19	4.53
Sample compatibility with your testing equipment and reagents.	0.00% 0	0.00% 0	5.26% 1	15.79% 3	78.95% 15	19	4.74

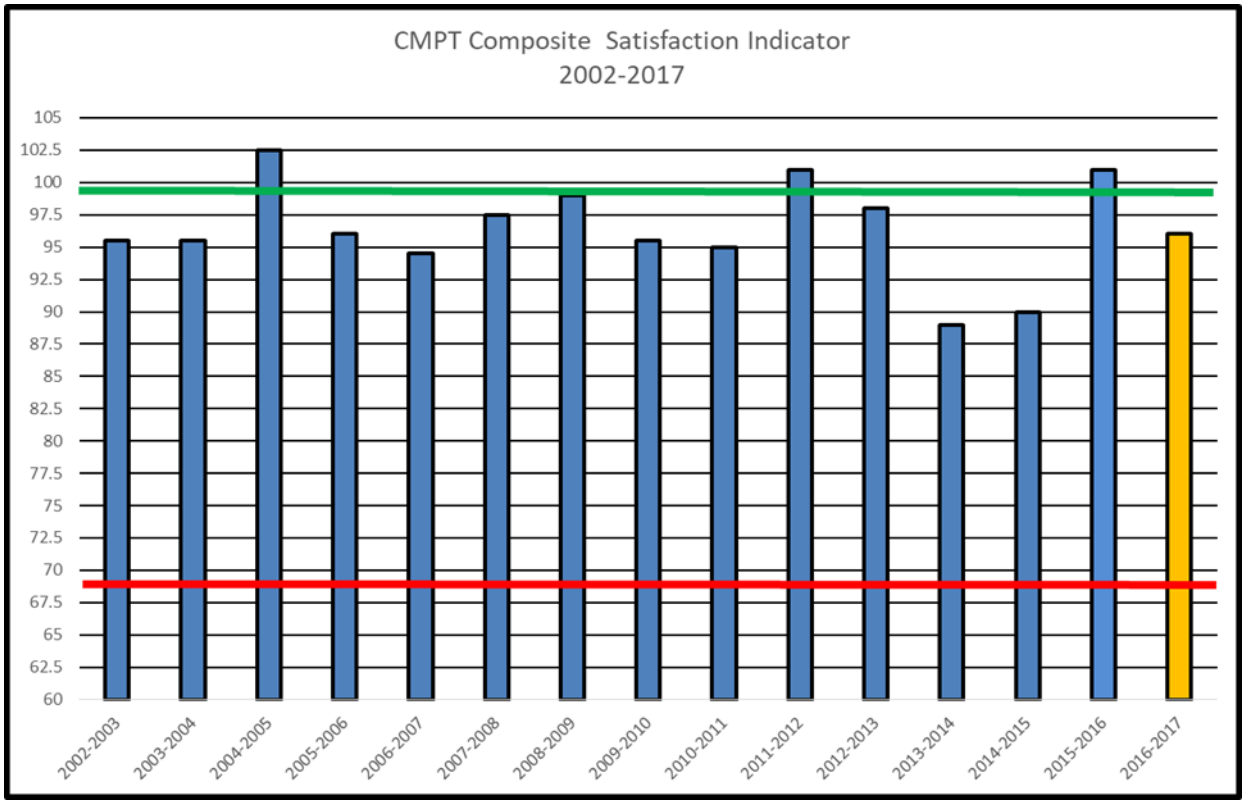
Thinking about your overall experience with the the CMPT Water Bacteriology program including receiving the samples, working with the samples, submitting your results and receiving CMPT evaluation, please assess CMPT performance using the sliding scale. The further to the left, the poorer your opinion, the further to the right, the better your assessment of CMPT



CMPT Composite Satisfaction Score (CSS)

Each year, CMPT combines the information from the surveys with other factors (contracts, complaints, consultations) and derives a weighted composite score Customer Satisfaction. In the weighting negative comments, lost contracts and complaints are weighted greater than positive counterparts. We have been monitoring this indicator since 2002-2003 (15 years). In 2016-17, CMPT had no new contracts (0) and 3 consultations (+30), and no complaints or lost contracts. The approval rating for the satisfaction surveys was 91 (+910). In addition there were 2 free text positive comments (+20) and no negative one (0). Our aggregate weighted score for 2016-2017 was 96, which was lower than the previous year, due mainly to fewer new contracts (we know this will be very different for 2017-18). A composite score of 94 approximates our mean score over the past 15 years.

Because the same survey structure has been used for 15 years, we would not likely make any changes without considerable review and analysis.



Ongoing laboratory performance

CMPT regularly monitors laboratory category performance. Over the last 15 years, we have seen great stability with Category A laboratories, but the record for smaller laboratories has been less stable. Over the last several years we have seen definite improvement in the performance of smaller laboratories. This does not appear to be regional. We cannot account for the improvement, but we are very supportive of the new pattern of improvement. Unfortunately consolidation and reformation of laboratories has resulted in some distortions in our CMPT classification. The number of category C laboratories has

dropped so low that its mean achievement performance is not trustable. As such we have followed through with the proposal made last year to discontinue the annual monitoring of mean achieved scores. That being said, were there to be a reversal in laboratory closures with re-introduction of more local smaller laboratories, we could return to the previous analysis.

CMPT Presentations and Publications

1. Laboratory Developed Tests: The Good, The Bad, The Ugly. International Training and Education Center for Health. Seattle Washington. May 2016.
2. Costs of Poor Quality in the Pre-examination phase: CSMLS Annual Conference (LabCon) Charlottetown, PEI. June 2016.
3. Laboratory Management and Quality Assessment2016 – Teaching seminar Pathology 722b Vancouver BC September 2016
4. EQALM Microbiology Working Group Survey Results. Where are we going next? EQALM Annual Conference. Barcelona Spain. October 2016
5. Gathering 4C information for the Medical Laboratory. POLQM Fall Conference: Customer Satisfaction/Voice of the Customer. UBC Life Sciences Centre. October 2016
6. Measuring Customer Satisfaction in the Medical Laboratory. Teaching Seminar BCSLS on-line Webinar Series. October 2016.
7. Microbiology and Laboratory Safety Part 1. Teaching seminar. BMLSc. Vancouver November 2016
8. Microbiology and Laboratory Safety Part 2. Teaching seminar. BMLSc. Vancouver November 2016
9. What is Proficiency Testing and Why it is Important for you to Know. Teaching Seminar. BCIT School of Business. OPMT 1106 Quality Assurance Fundamentals. Burnaby BC. March 2017.
10. How we improve laboratory quality 2017 – Teaching Seminar. U Washington, Department of Global Health. 590D Seattle Washington. April 2017.
11. EQALM Microbiology Working Group: Working to the Plan. Poster Presentation. Eurochem Conference Athens Greece. May 2017
12. Veronica Restelli, Annemarie Taylor, Douglas Cochrane and Michael A. Noble 2017. * Medical laboratory associated errors: the 33-month experience of an on-line volunteer Canadian province wide error reporting system. Diagnosis (De Gruyter) May 8, 2017

CMPT and Strategic Planning

CMPT continues to function consistent to its Mission and Vision statements. Our long term objectives continue as iterated in our Vision statement (see above). In order to continue to meet our expectations, the following issues have been identified that need to be addressed over the shorter term: workload, financial resources, space, sample supply chain, partnerships, research, and committee structure.

CHAIRMAN'S ANNUAL REPORT

Research

CMPT has over the years been able to engage in a continued program of internally funded research and development that has resulted in our being leaders in the production of clinically realistic challenge samples in bacteriology and toxin testing, mycology, and water bacteriology. Lead by Caleb Lee, we have developed strategies that significantly extend the shelf and transport life of samples and developed more realistic sample simulations. These programs will continue.

Succession Planning

Over the past several years, CMPT has had concerns about having an organized process to new management in order to ensure the continuity of CMPT as we go forward into the years to come. Towards that end, CMPT has identified an interim plan through the creation of a new Deputy Chair position. This position will be filled in 2018.

www.CMPT.ca and Publications

As previously mentioned, CMPT website has become the program's primary communication centre for data entry, preliminary results, critiques, newsletters, and the annual report. Our recent satisfaction survey focused on the value of this site. The results were mentioned previously.

Looking to the Future

As a direct consequence of the recognition of our ISO17043:2010 accreditation, and our presence on the international stage, CMPT has been approached by new laboratories across Canada and Europe and Africa for new opportunities. Some of these arrangements have already come on stream in 2017 and will be cited as new activities in 2017-18. These projects broaden our outreach, create new opportunities and strengthen our financial position and future.

Effectiveness of our Quality Management System

Overall we have strong evidence that our Quality Management System is working and is effective for us. As mentioned while we continue to reinforce the importance of identifying and reporting our opportunities for improvement, the number of OFIs being recorded is fewer than before. We continue to have strong positives from our satisfaction surveys, and we continue to attract new opportunities to expand our international influence. We are convinced that our known accreditation to ISO17043:2010 opens a variety of doors and the stability of our system gives us the wherewithal to successfully follow through.

CHAIRMAN'S ANNUAL REPORT

A new Strategic Plan (SWOT) was developed. Consistent with ISO 9001:2015, the plan was developed to take into consideration both internal and external factors.

- **Workload**

There have been continued decreases in laboratory participants, but not to the level that this has reduced workload. The impact of excess workload has been reflected in the number of OFIs associate with overwork errors. Over the past year, we have been able to make strategic increases to CMPT personnel. This will be seen to continue going forward into 2016-2017.

- **Financial resources**

As the number of laboratories in many provinces continues to consolidate, the number of laboratories participating in CMPT Clinical Bacteriology program continues to reduce. This is particularly true of the Category C and C1 laboratories having some impact on the financial stability of CMPT. However, through good fiscal management and the efforts of all our staff, we have been able to minimize and control this impact.

More importantly, we have been able, through research and development, to create more samples, for more programs, and at a more efficient cost. In addition, we have also been working with and assisting other proficiency testing programs. All this has taken pressure off our revenue stream. We see this to continue (and increase) through the next series of years.

- **Space**

Our facility on the UBC Campus continues to be an efficient and effectiveness space. This has provided closer contacts with the department and with UBC safety. We will need to watch for space impacts as we start to increase CMPT staff, and seek more opportunities for international and national education programs.

- **Equipment**

With increasing financial stability, CMPT has a high priority to focus on improving our photographic capabilities to improve both communication and documentation.

- **Enteric sample suppliers**

All EQA programs across North America, and increasingly also in Europe have had difficulties in finding sufficient samples to provide enteric parasite assessments. Some programs have found an alternative solution by using circulated photographs.

CMPT has worked hard at maintaining its program based in true samples. We have identified new providers of sample materials which have the potential to sustain our program.

Partnerships

CMPT has developed partner/collaborative relationships with Canadian Immunohistology Quality Control (cIQc), Oneworld Accuracy network, International Training and Education Center for Health (ITECH) in the Department of Global Health, University of Washington, and with the European Committee for EQA in Laboratory Medicine. We have renewed our work and collaboration with the Canadian Association for Laboratory Accreditation (CALA).

CHAIRMAN'S ANNUAL REPORT

As part of our Quality Management System, CMPT sets it goals and objectives for the upcoming year and well as reviews its success with the previous goals. Since our inception we have only failed to meet one annual objective.

GOALS and OBJECTIVES 2016 - 2017

P16_1	Purchase new microscope photography apparatus to improve time and focus issues (carry over again)	Completed
P16_2	Continue Research and Development for new programs and products directly related to CMPT programs	Continues and ongoing
P16_3	Improve Trichomonas program with new challenge materials	Completed
P16_4	Examine for addition improvements to www.CMPT.ca	Completed and ongoing
P16_5	Expand revenue generation program with one new partner organization	Completed and ongoing
P16_6	Complete training and competency of new staff member.	Completed and ongoing
P16_7	Continue forward with Succession Plan	Completed and ongoing
Q16_1	Continue with ISO9001 certification with ISO9001:2015	Completed and ongoing
Q16_2	Continue with ISO17043:2010 accreditation	Completed and ongoing

GOALS and OBJECTIVES 2017 - 2018

P17_1	Investigate the possible acquisition of a new autoclave
P17_2	Update the Grading Guidelines.
P17_3	Investigate the possibilities of new part time person
P17_4	Investigate the possibilities of a new extended international support program for developing countries.
P17_5	Seek investigation collaborations through EQALM members.
P17_6	Continue forward with Succession Plan
Q17_1	Continue with ISO9001 certification with ISO9001:2015
Q17_2	Continue with ISO17043:2010 accreditation
Q17_3	Redesign of our Strategic Quality Plan numbering system.

Signed Michael A Noble,
Chair, CMPT August 2017

COMMITTEE MEMBERS 2015 - 2016

Committee members volunteer their time and are essential for selecting challenges, assessing results, and producing the critiques. The efforts contributed by each committee member are critical to the function of CMPT and are very much appreciated.

Water Microbiology Program

Chris Enick, BSc ……..Exova, Surrey, BC

Brian Auk, BSC……....BCCDC, Environmental Microbiology, Vancouver, BC

Mycology Program

Robert Rennie, PhD FCCM, D(ABMM) ……..University of Alberta Hospital, Edmonton, AB

Romina Reyes, MD FRCPC ……..…….LifeLabs, Burnaby, BC

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Brad Jansen BSc, MLT…….……...…….Provincial Laboratory for Public Health, Edmonton, AB

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Romina Reyes, MD FRCPC ……...……..……..……LifeLabs, Surrey, BC

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Pauline Tomlin, ART, BSc. MPH…….. Provincial Laboratory for Public Health, Edmonton, AB

Quantine Wong, BSc. MLT……..…….... BCCDC, Vancouver, BC

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Lorraine Campbell, MLT……..……...Calgary Laboratory Services, Calgary, AB

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James A. Karlowsky, PhD (D)ABMM…….. St. Boniface General Hospital, Winnipeg, MB

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Diane Roscoe, MD FRCPC ……..……Vancouver General Hospital, Vancouver, BC

Denise Sitter, ART ……..Cadham Provincial Laboratory, Winnipeg, MB

Titus Wong, MD ……..……..……..Vancouver General Hospital, Vancouver, BC

CLINICAL BACTERIOLOGY PROGRAM

CMPT acknowledges, with appreciation, the valuable and essential advisory and technical support of the Clinical Bacteriology Advisory Committee.

Program Overview

Clinical bacteriology surveys are shipped 4 times per year. Each survey can consist in up to seven different types of samples depending on the category of the laboratory and the challenges to which they are subscribed.

Only category A laboratories receive all samples, category B, C, and C1 laboratories receive samples according to their capabilities.

For a more comprehensive Program Overview, please visit:

http://cmpt.ca/eqa-programs/clinical-microbiology/

HISTOGRAMS 2016 - 2017

About the histograms

All histograms have been converted to a single format, which is the percent achievable score. For each laboratory, the sum of all challenges performed and graded was calculated, either as a total for all challenges, or within a specific category, such as “bacterial identification”.

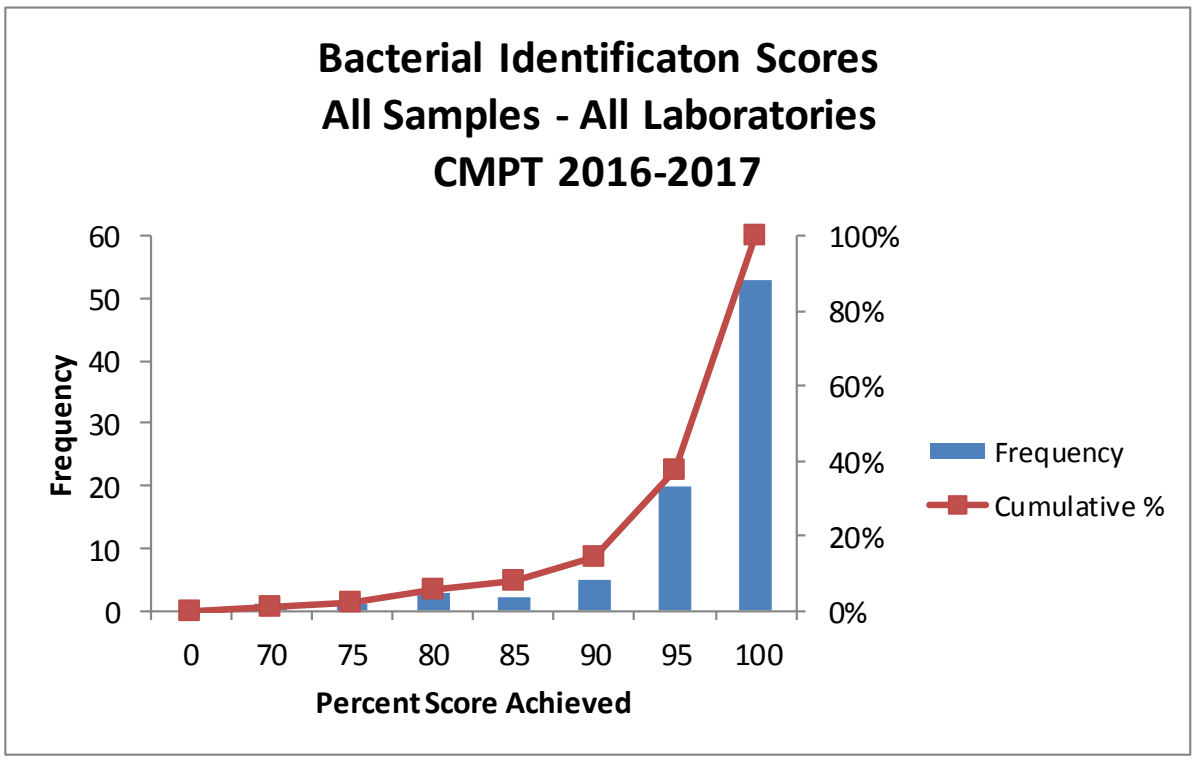
The total achievable score, that is the score the laboratory would have obtained if they received a grade of 4/4 for each graded challenge was calculated. Challenges that were ungraded were excluded. The percent achievable score was calculated as (total achieved score/total achievable score) X100.

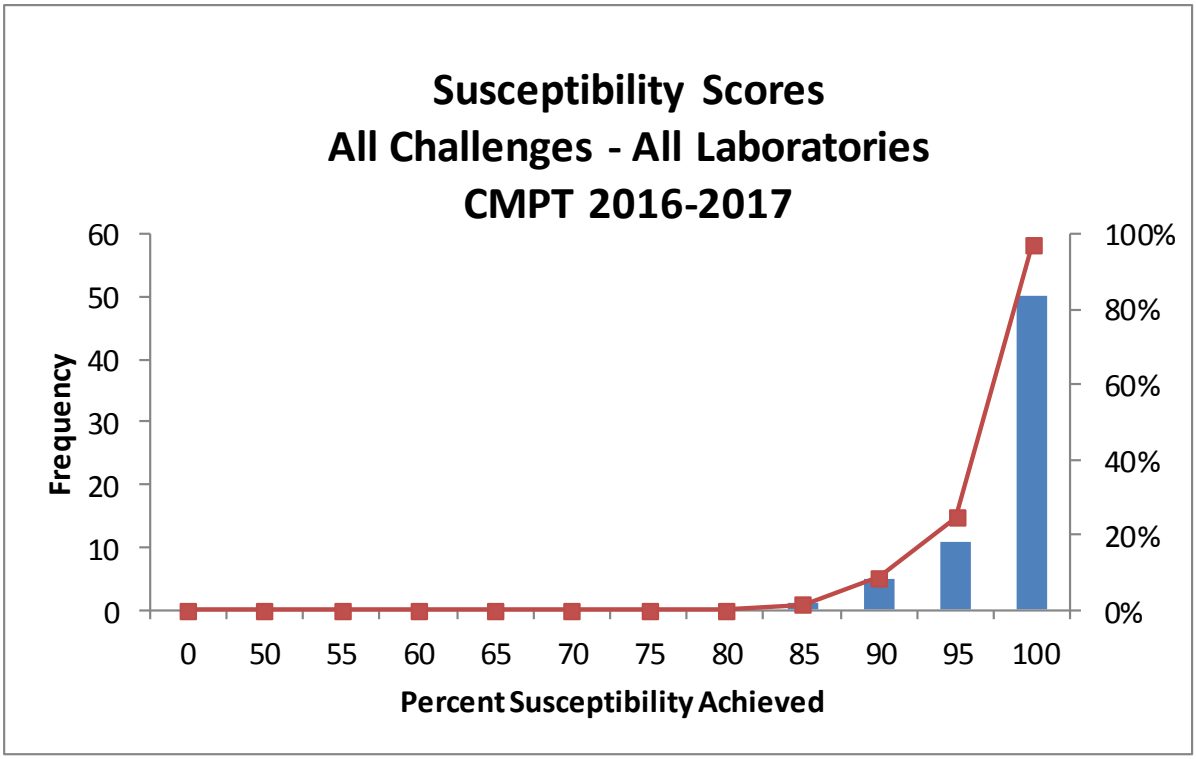
How to read the histograms

The number of laboratories achieving a specific grade is indicated by the height of the columns over the Percent Achievable Score, and is read on the LEFT side scale of the chart (frequency).

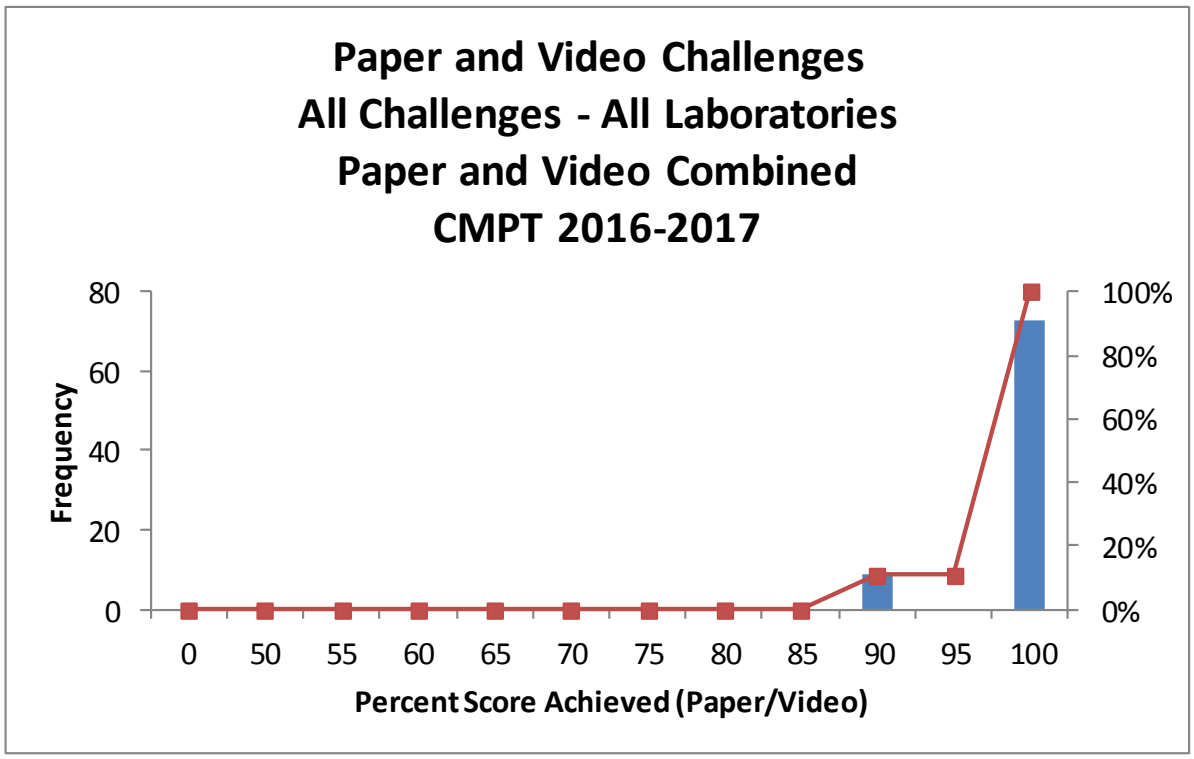
The Cumulative Scoring is indicated by the connected box-line that starts low on the left and rises to the right, and is read on the RIGHT side scale of the chart. The cumulative column indicates the percentage of laboratories that received an acceptable grade on the challenge.

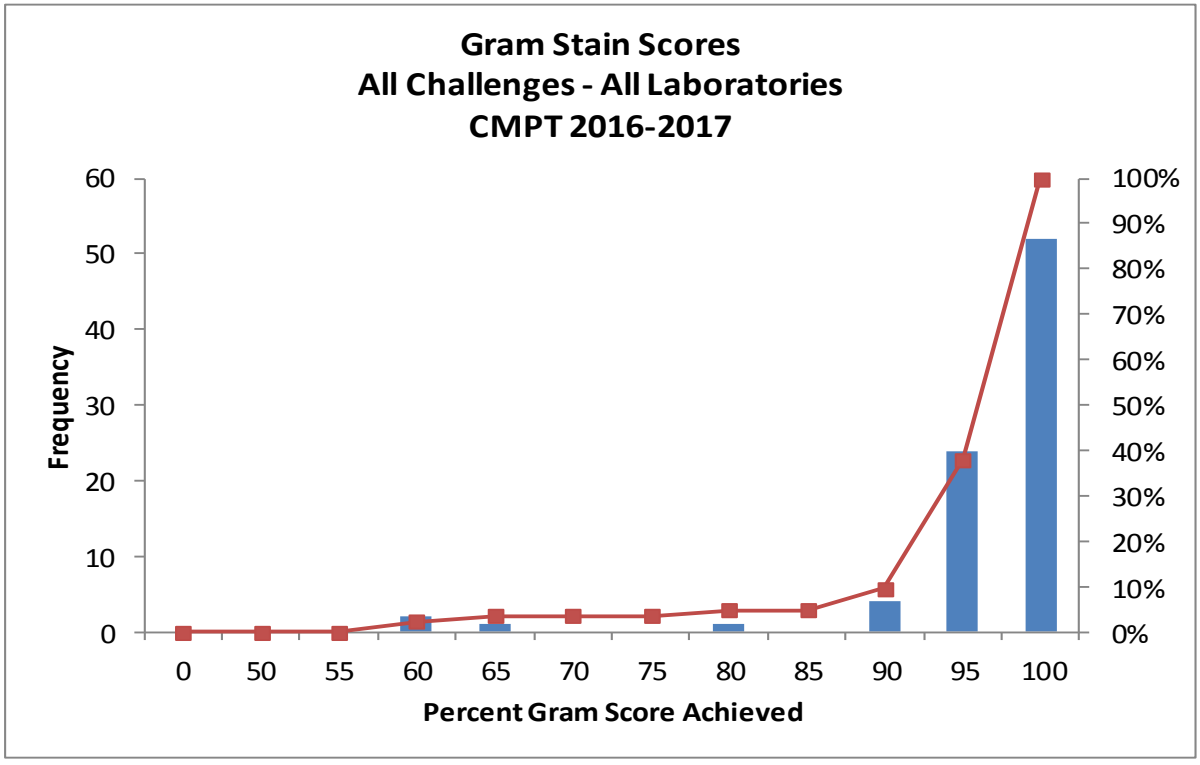
Clinical Bacteriology - Histograms



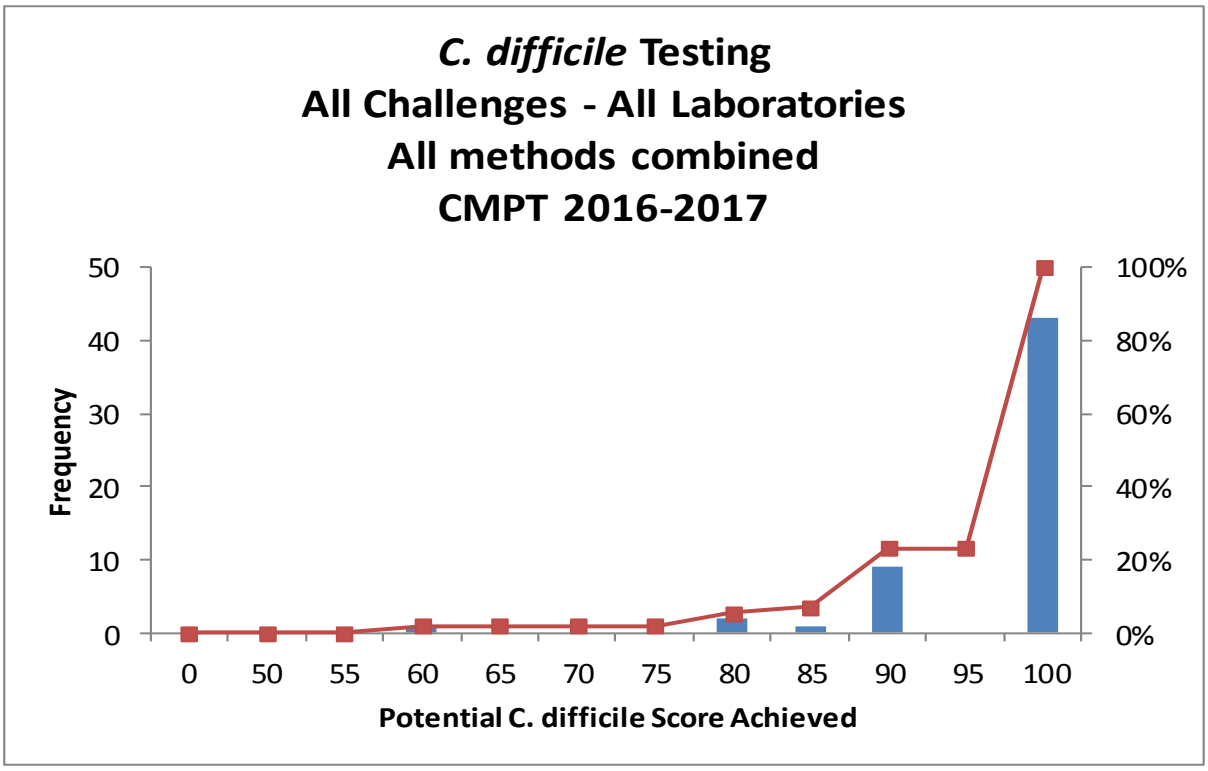


Clinical Bacteriology - Histograms





Clinical Bacteriology - Histograms



WATER MICROBIOLOGY PROGRAM

CMPT acknowledges with appreciation the valuable and essential advisory and technical support of:
Chris Enick BSc……Exova, Surrey, BC
Brian Auk BSc……BCCDC Environmental Microbiology, Vancouver, BC

CMPT participates with the following organizations to provide external quality assessment challenges and assistance for water bacteriology.

- Enhanced Water Quality Assurance (British Columbia Water Bacteriology Approval Committee)
- BCCDC Environmental Microbiology Laboratory
- British Columbia Ministry of the Environment

Drinking Water challenge surveys are shipped to laboratories three times per year. Each survey consists of sets of 4 drinking water samples. Starting in 2015, the Heterotrophic Plate Count program was offered to laboratories that tested drinking water samples with this method. Recreational Water challenge surveys are shipped two times per year. Each survey consists of one set of recreational water samples (spa water, freshwater beach or marine water). Participants participate in one, two or all the recreational challenge samples.

Not all laboratories perform all challenges and not all laboratories use the same methods when testing water samples. Laboratories perform testing use one to four methods depending on the laboratory's accreditation criteria. Laboratories also perform a qualitative method, the Presence/Absence method, as their primary method or in addition to the quantitative methods. The drinking water bacteriology (membrane filtration, Enzyme Substrate, MPN and Presence/Absence methods) challenge records for 2016 are shown in Table 1, the HPC challenge records are shown in Table 2, and the recreational water challenge records are show in Table 3.

Table 1: 2016 Drinking Water Bacteriology challenge record

Date	Sample No.	Organism	Membrane Filtration mean/median/MU% cfu/100 ml		Enzyme Substrate mean/median MPN/100 ml		MPN mean/median MPN/100 ml		Presence/ Absence (P/A)
			Total Coliforms	*E.coli*	Total Coliforms	*E.coli*	Total Coliforms	*E.coli*	Total Coliforms/ *E.coli*
W161 April 3, 2016	1	*Escherichia coli*	29/29/20	27/29/19	29/30/22	27/29/33	≥23/≥23	≥23/≥23	P/P
	2	*Escherichia coli*	28/27/20	27/27/18	30/29/22	28/29/32	≥23/≥23	≥23/≥23	P/P
	3	no organisms present	0/0/0	0/0/0	0/0	0/0	0/0	0/0	A/A
	4	*Enterobacter* species	34/36/18	0/0/0	32/32/14	0/0	≥23/≥23	0/0	P/A
W162 July 4, 2016	1	*Enterobacter* species	17/17/2	0/0/0	17/16	0/0	≥23/≥23	0/0	P/A
	2	*Escherichia coli*	13/14/39	12/13/41	14/12	11/12	13/12	13/12	P/P
	3	*Enterobacter* species	27/27/28	0/0/0	25/23	0/0	≥23/≥23	0/0	P/A
	4	*Escherichia coli*	45/46/20	44/46/20	48/50	41/41	≥23/≥23	≥23/≥23	P/P
W163 October 23, 2016	1	*Escherichia coli*	16/16/31	16/16/32	17/16	16/15	14/13	14/13	P/P
	2	*Enterobacter* species	42/42/19	0/0/0	44/41	0/0	≥23/≥23	0/0	P/A
	3	*Escherichia coli*	51/52/20	50/51/21	50/48	47/48	≥23/≥23	≥23/≥23	P/P
	4	no organisms present	0/0/0	0/0/0	0/0	0/0	0/0	0/0	A/A

WATER MICROBIOLOGY PROGRAM

Table 2: 2016 Drinking Water Bacteriology for Heterotrophic Plate Count			
Date	**Sample No.**	**Organism**	**mean/median (cfu/ml) /MU%**
H161 April 3, 2016	1	*Escherichia coli*	83/87/18
	2	no organisms present	0/0/0
	3	*Enterobacter* species	75/78/40
	4	*Escherichia coli*	91/92/20
H162 July 4, 2016	1	*Escherichia coli*	93/97/21
	2	*Enterobacter* species	39/37/40
	3	*Enterobacter* species	52/49/35
	4	*Escherichia coli*	89/96/21
H163 October 23, 2016	1	*Enterobacter* species	80/80/16
	2	*Escherichia coli*	80/76/21
	3	*Escherichia coli*	110/103/17
	4	no organisms present	0/0/0

Table 3: 2016 Recreational Water Bacteriology challenge record				
Date	**Source**	**Challenge**	**mean/median/MU%**	
			Membrane Filtration (cfu/100mL)	**Enzyme Substrate MPN/100 ml**
R161 April 3, 2016	Spa Water	*Pseudomonas aeruginosa*	279/270/35	134/165
	Freshwater Beach	*Escherichia coli*	53/52/17	43/42
	Marine Water	*Enterococcus* species	77/73/22	66/68
R162 August 21, 2016	Spa Water	*Pseudomonas aeruginosa*	46/41/27	38/30
	Freshwater Beach	*Escherichia coli*	263/252/12	296/275
	Marine Water	*Enterococcus* species	269/280/12	181/141
	Spa Water	*Pseudomonas aeruginosa**		13/13*

MU% - not applicable for EST, MPN or PA methods *replacement sample (for R161-1, ungraded challenge) sent to labs performing the enzyme substrate method only

WATER MICROBIOLOGY PROGRAM

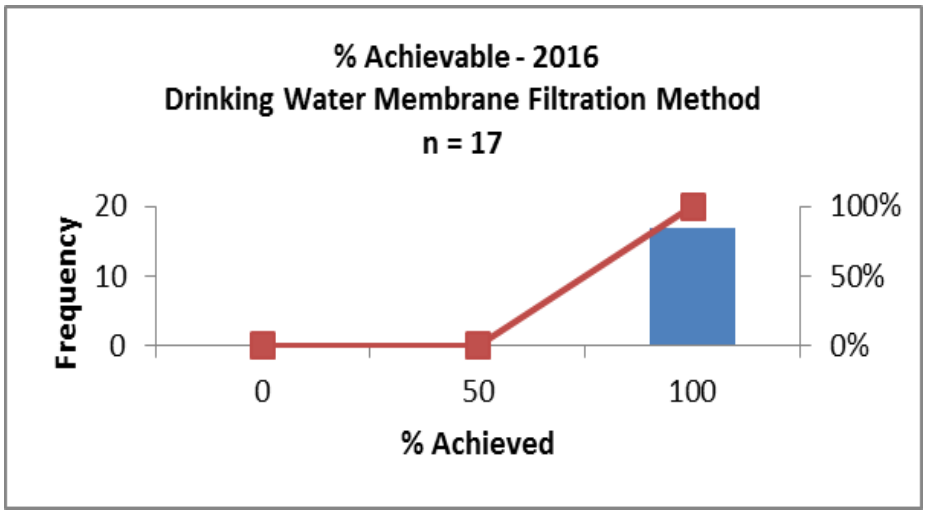
Laboratory testing results are graded based on the Membrane Filtration, Enzyme Substrate, MPN, Heterotrophic Plate Count (HPC) and/or Presence/Absence methods.

All methods are graded on a point scale for assessment of water samples with the exception of the Presence/Absence method, a qualitative method and are, therefore, graded qualitatively. With 12 drinking water samples tested for the program year, the maximum score is 36. With 12 drinking water samples tested, using the HPC method, the maximum score is 36 for the program year. With 3 environmental water samples, laboratories can receive up to a maximum score of 9.

The following Score Tables illustrate the % Achievable scores for methods used for Drinking Water samples during 2016.

Drinking Water Performance Table for the Membrane Filtration method, 2016

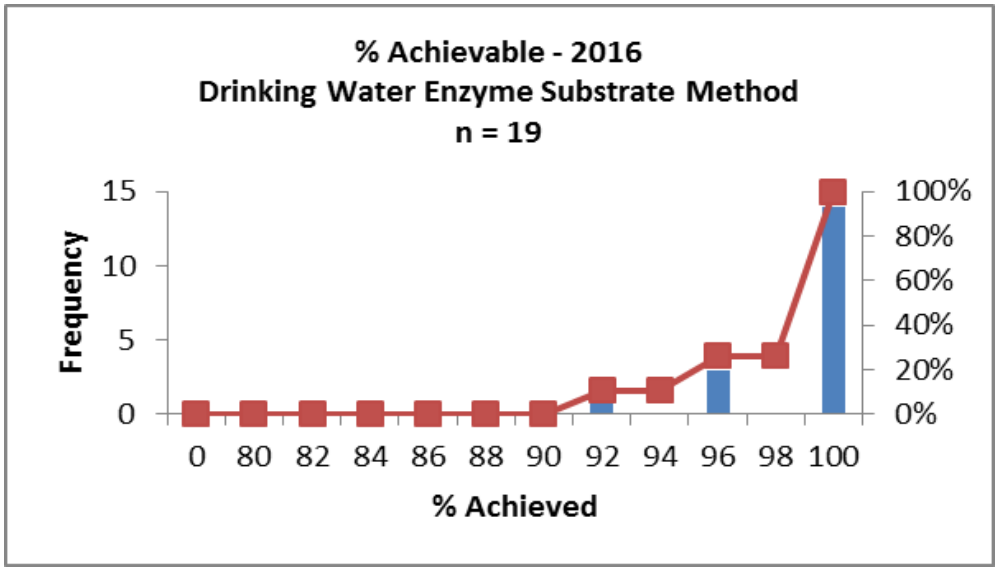
% Achievable	Labs (n=17)	Cumulative %
100	17	100



WATER MICROBIOLOGY PROGRAM

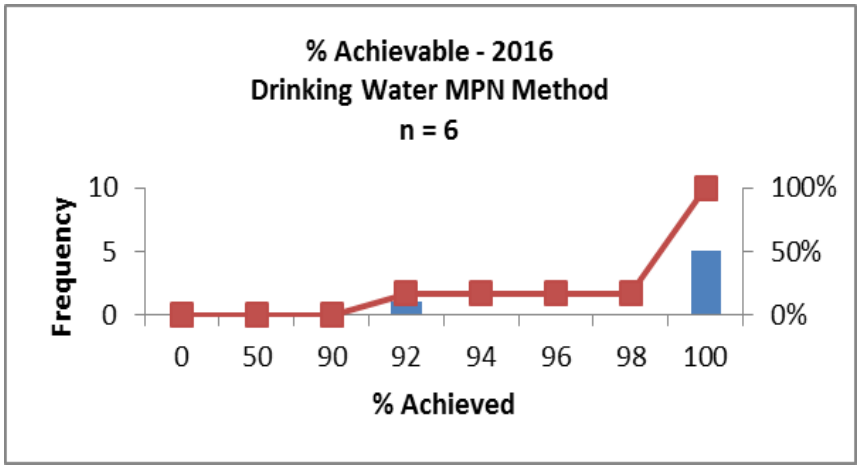
Drinking Water Performance Table for Enzyme Substrate Methods, 2016

% Achievable	Labs (n=19)	Cumulative %
92	2	10.5
96	3	26.3
100	14	100



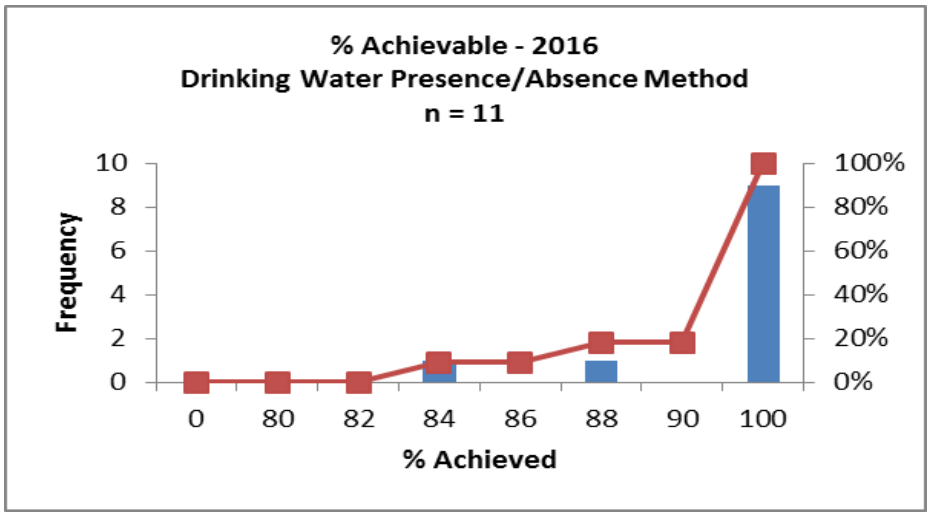
Drinking Water Performance Table for Most Probable Number (MPN) method, 2016

% Achievable	Labs (n=6)	Cumulative %
92	1	16.7
100	5	100



Drinking Water Performance Table for Presence/Absence method, 2016

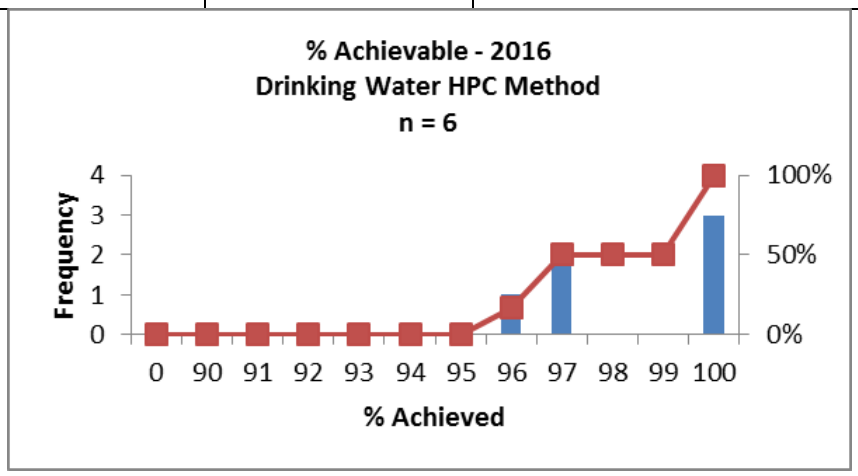
% Achievable	Labs (n=11)	Cumulative %
84	1	9.1
88	1	18.2
100	9	100



The following Table illustrates the % Achievable scores for the Heterotrophic Plate Count method used for Drinking Water samples during 2016.

Drinking Water Performance Table for the Heterotrophic Plate Count (HPC) method Table, 2016

% Achievable	Labs (n=6)	Cumulative %
96	1	16.7
97	2	50
98	0	0
99	0	0
100	3	100

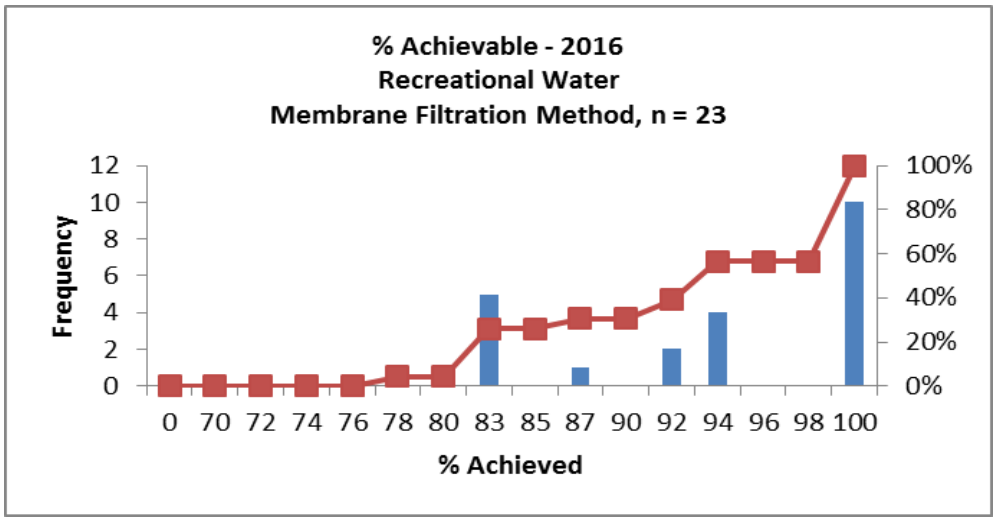


WATER MICROBIOLOGY PROGRAM

The following Score Tables illustrate the % Achievable scores for methods used for Recreational Water samples during 2016.

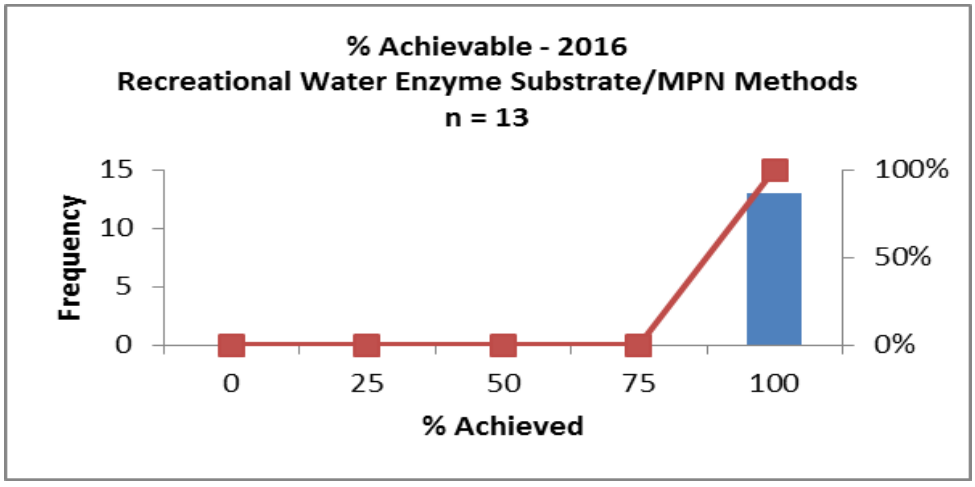
Recreational Water Performance Table for the Membrane Filtration method, 2016

% Achievable	Labs (n=23)	Cumulative %
78	1	4.4
83	5	26.1
87	1	30.4
92	2	39.1
94	4	56.5
100	10	100



Recreational Water Performance Table for Enzyme Substrate/MPN methods, 2016

% Achievable	Labs (n=13)	Cumulative %
100	13	100

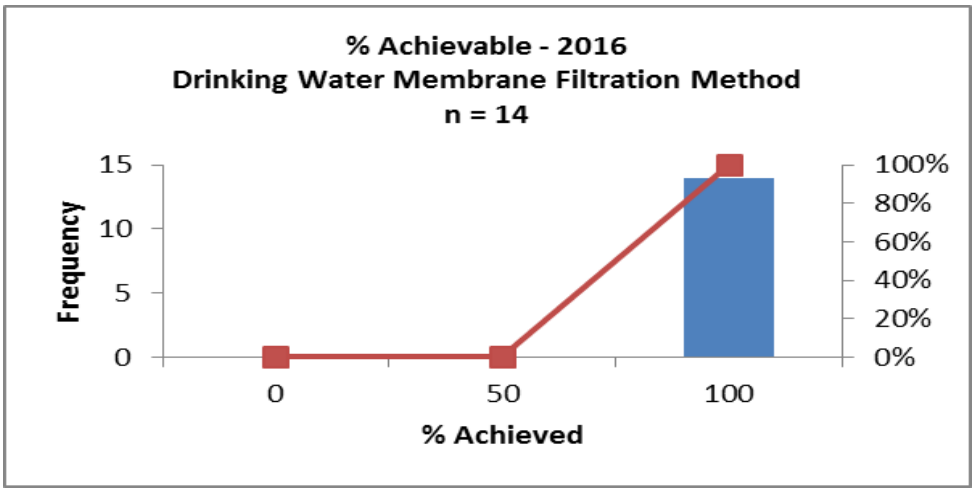


E.coli Supplemental Testing

Laboratories perform supplemental water bacteriology testing to discern *Escherichia coli* from other thermotolerant coliforms. These laboratories are assessed as a separate group and are assessed an additional 36 points maximum for the program year per method, if *Escherichia coli* and thermotolerant coliforms are reported. The Membrane Filtration and the MPN methods are the primary methods used for testing, however, two laboratories tested the water samples using the Enzyme Substrate method.

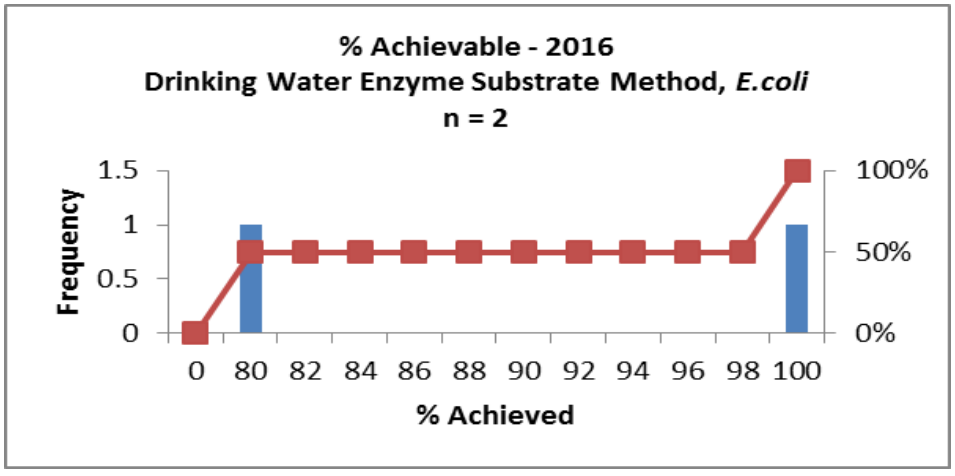
Drinking Water Performance Table for Membrane Filtration method, *E.coli*, 2016

% Achievable	Labs (n=14)	Cumulative %
100	14	100



Drinking Water Performance Table for Enzyme Substrate methods, *E.coli*, 2016

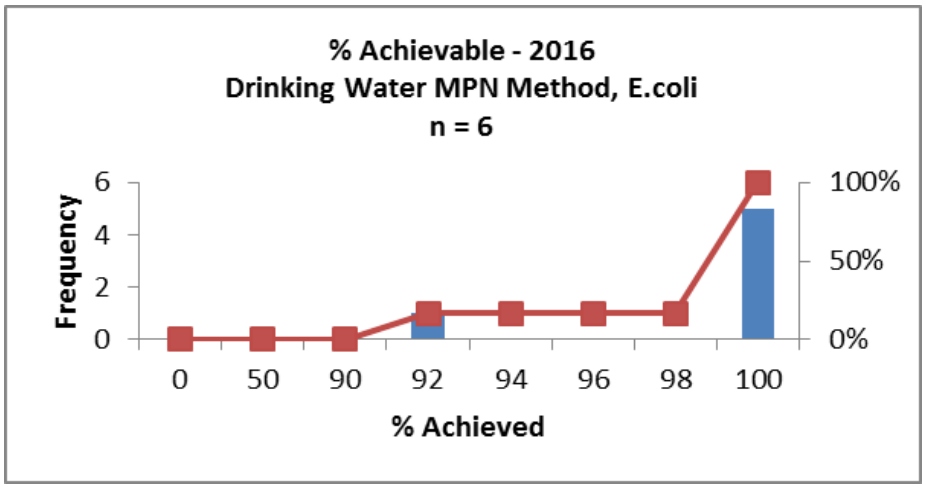
% Achievable	Labs (n=2)	Cumulative %
80	1	50
100	1	100



WATER MICROBIOLOGY PROGRAM

Drinking Water Performance Table for Most Probable Number (MPN) method, *E.coli*, 2016

% Achievable	Labs (n=6)	Cumulative %
92	1	16.7
100	4	100



MYCOLOGY PROGRAM

CMPT acknowledges with appreciation the valuable and essential advisory and technical support of:

Robert Rennie MD FRCPC……..University of Alberta Hospital, Edmonton, AB

Romina Reyes MD FRCPC..……LifeLabs, Burnaby, BC

Brad Jansen BSc, MLT……..University of Alberta Hospital, Edmonton, AB

The Mycology Plus Program was introduced to participants in June 2001 and includes 12 proficiency challenges for dermatophytes, common laboratory contaminants, yeast identification and Fungal Smear slides. In 2016-2017, grades were awarded to the Fungal Smears and identification challenges on a two point scale, acceptable or unacceptable. Susceptibility challenges for yeasts were introduced in 2008 and laboratories performing anti-fungal testing were encouraged to report their results. However, reports for susceptibility testing remain ungraded. In 2013-2014, CMPT added an additional fungal smear to the program.

Table 1: 2016-2017 challenge results

Survey	Samples			Grades		
				Acceptable	Unacceptable	Ungraded
MY1609 September 12, 2016	**Fungal Smear** (hyphae)	**A**	negative	7	3	0
		B	positive	10	0	0
		C	positive	10	0	0
	Yeast	**1**	*Candida tropicalis**	9	0	1
	Dermatophyte	**2**	*Trichophyton tonsurans*	9	0	1
	Mold	**3**	*Malbranchea* species	9	0	1
MY1701 January 16, 2017	**Fungal Smear** (hyphae)	**A**	positive	10	0	0
		B	negative	10	0	0
		C	negative	10	0	0
	Yeast	**1**	*Cryptococcus gattii**	9	0	1
	Dermatophyte	**2**	*Trichophyton verrucosum*	7	0	3
	Mold	**3**	*Bipolaris* species	9	0	1
MY1704 April 3, 2017	**Fungal Smear** (hyphae)	**A**	positive	10	0	0
		B	positive	10	0	0
		C	negative	10	0	0
	Yeast	**1**	*Candida lusitaniae**	9	0	1
	Dermatophyte	**2**	*Microsporum audouinii*	0	0	10
	Mold	**3**	*Rhizopus* species	7	2	1
			Totals	**155**	**5**	**20**

*susceptibilities applicable

ENTERIC PARASITOLOGY PROGRAM

CMPT acknowledges with appreciation the essential advisory and technical support of:

Tara Bonham RT……..LifeLabs, Surrey, BC

Romina Reyes MD FRCPC……..LifeLabs, Burnaby, BC

Joan Tomblin MD FRCPC……..Royal Columbian Hospital, New Westminster, BC

Pauline Tomlin ART, BSc, MPH ……..Provincial Laboratory for Public Health Edmonton, AB

Quantine Wong BSc……BCCDC, Vancouver, BC

Samples are supplied by LifeLabs, DynaLife $_{Dx}$ and BCCDC. The program consists of 3 surveys. Each survey consists of 3 SAF preserved samples requiring a total of 9 challenge readings that include 3 concentrates and 3 stained smears.

Grading is assessed on the combined results of the stained smear and the concentrate and is based on a 2 point scale (acceptable or unacceptable). Table 1 lists the samples and grades received for the 2016 challenges.

Table 1 Enteric Parasitology Challenges 2016

Date	Sample	Parasite	Acceptable	Unacceptable	Ungraded
April 4, 2016	PA1604-1	***Dientamoeba fragilis*** ***Blastocystis hominis***	19	1	0
	PA1604-2	no ova and/or parasites seen	19	1	0
	PA1604-3	***Cyclospora cayetanensis***	18	2	0
July 4, 2016	PA1607-1	***Hymenolepis nana*** ***Giardia lamblia*** ***Blastocystis hominis*** *Chilomastix mesnili* *Entamoeba coli*	19	1	0
	PA1607-2	***Diphyllobothrium* species** ***Blastocystis hominis*** *Entamoeba hartmanni*	20	0	0
	PA1607-3	no ova and/or parasites seen	20	0	0
September 26, 2016	PA1610-1	no ova and/or parasites seen	19	1	0
	PA1610-2	***Entamoeba histolytica/dispar*** *Entamoeba hartmanni* ***Blastocystis hominis*** *Endolimax nana*	19	1	0
	PA1610-3	***Giardia lamblia*** ***Blastocystis hominis***	18	2	0
		Total	**171**	**9**	**0**

BOLD – pathogen **Blue – potential pathogen**

TRICHOMONAS VAGINALIS ANTIGEN PROGRAM

CMPT launched the *Trichomonas vaginalis* Antigen Program with the first shipment on August 8, 2011. The program consisted of 2 surveys in 2011. Since 2012, the number of surveys was increased to 3. Each survey consists of 4 samples which are designed to be used with the Genzyme OSOM®

Table 1. *Trichomonas vaginalis* Antigen Challenges 2016

Date	Sample	Results	Acceptable	Unacceptable	Ungraded
April 4, 2016	TR1604-1	negative	35	0	0
	TR1604-2	negative	35	2	0
	TR1604-3	positive	35	0	0
	TR1604-4	positive	35	0	0
July 4, 2016	TR1607-1	positive	36	0	0
	TR1607-2	negative	36	0	0
	TR1607-3	negative	36	0	0
	TR1607-4	positive	36	0	0
September 26, 2016	TR1610-1	negative	37	0	0
	TR1610-2	positive	37	0	0
	TR1610-3	positive	37	0	0
	TR1610-4	negative	37	0	0
		Total	**432**	**0**	**0**

SHIGA TOXIN PROGRAM

CMPT launched the Shiga Toxin Program with the first shipment on May 7, 2012. The program consists of 2 surveys and each survey consists of 3 simulated stool samples.

Grading is based on a 2 point scale (acceptable or unacceptable). Table 1 lists the samples and grades received for the 2016 challenges.

CMPT acknowledges with appreciation the essential advisory and technical support of Denise Sitter, Cadham Provincial Laboratory, Winnipeg, MB.

Table 1 Shiga Toxin Challenges 2016

Date	Sample	Results	Acceptable	Unacceptable	Ungraded
May 16, 2016	ST1605-1	gene and toxin negative	11	0	0
	ST1605-2	gene and toxin positive	11	0	0
	ST1605-3	gene and toxin negative	11	0	0
November 7, 2016	ST1611-1	gene and toxin positive	11	0	0
	ST1611-2	gene and toxin positive	11	0	0
	ST1611-3	gene and toxin negative	11	0	0
		Total	**60**	**0**	**0**

SCREENING AND MOLECULAR TESTING PROGRAM

CMPT launched the Molecular Proficiency Testing Program with the first shipment on March 23, 2009. The program consists of 2 surveys. Each survey consists of 4 samples for methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant *Enterococcus* species (VRE) and group B *Streptococcus* (GBS). In 2016, CMPT expanded the Molecular Proficiency Testing Program to include Carbapenem-Resistant Enterobacteriaceae (CRE). Because all of the samples can also be tested using screening methods, such as chromogenic media, the program was renamed as the "Screening and Molecular" Program. Laboratories can participate in one, some or all of the 4 sample types.

Grading is based on a 2 point scale (acceptable or unacceptable). Table 1 lists the samples and grades received for the 2016 challenges.

Table 1. Screening and Molecular Challenges 2016

Date	Sample		Results	Acceptable	Unacceptable	Ungraded/DNP
April 25, 2016	***MRSA***	MR 1604-1	positive	14	0	0
		MR 1604-2	positive	14	0	0
		MR 1604-3	positive	14	0	0
		MR 1604-4	negative	14	0	0
	VRE	VR 1604-1	negative	12	0	0
		VR 1604-2	negative	12	0	0
		VR 1604-3	positive (van B)	10	1	1
		VR 1604-4	positive (van A)	11	1	0
	GBS	GB 1604-1	negative	16	0	0
		GB 1604-2	positive	16	0	0
		GB 1604-3	positive	16	0	0
		GB 1604-4	positive	16	0	0
	CRE	CRE 1604-1	negative	9	0	0
		CRE 1604-2	negative	9	0	0
		CRE 1604-3	positive	8	1	0
		CRE 1604-4	positive	8	1	0

Table 1 cont'd. Screening and Molecular Challenges 2016.

Date	Sample		Results	Acceptable	Unacceptable	Ungraded/DNP
August 15, 2016	MRSA	MR 1608-1	negative	15	0	0
		MR 1608-2	positive	15	0	0
		MR 1608-3	negative	15	0	0
		MR 1608-4	negative	15	0	0
	VRE	VR 1608-1	negative	13	0	0
		VR 1608-2	negative	13	0	0
		VR 1608-3	positive (van A)	12	1	0
		VR 1608-4	negative	13	0	0
	GBS	GB 1608-1	positive	16	1	0
		GB 1608-2	negative	16	1	0
		GB 1608-3	negative	16	1	0
		GB 1608-4	positive	16	1	0
	CRE	CRE 1608-1	positive	9	0	0
		CRE 1608-2	negative	9	0	0
		CRE 1608-3	negative	9	0	0
		CRE 1608-4	negative	9	0	0
			Total	**49**	**2**	**5**

2016 - 2017 CMPT PROGRAMS' PARTICIPANTS

Clinical Bacteriology - Distribution of Participant Laboratories

Province/Territory	Joined	A	B	C	C1	Total
Alberta	1992	13		1		14
British Columbia	1982	13	3	1	12	29
Manitoba	2001	6	1			7
New Brunswick	1993	4				4
Nova Scotia	1993	8	1			9
Northwest Territories	1992	1				1
Ontario	2004	1				1
Prince Edward Island	1993	2				2
Quebec	2016	1				1
Saskatchewan	1996	11	1			12
Yukon	1992	1				1
Total		61	6	2	12	81