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Cross-Connection Control Program Evaluation

A Provincial Framework for Water Suppliers

*Research Presentation for the Ontario Backflow Prevention
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- **Applying Uniformity:**
 - **To initiate or develop changes**
 - to an existing Cross-Connection Control Program (CCCP) or to implement a new CCCP in a uniform approach
 - **Effective leadership styles and collaboration are strategies for uniformity,**
 - including policy makers, water suppliers, health officials, local government, and consumers
 - **Research study is to create positive change**
 - toward new and existing CCCPs for water suppliers throughout the Province of B.C.



- **Research Purpose:**

- **To analyze the Capital Regional District Cross-Connection Program**
- **To identify the health risk in provincial communities without an established CCCP**
- **To inform the provincial government the importance of supporting health authorities in implementing CCCP**
- **To provide conclusions and recommendations for province wide improvements**

- **Uniformity Success:**
 - **The Capital Regional District CCCP** has shown success in demonstrating leadership in developing a uniform program for 13 municipalities:
 - safeguard public drinking water systems from contaminated water flowing backwards
 - assurance that the drinking water supply system reduces the risk from backflow contamination





- **Research Question:**

- **How can the evaluation of the Capital Regional District Cross-Connection Control Program**

- lead change for implementing a framework to facilitate Cross-Connection Control Programs for Water Suppliers throughout the Province of B.C.?

- A framework enables all parties to work toward a common platform, it will help minimize gaps in implementing backflow protection, program funding, staffing, inconsistent policies, and lack of enforcement.



- **Organization Context:**
 - The Ministry of Health is responsible to the government and to legislation for the overall management of the health act and regulation.
 - The five regional health authorities are responsible for implementation of the Drinking Water Protection Act.
 - The Drinking Water Program enforced by regional health authorities:
 - (a) drinking water officers, (b) medical health officers, (c) public health inspectors, (d) environmental health officers, and (e) public health engineers.



- **Research Study Findings:**
 - **analyzed the data under 6 major headings:**
 - general information,
 - organizations,
 - those who have Cross-Connection Control Programs,
 - those who do not have Cross-Connection Control Programs,
 - legislation and codes, and
 - the CRD Cross-Connection Control Program



- **Research Study Findings – cont'd:**
 - **questions arranged into 6 categories,**
 - which allowed a full 360-degree evaluation of the CRD CCCP
 - **45 survey questions and 5 interview questions**
 - **survey questions**
 - 33 yes-and-no questions, 4 open-ended questions, and 8 multiple-choice questions
 - **interview questions**
 - short answers and open-ended questions



- **Research Participants:**
 - **research encompassed 5 health authority boundaries in the province of B.C.**
 - **109 individuals participated in surveys, and 6 individuals participated in interviews**
 - **participants were contacted via email through B.C. Water and Waste Association**
 - **78% of the 109 survey participants**
 - reported that there is a CCCP in their area, and 50% of them operate a CCCP



Survey Participant's Job Classification	Number who Participated in Survey	% N = 109
<i>Enforcement Officer</i>	3	2.8
<i>Building or Plumbing Inspector</i>	7	6.4
<i>Manager</i>	23	21.1
<i>Director</i>	3	2.8
<i>Health Official</i>	3	2.8
<i>Operator</i>	30	27.5
<i>Tester</i>	8	7.3
<i>Engineer/Technician</i>	13	11.9
<i>Plumber/Sprinkler Fitter</i>	9	8.3
<i>Irrigation</i>	4	3.7
<i>Maintenance/Worker</i>	4	3.7
<i>Other</i>	2	1.8



Themes	Sub-Themes
1. Public awareness to increase knowledge about CCCP	<i>Education and training</i>
2. Maintaining and improving existing CCCP	<i>Organization long-term business strategy</i> <i>Organizations proactively identify new ways of doing things</i>
3. Organizational priorities for those who do not have CCCP	<i>Motivation</i>
4. Consistency of process and standards from legislation and codes	<i>Framework and guidelines</i> <i>Health Authority Involvement</i>
5. Emergency Response plan for CC incidents	<i>Public health protection</i>
6. Organizational change resistance for starting and or operating a CCCP	Funding Public hardship

- **Theme #1: Public Awareness:**
 - **resistance in starting the CCCP**
 - *“Lack of understanding and costs are cause of resistance to any change/improvements. Health directives force positive changes in water quality”*
 - *Resistance to operating a program can arise when there is a “public lack of knowledge”*
 - **a health official was equally frustrated with the water supplier operators because:**
 - *of the lack of knowledge about what a CCCP is and what is involved in starting up and operating a CCCP*



- **Theme #1: Public Awareness – cont'd:**
 - **85% of survey respondents suggested**
 - developing and distributing CCCP information to consumers
increase public education
 - **need for education**
 - *education at all levels of the organization and among the public, as there is “very little knowledge at the management level”*



- **Theme #2: Maintaining and Improving Existing CCCPs:.**
 - **to maintain and improve existing CCCPs:**
 - *the survey and interview responses suggested that the organization needs to promote public education and collaborate more with health officials*



- **Theme #3: Organizational Priorities:**
 - **76.9% of the organizations that have initiated their CCCP credited:**
 - *the success of the program to strong leadership and to champions within their organizations*
 - **management and supervisors supporting CCCPs:**
 - *are directly related to organizations' provision of high-quality protection of drinking water*



- **Theme #3: Organizational Priorities – cont'd:**
 - **funding and staffing problems:**
 - *We have a requirement from the local Health Authority to start a program but there has been no lead by management to budget for additional staff and expenditures to start the program; therefore we do not have a program in place*



- **Theme #3: Organizational Priorities – cont'd:**
 - **Mandate to implement a CCCP:**
 - *56.5% of the respondents stated they were motivated to start their CCCP*
 - **upper management to avoid bringing up cross-connection control to their Risk Management Staff:**
 - *There seems to be a fear of approaching council and even CEO with the concept of Cross-Connection Control, as the public would not be happy. They do not want to bring this up to Risk Management Staff*

- **Theme #3: Organizational Priorities – cont'd:**
 - **supporting the Health Authority:**
 - *voluntary start up [of] a cross-connection control program does not work; this only works if health authorities mandate the water supplier, then the water supplier will be forced to comply*
 - *if funds were available, more water suppliers would implement CCCPs*
 - **lack of motivation:**
 - *cost and expense is always a deterrent*

- **Theme #3: Organizational Priorities – cont'd:**
 - **the lack of motivation for operating a CCCP:**
 - *concern about upsetting the customer by putting the extra costs to them, as a result conflict caused by enforcement is avoided*
 - *current legislation and organizations do not make it easy to implement a CCCP*
 - *very high resistance by other departments to take on any extra work/ responsibility to make the program workable.... Existing standards too lax/generalized*
 - *Some businesses object to yearly testing of backflow devices. After explaining the value of the program and the requirements by the Health Authority, most comply willingly*



- **Theme #4: Consistency of Process:**
 - **funding for operating a program:**
 - *91% of survey participants indicated that if sufficient funds were available to their organization they would implement or improve an existing CCCP*
 - *funding “can be directly related to the effectiveness of a cross-connection control program”*
 - *58.8% of the survey respondents noted that their CCCP was sufficiently funded*



- **Theme #4: Consistency of Process – cont'd:**
 - **framework or model:**
 - *if a framework or model of a CCCP would be helpful in maintaining their CCCP, 88.6% agreed*
 - *92.8% of survey participants belonging to organizations without a CCCP support a framework or model of a CCCP*
 - *key steps they would recommend for developing a CCCP a majority indicated bylaws, public education, management support, and record keeping*

- **Theme #4: Consistency of Process – cont'd:**
 - **existing CCCPs required by the Regional Health Authority:**
 - *41% of survey respondents claimed that the Health Authority provided some guidance*
 - **89.9 % supported the Ministry of Health legislating mandatory CCCPs**
 - *...the Health Official appear to be in favour of CCCP, but not actively promoting cross-connection control programs....*



- **Theme #4: Consistency of Process – cont'd:**
 - ***organization is waiting for direction from the Health Authority to mandate a CCCP:***
 - *...want Health Authority to specify the type of program needed (e.g., premises isolation)...*
 - *97.2% responded that CCCP managers or specialists should be certified by an accredited agency for ensuring the CCCP is operating properly*



- **Theme #5: Emergency Response Plan:**
 - **Backflow incidents often are hard to detect:**
 - *..had bacterial counts in distribution system that could not be accounted for in any other way, so conclusion was that there was likely a cross-connection incident caused by backflow..*
 - *.. had E. coli contamination and not 100% positive that it was caused by a cross-connection because we have not found the source. But it is very likely that it was caused by a cross-connection...*
 - *..having the health official on side would be one of the key steps for developing a CCCP...*



- **Theme #5: Emergency Response Plan – cont'd:**
 - **cross-connection incident caused by backflow:**
 - *22.2% reported to had a backflow incident*
 - *..back siphonage of contaminated domestic water at golf course, which resulted in people getting ill..*
 - *..film processing fluid from a dental office was siphoned back into water in a medical building..*
 - *...petroleum-based product was sucked in to a 100mm service line and into a warehouse retail store...*
 - *..soap from truck wash back pressuring through a faulty double check valve assembly. Soap from pressure washer back pressuring through an unprotected water connection...*



- **Theme #6: Organizational Resistance to Change:**
 - **organization resistance:**
 - *..organizational resistance to starting or operating a CCCP may be rooted in “[understaffing], lack of time, budget issues, and public hardship..*
 - *..this year is an election year, therefore the council will not be reviewing the proposed cross-connection control bylaw..*

- **Theme #6: Organizational Resistance to Change – cont'd:**
 - **91.1% noted that, if sufficient funds were available to their organization, they would implement a CCCP:**
 - *...manager directs the staff to do it and limited funding to do the surveys..*
 - *...last year I had money set aside for a Cross-Connection Control Officer, but instead I had to redirect that money for a different position in another department...*
 - *under funded existing CCCP makes it difficult to hire staff and increase public awareness*



- **Theme #6: Organizational Resistance to Change – cont'd:**
 - **public hardship:**
 - *...management is concerned about the hardship to industry if they are made to comply...*
 - *...program focus mostly on voluntary basis also instructed by management to focus mainly on education rather than protecting our safe drinking water from pollutants/contaminants...*
 - *...very high resistance by other departments to take on any extra work/responsibility to make the program workable...*



- **Study Recommendations:**
 - **implementing and operating CCCPs in three phases:**
 - allowing organizations and health authorities opportunities:
 - *to adjust to the changes,*
 - *develop collaboration, and*
 - *evaluate each phase to make adjustments before the next phase is implemented*



- **Study Recommendations – cont'd:**
 - **Phase One:**
 - *amend the Drinking Water Officers' Guide (Drinking Water Leadership Council, 2006) to list the minimum requirements for operating a CCCP*
 - **Phase Two:**
 - *amend existing legislation to mandate minimum requirements for operating a CCCP*
 - **Phase Three:**
 - *provincially monitor cross-connection control incidents and activities amongst the water suppliers throughout the province*



Themes

Recommendations

Phase 1: Amend Drinking Water Officers' Guide

- | | |
|---|--|
| <p>1. <i>Public awareness about CCCPs</i></p> <p>2. <i>Resistance within the organization for raising CCCPs as a higher priority</i></p> <p>3. <i>Lack of direction by the Health Authority to water suppliers for implementing and operating CCCPs</i></p> | <ul style="list-style-type: none">• Promote public awareness• Identify and eliminate organization resistance• Encourage collaboration between health authorities and water suppliers |
|---|--|

Phase 2: Amend Drinking Water Protection Act and Regulation

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|---|--|
| <p>4. <i>Existing codes and provincial standards about cross-connection control are too lax.</i></p> <p>5. <i>Requirement for a detailed framework for developing and operating CCCPs</i></p> <p>6. <i>No motivation for maintaining and improving existing CCCPs</i></p> | <ul style="list-style-type: none">• Develop process for amending legislation• Develop CCCP framework• Motivate water suppliers |
|---|--|

Phase 3: Include a Provincial Cross-Connection Control Incident & Monitoring System

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|--|--|
| <p>7. <i>Need for provincial accreditation CCCP managers or operators</i></p> <p>8. <i>Need for an approved Emergency Response plan for Cross-Connection incidents</i></p> | <ul style="list-style-type: none">• Implement a provincial accreditation for CCCP managers or operators• Implement a provincial Cross-Connection incident recording and CCCP monitoring |
|--|--|



- **Phase One – Amend Drinking Water Officers’ Guide:**
 - **need to provide enhanced education, training, and awareness of CCCPs to the water suppliers:**
 - *managers responsible for CCCPs are encouraged to attend water quality education conferences relating to cross-connection control in order to stay up-to-date about the trends, technology, codes, standards, and issues relating to cross-connection control*
 - *educating the public about CCCPs involves outreach programs to other water suppliers, health authorities, and schools that train plumbing professionals*



- **Phase One – Amend Drinking Water Officers’ Guide:**
 - **public outreach programs may include more than one outreach method, such as:**
 - *public forums and information sessions that are open to the general public,*
 - *articles in the local newspaper about cross-connection control,*
 - *presentations about cross-connection control to schools,*
 - *information at the local community center, and*
 - *community events calendar.*



- **Phase One – Amend Drinking Water Officers’ Guide:**
 - **Eliminate barriers within organizations:**
 - *identify the resistance about public hardship, reinforce the responsibility back on the owner, whose facilities are rated as presenting a higher health risk to the public drinking water supply system from potential or actual backflow*
 - *build community trust to support CCCPs*
 - *Communicate with the public about the importance of cross-connection control*



- **Phase One – Amend Drinking Water Officers’ Guide:**
 - **strategies to fund CCCPs**
 - As stated by one participant, “Managers do not want to spend money to protect the public”
 - **Examples of methods to fund CCCPs are:**
 - increase bulk water rates;
 - apply a surcharge that appears on customers’ water utility bills;
 - charge customers individually, on installed backflow devices;
 - introduce test report fees; & apply water use annual permit fee



- **Phase One – Amend Drinking Water Officers’ Guide:**
 - ***Encourage Collaboration Between Health Authorities and Water Suppliers:***
 - *people expect their drinking water to be safe; this is a major public health issue in Canada (Bennett et al., 2007, p. 15).*
 - *“all stakeholders must communicate quickly and effectively to mitigate risks to public health” (Williams & Hruday, 2007, p. 2).*
 - *cross-connection control is clearly a health issue*



- **Phase One – Amend Drinking Water Officers’ Guide:**
 - **Water suppliers need to take the champion role by initiating discussions about CCCPs with their local health authority**
 - *One survey participant stated he or she was “waiting for a health authority to mandate a program. [I] want the health authority to specify the type of program needed”*
 - **Water suppliers need to accept that obtaining direction from the health authority may not happen quickly or easily, and each water supplier is strongly encouraged to start by taking the leadership role**



- **Phase One – Amend Drinking Water Officers’ Guide:**
 - **involving health authorities in the regulation of CCCPs may potentially demonstrate to the public that the health authorities are supportive of cross-connection control**
 - *“After explaining the value of the program and the requirements by the health authority, most comply willingly”*
 - *“Health directives force positive changes in water quality”*



- **Phase Two – Amend Drinking Water Protection Act and Regulation:**
 - **Develop process for amending legislation:**
 - *existing legislation does not address the type of CCCP and does not force the health authorities to enforce cross-connection control or describe the type of CCCP that the water suppliers must operate.*
 - *amend the Drinking Water Officers' Guide (Drinking Water Leadership Council, 2006) first to include minimum CCCP requirements*
 - *to change legislation, the public health officials need to support CCCPs, as they are the voice to the B.C. Cabinet Health Minister*



- **Phase Two – Amend Drinking Water Protection Act and Regulation:**
 - **Develop a CCCP Framework**
 - *apply a provincial uniform approach for all water suppliers to use when implementing and operating CCCPs can minimize confusion and inconsistencies, as this approach provides clear direction regarding the type of CCCP that water suppliers are required to operate*
 - *one participant noted that “communities do not know the requirements for planning a CCCP”*
 - *Health authorities can provide some direction for the water supplier and are encouraged to follow a framework for implementing and operating an effective CCCP, which can be included in the Drinking Water Officers’ Guide*



- **Phase Two – Amend Drinking Water Protection Act and Regulation:**
 - **Develop a CCCP Framework**
 - suggested components to be included in a provincial framework for operating a CCCP's
 - *develop and maintain CCCP records,*
 - *adopts a cross-connection control bylaw,*
 - *monitor install backflow prevention devices,*
 - *develop and implement procedures for evaluating new and existing facilities to assess level of risk,*
 - *develop and distribute CCCP information to consumers,*
 - *develop and implement procedures for CCC inspections and surveys,*
 - *develop and implements procedures for reporting CCC incidents,*
 - *use certified cross-connection control surveyors and testers*



- **Phase Two – Amend Drinking Water Protection Act and Regulation:**
 - **Motivate Water Suppliers**
 - **Health Authority to motivate the water suppliers to comply using provincial CCCP requirement legislation**
 - **Health Authorities should encourage water suppliers to be proactive in protecting the public drinking water supply**
 - *In order for water suppliers to instigate change, collaborative leaders within the water suppliers need to believe that change is possible.*



- **Phase Three – Include a Provincial Cross-Connection Control Incident and Monitoring System:**
 - **Implement a Provincial Accreditation for CCCP Managers or Operators**
 - majority of participants responded that CCCP managers or facility survey specialists should be certified by an accredited agency
 - *currently, B.C.W.W.A. provides accreditation for backflow testers*
 - *water suppliers who operate existing CCCPs already recognize the B.C.W.W.A. accreditation for testers*
 - *provincial governing body needs to recognize B.C.W.W.A. accreditation for both testers and facility surveyors*
 - accreditation demonstrates competence to the health officials



- **Phase Three – Include a Provincial Cross-Connection Control Incident and Monitoring System:**
 - **Implement a Provincial Cross-Connection Incident Recording and CCCP Monitoring**
 - *there were a number of cross-connection control incidents that have already occurred throughout the province of B.C. and not reported*
 - **no formal provincial process for monitoring or collecting data about cross-connection incidents.**
 - **monitoring process to make certain that a central backflow incident data statistical tracking system can identify, track, and eliminate potential cross-connections in their areas**



- **Phase Three – Include a Provincial Cross-Connection Control Incident and Monitoring System:**
 - **monitoring and auditing of cross-connection control activities in the province of B.C. using a centralization approach**
 - *currently, B.C. Centre for Disease Control (2008) is set up for monitoring the whole province for preventing and controlling communicable disease and promoting environmental health*



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Thank you for your time!

