National Collaborating Centre for Infectious Diseases

Strategies for Preventing and Mitigating Influenza in Canada through the One Health Approach

Workshop Proceedings

April 20, 2011
Winnipeg, Manitoba

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Workshop Background/Context

The H1N1 influenza pandemic has produced a large volume of literature reporting new observations and findings related to the public health response. The National Collaborating Centre for Infectious Diseases (NCCID) undertook a series of evidence reviews to critically assess, consolidate and contextualize these new research findings in both human and animal health for the Canadian setting. As part of this work, NCCID is exploring prevention and mitigation strategies for pandemic influenza A/H1N1 in the animal health arena, with a focus on zoonosis and application to human public health. In addition to the more conventional literature review approach to gathering evidence, NCCID is also committed to documenting experiences and lessons learned from frontline public health practitioners during the H1N1 pandemic. To this end, NCCID invited animal and human health experts to an introductory workshop in Winnipeg on April 20, 2011 to address challenges related to implementation of surveillance and primary prevention programs during the pandemic, with particular attention to swine operations, and to discuss the way forward in the preparedness for future influenza epidemics/pandemics. These proceedings summarize the outputs from that workshop.

Introductory Remarks

Dr. Margaret Fast, Scientific Director of NCCID, welcomed participants on behalf of the Centre. Margaret provided background information on the work of the Centre and then discussed the objectives of the workshop. (The list of participants is provided in Appendix 1. The workshop agenda, including the objectives, is copied in Appendix 2.)

Hajo Versteeg, the workshop facilitator, reviewed the day's agenda with participants. He noted that draft proceedings would be distributed to participants for their comment. Participants would also be given the opportunity, after reviewing the draft proceedings, to provide additional feedback not raised at the workshop. These comments will be captured in Appendix 3 in the final proceedings.

Hard copies and a memory stick containing all workshop background papers and PowerPoint presentations were provided to participants at the workshop. Anyone interested in receiving these documents is asked to contact Eve Cheuk at echeuk@icid.com.

1. Setting the Stage: Implementing One Health

Dr. Craig Stephen, from the Centre for Coastal Health, Nanaimo, BC, and the Faculty of Veterinary Medicine, University of Calgary, presented his paper on the "One Health Approach" as the overarching theme for the workshop. The implementation of the One Health approach focuses on the need to develop and maintain relationships, trust, knowledge and agreements for collaboration and sharing across relevant disciplines and stakeholders with a view to getting ahead of the next pandemic.

In the plenary discussion following Dr. Stephen's presentation, participants recognized that the One Health approach to preventing and managing pandemics was not a panacea. It had strengths and weaknesses. In particular, One Health is not well defined and implementation strategies are not clear. However, there seemed to be general agreement that cooperative, coordinated cross-disciplined horizontal management would make pandemic influenza programs more effective and efficient in preventing, anticipating and mitigating pandemics.

Participants identified several key components of effective horizontal management for influenza programs:

- Shared frameworks (common issues, goals)
- Coordinated and cooperative teams and networks (strong leadership, knowledge exchange and trust)
- Inclusion of (social) determinants of health
- Inclusion of economic animal goals, workplace safety goals, re-assortment goals
- Supportive governance structures; and
- Fair, full and understandable information exchange and common "non-political" messaging/communication initiatives across all stakeholder sectors. This will ensure that different sectors (e.g., pig producers, the general public, and government regulators) understand each other's needs, capacities and expectations. This point was seen as fundamental to building trust and collaborative work.

Several participants noted that significant funding constraints and aversion to structural changes particularly within and between government agencies seriously impeded the ability to develop and implement coordinated One Health management approaches.

2. Swine Surveillance for Public Heath Planning: Plenary Sessions

2.1 Plenary Presentation: pH1N1 2009: Swine Surveillance for Public Health Planning – Dr. Lee Wisener

Dr. Wisener, from the Centre for Public Health and Zoonoses, Ontario Veterinary College, University of Guelph, provided the plenary presentation on this topic. Dr. Wisener provided background information on the pH1N1 pandemic, and summarized the current state of knowledge and key issues relating to swine influenza virus (SIV) surveillance that inform public health policies and decisions.

The plenary discussion following Dr. Wisener's presentation focused on challenges associated with SIV surveillance domestically and internationally. Several participants noted that swine are not the only "mixing vessels" for influenza; surveillance can be done with any species, including humans. Participants recognized, in line with the One Health concept that a more inclusive approach to species surveillance would be, subject to financial considerations, more appropriate.

2.2 Plenary Discussion: Goals, Elements and Challenges relating to a One Health Influenza Prevention Program

Led by the facilitator, participants provided extensive perspectives on four questions that addressed themes that came out of the plenary presentations. The perspectives raised by participants have been consolidated below to minimize duplication. The results of an exercise to prioritize the "challenge" perspectives detailed in Question Four in this section are captured in section 2.3.

What do we want to achieve through a One Health influenza prevention and management program in Canada?

- Decrease human morbidity, but not at the expense of the swine industry. Need to ask if our ultimate concern is animal health and welfare, or economics. It makes sense to tout all the benefits of surveillance, including local, national and international economic, societal and public health implications. Perhaps we need to focus on a "One Health zoonotic prevention" approach.
- Look at all species (zoonotics), with regards to biosecurity.
- Fill knowledge gaps and address both the animal and the human sides of the risk equation.
- Focus on long-term support, promoting greater understanding of and acceptance among all stakeholders for the One Health approach.
- Develop a better understanding of how influenza interacts in humans. Better methodologies would decrease the need for unnecessary or over-reactive remedial actions at the farm level if we were able to determine that the problem was not with the animals.
- Determine what subtypes of influenza we should track and manage.
- Better allocate efforts and resources in proportion to risks (adopt risk/benefit strategies), otherwise unbalanced perspectives and economic instability may result. Sometimes we unnecessarily destroy an industry in our zeal to support public health.
- Horizontal management structures will allow us to implement a One Health approach.
- Work towards consistently early recognition of potentially pandemic viruses and what species they are coming from.
- Develop/utilize timely efficacious vaccines for animal populations as well as for humans.
- Better understand the weaknesses in the system.

What are the elements of an efficient influenza prevention and management program?

- An administrative structure that cooperates and coordinates efforts across federal, provincial and territorial governments.
- Expand focus to address all zoonotics; make it broader than influenza. Focus on multispecies. This approach would be more efficient to catch all emerging problems.
- Develop, consolidate and maintain a central database.
- Anticipate problems, be preventative in our outlook, and develop efficient influenza prevention programs.
- Foster interdisciplinary coordination and cooperation.
- Build trust and ensure buy-in of the key players.
- The programs must be properly resourced.

- Need effective ways to communicate with, and teach/inform all stakeholders, including "the industry": (e.g., kitchen meetings, organizing buy-in, using plain language). Note that farmers are considered part of "the industry".
- Make influenza A notifiable at the national level.
- Consider all players in management initiatives (e.g., frontline workers have to understand the value of biosecurity to them).
- Invest in analytical intelligence; improve our ability to detect new variants.
- Tackle "low hanging fruit" first; do a better job with what we've already got.
- In an era of cut backs, be careful that saving money does not compromise animal and public health goals.
- Discuss, clarify and communicate influenza prevention and management program goals, methods, and roles and responsibilities of all key players before a response is required (be preventative and anticipate). Focus on unified, uniform messaging that is coordinated and consistent, from the frontline to the top of management.
- Ensure biosecurity (human = infection control) is understood, practiced and enforced.

How does swine surveillance fit into the overall One Health program in influenza prevention and management? [Participants clarified the question, as follows: How *should* swine surveillance fit, or how could it *better* fit into the overall One Health program in influenza prevention and management?]

- Need to focus on swine surveillance in general, not just swine viruses.
- Promote a multispecies (including humans) surveillance system.
- In an era of limited resources, surveillance of any species should be targeted to look at areas where there is interspecies connection (e.g., pigs and people, pigs and water fowl).
- An emergent variant that is swine-related should trigger a predetermined surveillance system.
- Swine surveillance should fit in at the national and global level program.
- SIV should be notifiable and linked to human surveillance. But we need to be careful that diagnostic labs are not overburdened.
- It is difficult to justify the cost of farm surveillance for influenza that does not have a negative impact on animal health, unless it has a connection to human health, and then may require public funding to support it for the public good.
- Reporting all swine diseases may overburden the system. We need to discriminate and report only the "important" ones.
- A clear definition of "surveillance" based on human surveillance is required.
- Linking pig surveillance to a human connection is problematic. The infection can go the other way too.

What are the challenges with implementing swine surveillance as part of the One Health approach?

- Time and human and financial resource constraints; swine farming is not lucrative. Who is going to pay for surveillance?
- Human and animal surveillance models are not the same. We have to realize the differences and learn from each system.
- Uncertainties of surveillance (e.g., what do we do when we find it; how do we sample a swine population to catch emerging risks in a timely and interpretable fashion; what information do we need to track to keep on top of changing risk status).

- Clarify Canada's role in the international/global structure.
- Build and maintain trust among all stakeholders. We also need to better understand industry (including farmer/worker) concerns (e.g., not realistic that sick workers stay home if it means they do not get paid).
- Ongoing industry compliance.
- Lack of an overarching national framework, with a clearly recognized strong *lead* to coordinate and implement efforts (could it be PHAC, CFIA, Health Canada?). Leadership does not mean ownership; lead agency must be collaborative, coordinated and multidisciplinary, and must appreciate multijurisdictional dimensions of swine surveillance structures.
- Need to build on preexisting structures; perhaps can learn from how PHAC was started.
- Ensure sustainability of the structure, given competing animal and human health priorities.

2.3 Prioritizing the Identified Challenges

Prior to the health break, participants consolidated some of the challenges they had just identified. During the break all participants earmarked their top two priority challenges. The results of this exercise were as follows:

- **Framework/leadership/structure: 19 votes**
- **Trust: 14 votes**
- **Uncertainty about outcomes: 8 votes**
- What information is needed: 2 votes
- Resource constraints. 1 vote
- Sustainability: 1 vote
- Canada's role, contribution: 1 vote
- Sampling swine, and differences in human and animal surveillance: 0 votes

3. Swine Surveillance for Public Heath Planning: Breakout Sessions

Participants were assigned to one of three breakout groups. Each breakout group was asked to consider ways to overcome the top three prioritized challenges and to provide advice on the role NCCID might play in addressing gaps in swine surveillance. A breakout discussion template was provided to record group discussions. These templates are duplicated in Appendix 4. NCCID recognizes that a great deal of valuable "detailed" information is included in the breakout temples and plans to examine them carefully. The following section summarizes the reporting-back to plenary from each of the three breakout groups.

3.1 Plenary Report from Breakout Group One

Overcoming Trust challenges:

- Establish and maintain networks that represent all stakeholders, share perspectives and needs, identify common interests, set common goals and work together to achieve them.
- Need national and provincial collaborators.
- Building trust requires adequate time, money and stakeholder buy-in.

- Need to be clear on who takes responsibility for what.

Overcoming Leadership challenges:
- First, build strong leadership, then focus on building trust.
- Strong leadership must begin with the federal government, but not obvious which agency would take a leadership role (e.g., CFIA and PHAC have limited focus, money and authority/mandate to address this issue in a collaborative manner).

Possible role for NCCID:
- Explore current structure and efforts, identify structure gaps and common vision.
- Inventory who is doing what, resources, existing structure - gaps in authority, sustainability, knowledge.
- Advocate for a "whole government" approach.
- Clarify who "owns" zoonotic diseases and related public health efforts.
- Identify stakeholders, what their mandates are, and then propose a unifying mandate.

3.2 Plenary Report from Breakout Group Two

Overcoming Trust and Uncertainty challenges:
- Current mistrust goes both ways. Need to overcome perception that animal health practitioners feel that public health practitioners overreact while human health practitioners think animal health practitioners under react.
- Build relationships amongst all stakeholders, with education as the starting point.
- Develop a common secure and legal database to share information.
- Find value for all participants in collaboration.
- Find ways to share expenses.
- Coordinate policy and set up a common think-tank to resolve issues.
- Share investigation responses (animal and human health personnel work together).
- Develop a decision tree of actions: if "this", then "that".
- Promote dialogue: joint conventions, educational and academic opportunities for public health and animal people (e.g., Calgary veterinary college now includes veterinary public health in their undergraduate training).

Overcoming Structure, Framework, Leadership challenges
- **Build on existing networks and frameworks and groups where they exist.**
- Develop shared responsibilities and better communication mechanisms to ensure jurisdictional responsibilities (federal/provincial/territorial) are coordinated.
- Assess gaps in emerging diseases.
- Mandatory reporting of disease that are currently not notified.
- Attempts at integrating systems never fully developed.
- Need high level commitment to bring agriculture and health together.
- Ministries of environment have to be involved as well.
- Build and maintain laboratory networks.

Possible role for NCCID:

- Synthesize information, develop a paper and initiate dialogue to address identified challenges and path forward.
- Focus on "high level" individuals accessible to NCCID; talk to chief medical and veterinary officers in the country and 'go to it'.

3.3 Plenary Report from Breakout Group Three

Overcoming Trust and Uncertainty challenges

- Develop, implement and evaluate pilot projects (around the One Health theme) where all stakeholders can work together and build trust. Projects can start small and build to national dimensions as knowledge, trust and comfort develop.
- Evaluate projects with a focus on what worked, what didn't. Create an inventory of lessons learned from pilot projects and existing initiatives.
- Swine industry should not have to pay all surveillance costs especially where focus is public health.
- Ensure anonymity so no fault attaches to industry if something is found, perhaps through third party management of surveillance.
- Support sick leave for workers.
- Broader communication initiatives to discuss findings (e.g., industry must participate in the dialogue).

Overcoming Leadership challenges

- Identify champions broadly from different organizations and select an "alpha champion overlord".
- Ensure that the vision (the big picture) remains in the foreground. Clarify the distinction between leadership and management.
- Learn from international experiences
- Human public heath agencies should assume a significant portion of the responsibility, including costs for swine/animal surveillance.

Possible NCCID role:

- Facilitate a surveillance pilot project, provide resources for its evaluation and initiate a national process to put a "spotlight" on the pilot project.
- Build trust (e.g., initiate stakeholder meetings to address trust issue with a third party to bring stakeholders together).
- Facilitate meetings like this one to address common issues such as definitions, outcomes, goals, needs, etc. of surveillance.
- Expansion of a meeting of this type.
- Find or be the "alpha-champion".
- Provide financial assistance for surveillance initiatives.

4. Primary Prevention Measures on Swine Farms: Plenary Sessions

4.1 Plenary Presentation: Swine Farms and Lessons Learned from the H1N1 Pandemic: Challenges and Obstacles – Dr. Donald Tremblay

Dr. Tremblay, from the Faculté de médecine vétérinaire, Université de Montréal, provided the plenary presentation on this topic. Dr. Tremblay summarized swine management in Canada and abroad, and influenza virus considerations when developing biosecurity measures. He concluded that each link in the swine industry chain should have appropriate biosecurity protocols for its situation. The biosecurity measures must be evaluated based on: their potential impacts for the internal and external biosecurity aspects, and for the persistence of these impacts; the time to implement the measure; their initial and recurring costs; the interruption of the production chain; and their social acceptability. He noted that a national survey is currently being conducted by the Canadian Swine Health Board to collect data on biosecurity practices in Canadian pig farms. This survey should enable evaluating the beneficial effects of current biosecurity programs and determining the areas where biosecurity needs to be reinforced.

4.2 Plenary Discussion: Goals, Elements and Challenges relating to a One Health Influenza Prevention Program

Led by the facilitator, participants provided perspectives on two questions that addressed themes that came out of the plenary presentations. The perspectives have been summarized below. The results of an exercise to prioritize the "challenge" perspectives detailed in Question Two in this section are captured in the section 4.3.

How do Primary Prevention Measures (PPM) on swine farms fit into the One Health influenza control program?

- Biosecurity measures (including bioexclusion measures such as health status of introduced animals, transportation, farm visits, worker vaccination; and biocontainment measures such as health monitoring, ventilation, quarantine, animal vaccination and disease investigation) are considered PPM.
- Swine industry is well organized, using "just in time production". The industry accounts for about 95% of pig production in Canada. The remaining 5% are small-scale, unlicensed "backyard' pig farms. Industry workers traditionally are hired day labourers and are often immigrants. They tend to be averse to vaccinations, have no benefits and cannot afford to "call in sick" and miss work. Truckers who move the pigs from one site to another and slaughter house workers could also play a role in PPM.
- Currently, PPM does not routinely address human to animal issues (e.g., sick workers are not told to stay away from the farm; influenza-like illnesses (ILI) would go undetected if workers are afraid to report it).
- Challenge is how biosecurity measures can become routine precautionary measures that are part of daily life. Currently there is a wide variation in implementing PPM (e.g., some

workers shower before and after entering a barn; some change suits from barn to barn; some meet at the local café in their farm clothes).
- Economic impacts are probably the best motivator for influenza control programs on farms.

What are the challenges with implementing PPM on swine farms as part of the One Health approach?
- Company policy: most companies endorse PPM.
- Compliance promotion and enforcement with the swine workers.
- The nature of the pathogen itself (it is inherently a respiratory virus).
- Who bears the costs associated with PPM?
- Worker disempowerment (e.g., lack of paid sick leave).
- Inadequate worker information/awareness/education/training.
- The movement network of pigs needs to be studied: current practices may be economically efficient, but not biologically sound.
- Biosecurity measures do not always match the level of risk.
- Better health monitoring and disease investigation is needed.
- Inconsistent investigation of hospitalized ILI cases (don't always ask where the infection may have originated); need for follow up (monitoring).
- Linking a severe human influenza case to swine production can trigger intensive on-farm surveillance. This is why we need linkages between human and animal surveillance; one should trigger the other.
- Evidence of what works is key to promoting PPM; feasibility and acceptability of action of on-farm measures.
- "Back door" ways of introducing infections can cause problems (e.g., maintenance staff, plumbers, electricians, etc. who are not necessarily thinking about biosecurity).
- Need to interact better with "backyard" small scale food movement (e.g., small organic farmers).

4.3 Prioritizing the Identified Challenges

Prior to the health break, participants consolidated the challenges they had just identified. During the health break all participants earmarked their top two priority challenges. The results of this exercise were as follows:
- **Compliance/worker disempowerment: 14 votes**
- **Evidence: 8 votes**
- **Epidemiology link/biomonitoring: 7 votes**
- Company policy: 3 votes
- Movement of pigs: 3 votes
- Small scale pig farms: 2 votes
- "Backdoor infection": 1 vote
- No votes for:
  - nature of pathogen
  - cost (who will pay for PPM)
  - worker information and training
  - proper PPM in relation to risk

5. Primary Prevention Measures on Swine Farms: Breakout Sessions

Participants were assigned to one of three breakout groups. Each breakout group was asked to consider ways to overcome one of the three top prioritized challenges and to provide advice on the role NCCID might play therein. A breakout discussion template was provided to record group discussions. These templates are copied *in toto* in Appendix 5. The following section summarizes the reporting back to plenary from each of the three breakout groups.

5.1 Plenary Report Re Evidence from Breakout Group One

- Conduct a gap analysis: what are the best practices for transmission interruption (probably including other species, particularly avian)? What are the cost-benefits of the different practices? Look not only at literature, but also at practice (interviews with people, grey literature).
- Advocate for funding, especially for knowledge-to-action research; conduct practice-based as well as academic research.
- Create knowledge products to disseminate evidence to industry, workers, public health – ensure knowledge products are appropriate to audience.
- Reward industry participation for adopting/evaluating PPM (e.g., tax breaks for involvement in research, accreditation).
- Both academic and "practical" research is needed, with the involvement of producers.
- Trust building is key: involving all stakeholders from the beginning helps build trust.
- Link and pull together fragmented research programs.
- Human and financial resources needed to build, link and maintain networks.
- Revive vet extension services to get information out to, and back from producers.
- Time-sensitive projects can hamper long-term vision.
- Identify and utilize knowledge of experts in the large networks.
- NCCID can:
    - Have an animal health project;
    - Scope current knowledge, knowledge gaps, best practices;
    - Enable pilot projects involving both human and animal health;
    - Promote/distribute knowledge translation amongst stakeholders;
    - Conduct evaluations: follow up, track changes in behavior, relationships, and act as an information clearinghouse.

5.2 Plenary Report Re Compliance/Worker Disempowerment from Breakout Group Two

- Clarify rules/regulations for workers, especially seasonal workers (e.g., available learning programs, health/sick benefits etc).
- Prepare a "Worker Census" detailing work force demographics (e.g., who are typical workers, immigrants, available social welfare programs, education, language skills, etc) and current rules/regulations that apply to seasonal workers.

- Need minimum national biosecurity standards. [*NCCID Note:* National Swine Farm-Level Biosecurity Standard *has recently been published by the Canadian Swine Health Board. Visit http://www.swinehealth.ca/CSHB_Biosecurity_StandardE.pdf for more information. Implementation of these strategies has been initiated*.]
- Promote on-farm food safety and worker health (e.g., encourage vaccination, access to laundry facilities in the barns), education (e.g., ESL) and training programs (e.g., costs of shortcuts); use peer messaging; develop online self assessment tools for producers. Perhaps NCCID could champion this strategy.
- Certify those who are in compliance with rules/regulations.
- Reward workers embracing PPM (e.g., financial bonuses, profit-sharing).
- Monitor worker activities to encourage compliance (e.g., video cameras by washing facilities).
- Improve social conditions of the workers (i.e., determinents of health are important to feel empowered).
- Charge higher insurance premiums to farms with no obvious PPM in place.

5.3 Plenary Report Re Epidemiology Link/Biomonitoring from Breakout Group Three

- Link the level of biosecurity "strictness" to match risk (e.g. with increased human illness you increase PPM - hasn't worked in other countries). Routine vs. increased/enhanced biosecurity requires clear definitions.
- Enhance current industry guidelines (these already exist to deal with endemic diseases) to address human illness/risk.
- Prepare contingency plans in the event of severe human illness with possible link to swine
  - Trigger: human health OR animal health;
  - Result: increased biosecurity;
  - Requires: standardized definitions, diagnostics, reporting.
- Develop, implement and evaluate an effective communication plan.
- Examine a national swine surveillance system in relation to human surveillance systems
  - Develop ability for comparative diagnostics (beyond general PPM issues);
  - Needs to be linked to a decision – a priori analysis and decision rules to link to increased biosecurity.
- Pay sick workers to stay home.
- Assess global intelligence (e.g. events in other countries) to help assess need for increased biosecurity.
- NCCID can:
  - Develop a position paper on what the human surveillance systems would have to look like in order to act as an effective trigger: focus on linking human illness to swine operations; address what a system with national/interjurisdictional scope would look like; sustainability of the system; and how this is linked to swine industry (e.g. spatial, occupational issues);
  - Prepare a retrospective evaluation of previous initiatives (e.g., Walkerton) to develop lessons learned (e.g., could we have predicted events?);
  - Lobby to have public health system help subsidize costs of enhanced biosecurity.

6. Next Steps

Margaret Fast summarized the day's activities, highlighted some recurring themes and detailed next steps for NCCID. She noted that NCCID now has a significant number of excellent suggestions to explore and to move forward on the project. Margaret stated that draft workshop proceedings would be made available within 3-4 weeks of the workshop. Participants were asked to ensure the proceedings accurately summarized the discussions from the day. There would also be opportunity for participants to include ideas that were not raised at the workshop. Following receipt of the draft workshop proceedings, NCCID would also conduct follow up telephone interviews with participants to capture any additional thoughts, ideas or advice. Margaret also stated that the Centre would provide participants with a timely update (~ 6-9 months) on the status of advice that came out of the workshop.

A "roundtable" of "parting thoughts" from participants included the following:

- The meeting was "excellent" "very productive" "almost overwhelming" "addressed several complex issues" and "has been left in good hands" so that outputs from the day will not be lost or forgotten.
- The follow-up from the workshop will be critical to the ongoing success of the exercise and will be closely watched by participants as well as individuals who could not make the workshop.
- Follow up meetings should be considered but with broader stakeholder representation.
- Many participants saw the workshop as an excellent start to ongoing but broadened collaboration and trust building and thanked NCCID for a great job in "getting the ball rolling".

7. Closing Remarks

Dr. Fast thanked the presenters and participants for their hard work, enthusiasm and insightful advice and said that it was her hope that this workshop was the beginning of long-term dialogue and collaboration on this important topic. She thanked Alina Cameron for taking the workshop notes, and the NCCID staff for their excellent work in organizing the workshop.

Appendix 1 – List of Participants

Organization	First Name	Last Name	Title
B.C. Ministry of Agriculture and Lands	Jane	Pritchard	Deputy Chief Veterinary Officer
CFIA, National Centres for Animal Disease	Soren	Alexandersen	Executive Director
CFIA - Animal Health Programs - Western	Lynn	Bates	Veterinary Program Officer
Centre for Coastal Health	Craig	Stephen	Director
Direction de la santé animale et de l'inspection des viandes Direction générale de l'Alimentation	Michel	Major	médecin vétérinaire en chef
International Centre for Infectious Diseases	Wendy	Schettler	Director, Public Health Programs
Manitoba Agriculture, Food and Rural Initiatives	Chris	Green	Epidemiologist
	Tim	Pasma	Disease Control Veterinarian
	Wayne	Lees	Chief Veterinary Officer
Manitoba Health, Public Health and Primary Health Care Division	Susan	Roberecki	Medical Lead - Environmental Health
National Collaborating Centre for Infectious Diseases (NCCID)	Allan	Ronald	Senior Scientific Advisor
	Elsabé	du Plessis	Project Manager
	Eve	Cheuk	Project Manager
	Kelly	Bunzeluk	Project Manager
	Margaret	Fast	Scientific Director
	Stacie	Ross	Project Officer
New Brunswick Department of Agriculture and Aquaculture	Kevin	Budd	Field Veterinarian
Ontario Ministry of Agriculture, Food and Rural Affairs	Bruce	McNab	Veterinary Epidemiologist Lead Veterinarian – Planning and Preparedness
Saskatchewan Ministry of Agriculture	Wendy	Wilkins	Disease Surveillance Veterinarian
South Eastman Regional Health Authority	Jan	Roberts	MOH
Université de Montréal, Faculté de médecine vétérinaire	Carl	Gagnon	Associate Professor
	Donald	Tremblay	Laboratory Supervisor
University of Guelph, Ontario Veterinary College	Lee Virginia	Wisener	
	Jan	Sargeant	Director, Centre for Public Health and Zoonoses
	Victoria	Ng	Post-Doctoral Fellow Centre for Public Health and Zoonoses
	Zvonimir	Poljak	Assistant Professor
University of Manitoba	Richard	Rusk	

Appendix 2 – Workshop Agenda

Strategies for Preventing and Mitigating Influenza in Canada through the One Health Approach
April 20, 2011

Inn at the Forks, Winnipeg
Second Floor, The Forks Ballroom West
8:00 am – 4:30 pm

Consultation Objectives

- Define the scope of activities for the One Health approach to preventing and managing influenza in Canada
- Identify and prioritize challenges of implementing the One Health approach to preventing and managing influenza, with initial focus on swine surveillance and primary prevention measures on swine farms
- Identify and discuss strategies to overcome these challenges
- Identify next steps for human and animal public health in moving forward the One Health approach
- Identify next steps for NCCID to facilitate the One Health movement in Canada

Consultation Agenda

7:00 – 8:00	Breakfast	
8:00 – 8:15	Welcome remarks and introduction • Project overview • Consultation objectives	Margaret Fast
The One Health Movement		
8:15 – 8:45	Presentation: *Implementing One Health* Q&A	Craig Stephen
Swine Surveillance		
8:45 – 9:15	Presentation: *pH1N1 2009: Swine surveillance for public health planning* Q&A	Lee Virginia Wisener
9:15 – 10:00	Breakout 1a: Challenges • What do we want to achieve through a One Health influenza prevention and management program in Canada? • What are the elements of an efficient influenza prevention and management program? • How does swine surveillance fit into the overall One Health program in influenza prevention and management? • What are the challenges with implementing swine surveillance as part of the One Health approach?	All

10:00 – 10:30	Report back	All
10:30 – 10:45	Break	
10:45 – 11:15	Breakout 1b: Ways to overcome challenges • What are some strategies to overcome these challenges? • How can these strategies be implemented and evaluated?	All
11:15 – 11:45	Breakout 1c: Partnerships and future directions • What are some examples of linkages/partnerships between human and animal public health at the local, provincial and national levels? • What are other possible synergies between human and animal public health? • What are the next steps for human and animal public health with regard to swine surveillance? • What are some specific gaps in swine surveillance that NCCID can help fill?	All
11:45 – 12:15	Report back	All
12:15 – 1:00	Lunch	
Primary Prevention Measures (PPM) on Swine Farms		
1:00 – 1:30	Presentation: *Swine farms and lessons from H1N1 pandemic: Challenges and obstacles* Q&A	Donald Tremblay
1:30 – 2:00	Breakout 2a: Challenges • How do PPM on swine farms fit into the One Health influenza control program? • What are the challenges with implementing PPM on swine farms as part of the One Health approach?	All
2:00 – 2:30	Report back	All
2:30 – 2:45	Break	
2:45 – 3:15	Breakout 2b: Ways to overcome challenges • What are some strategies to overcome these challenges? • How can these strategies be implemented and evaluated?	All
3:15 – 3:45	Breakout 2c: Partnerships and future directions • What are some examples of linkages/partnerships between human and animal public health at the local, provincial and national levels? • What are other possible synergies between human and animal public health? • What are the next steps for human and animal public health with regard to PPM? • What are some specific gaps in PPM that NCCID can help fill?	All
3:45 – 4:15	Report back	All
4:15 – 4:30	Wrap-up and next steps • What are the next steps for human and animal public health? How can NCCID help in the process? • What are some specific roles that NCCID can play?	Margaret Fast / All

Appendix 3 – Additional Comments Provided by Participants Following the Workshop

I still don't feel I've received the answers to the questions I've asked

1. What is the economic burden of influenza in the swine industry in Canada?
2. What is the statistical probability (per decade?) of a new pandemic human influenza strain emerging in Canada based on reasonable assumptions and modelling studies?

Without some answers to these two questions, I still wonder if this doesn't primarily remain an area requiring excellent epidemiologic research rather than becoming an action item for public health or veterinary knowledge translation.

Allan Ronald

Given the emphasis on the recognition that inclusion of the swine industry is critical I think that it is very important that the key informant interviews planned for the near future include the major pork producer groups representing the 3 main pork producing provinces and the national body.
(i.e., Canadian Pork Council (CPC), Ontario Pork, Manitoba Pork Council**,** Quebec Pork Producers Federation)
This list is probably not exhaustive and should be explored for other potential participants.

I also think including some interviewees in regional and provincial laboratories would be helpful to enhance the understanding of laboratory constrains to surveillance of swine-origin influenza.

Lee Wisener

The one thought I had in my mind was that as a group, we came up with a very comprehensive list of what our next steps should be in terms of pushing the One Health agenda forward, however, none of these steps can really be implemented if we can't overcome one of the biggest challenges that we identified - which was/is - trust between key industry players and the researchers/managers/policy-makers. The concept of "building trust" came up many times over the day and in this report and I have a feeling this is where most of the work has to be done to push the One Health agenda forward (none of the other points that we identified can really be executed otherwise). It is easy to list the ways we can overcome this challenge, but to actually implement them may be a much larger hurdle. That said, I am really hopeful that the NCCID may have the negotiating power to be able to bring the different groups together, it is going to be a challenging goal, but it is good to see the NCCID working on this and building on what I felt was a very useful meeting and a solid foundation to put our suggestions into action.

Victoria Ng

It is not only sequencing of viruses that would be important for monitoring of influenza, but also experimental studies to evaluate pathogenicity or address other specific questions (e.g. antigenic maps).

Zvonimir Poljak

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pH1N1 Surveillance and Control at the Human/Animal Interface
Are the Benefits Worth the Costs?

Prepared by Dr. Chris Green, CVO/Food Safety, MAFRI
June 14, 2011

There appear to be few if any circumstances where surveilling and implementing control measures for pH1N1 (or other influenzas) at the human/animal (swine) interface would actually protect human public health by either preventing/slowing the spread to humans or diminishing human morbidity. The major reasons for this are:

- once pH1N1 enters and becomes established in the human population the major form of spread is human to human, with swine to human spread becoming negligibly small over time
- the window for effective detection, confirmation, and prevention of viral transmission at the human animal interface is so short that by the time it is recognized that a recombinant influenza virus dangerous to humans is being transmitted from swine to humans, the virus is already out of the barn and circulating in the human population

Given that public health has limited resources to allocate to surveillance and disease prevention in the best of times, it is critical to work through possible scenarios to determine if the opportunity cost of allocating resources to detecting and preventing pH1N1 transmission at the human/animal interface would be worth it under any circumstances.
Five possible scenarios are described below:

Scenario 1: pH1N1 ***develops spontaneously*** **in a swine herd through recombinant processes** in Manitoba and spreads to the human population before it is detected as being a serious problem in humans and confirmed as related to swine exposure. Within several weeks, as the pH1N1 accelerates its spread throughout the human population through human/human contact, swine/human contact is adding very little proportionately to overall spread. The result would be that swine contact would no longer be predictive of potential exposure as it might have been at the beginning of the outbreak. This is similar to how recent travel to Mexico was only predictive of potential pH1H1 exposure in the first several weeks of the pH1N1 outbreak.

In this case, surveillance and control of pH1N1 at the human/swine interface would not provide significant protection to humans as the major transmission dynamic is human/human.

Scenario 2: pH1N1 is ***introduced into a swine herd through fomites or other exposures*** and spreads to humans. As in scenario 1 above, within several weeks swine/human contact would be adding very little proportionately to overall spread of pH1N1 and swine contact would not be a significant predictor of potential exposure. Surveillance and control of pH1N1 at the human/swine interface in this case would not be useful in protecting human health since the vast majority of transmission would be occurring between humans.

Scenario 3: pH1N1 is **introduced into a swine herd by humans**. This would mean that the virus is already circulating and becoming established in the human population, thereby rendering negligible the proportion of disease transmission attributable to human/swine exposure. Taking action at the human/swine interface would do little to prevent spread at the population level.

Scenario 4: ***a pH1N1 like virus causing serious morbidity in humans which transmits primarily between swine and humans*** (i.e. limited or no spread between humans) emerges in Manitoba swine herds. In this case, the virus would have very limited impact on the health of the human population because its effects would be restricted to exposed swine workers. Swine workers make up a very small proportion of the population (n=3500), and there would be limited/no transmission between swine workers and the general population.

In this case, surveillance and control at the human/swine interface could be important to protect the health of swine workers.

Scenario 5: ***a PH1N1 virus causes mild morbidity in humans which transmits only between swine and humans*** emerges in Manitoba swine herds. In this case, the virus would have a very limited health impact on swine workers (mild illness) and negligible/non impact on the health of the general population.

In this case, surveillance and control at the human/swine interface might be effective in preventing mild illness in the swine worker population.

With the exception of scenario 4 (pH1N1 causing serious morbidity in humans, but with only swine/human transmission occurring), an unlikely scenario, it does not appear that allocating surveillance and control resources proactively (in advance of an outbreak) or reactively (after the outbreak has been detected) for pH1N1 at the human/swine interface would have a positive impact on human health that could be justified given the associated costs. Since the window for detection and response is likely too short for even established surveillance and control systems set up in advance to prevent the virus from leaving the barn, their cost/benefit ratio does not appear attractive. Surveillance and control systems set up after an outbreak has begun would have even less chance of preventing spread to humans.

Given that the cost of implementing an on-going surveillance and control system for pH1N1 or other influenzas at the human/swine interface is likely very high (i.e. the cost of continuous monitoring and surveillance of 3500 swine workers, or a statistically robust sample), with apparent marginal benefits for human health, this activity appears to represent a large opportunity cost for public health which could preclude more valuable surveillance/control efforts at the human/animal interface.

Appendix 4 – Surveillance Breakout Group Templates

Swine Surveillance:
Its Role in the One Health Approach to
Prevention and Management of Influenza

Breakout Group 1

Breakout Session 1b – Ways to overcome challenges

- Group felt that trust was overarching and both challenges were discussed as related themes due to lack of trust.
- Lack of trust was seen as occurring at all levels and based on 'not knowing'. Different agencies/organizations/disciplines have different ways of looking at things. Industry might not trust health because they fear that human health will exaggerate threats and are unsure of what the outcome of projects/programs may be. There is also little consideration for the economic impact of health programs.
- For other partners and agencies it could relate to the loss of control over the data or message.

Challenge #1 : Trust: no explicit understanding of everyone's views, roles, outcomes
What are some strategies to overcome this challenge?
Strategies to build trust (trust in evidence based recommendations, trust in what people are going to do with the information) • Identify a common interest that is widely shared • Establishing a network (and keep it going). Create opportunities for dialogue, getting on the same page. Recognize that it is a slow process. • For example working groups that meet regularly- helps to get to know people • Features of network: o Get to know individuals and their perspectives and agendas. Be clear – on expectations, outcomes, and communication. Make sure everyone is on the same page – different disciplines have different views. o Setting goals together and working together to make it work. o Share perspectives and needs o Ongoing o Representation of all interest groups. Make sure to involve key leaders from every area. Start small, from the ground up: regional, know the players. o Right level of organization of network o Early involvement o 'cross fertilize' – need a 'linker' across interests (and groups) o High level buy in - adds to the view of importance o Adequate time o Realize every organization has a different culture and works at different speed- be mindful and respectful of that. o Needs to be at all levels: local regional and national meetings. Network of back and forth. o Transparency

Action Plan

- Do a "situation assessment" – find out who is out there and what are they doing.
- Identify common interest that is widely shared and keep network going. Can start with producer's networks – economic importance for producers and working with veterinarians to respond to their needs as well as health.
- Need money - Asking producers to pay for surveillance if it's a public health issue can be problematic.
- Need leadership and structure to support the network (Whose responsibility is it?)
    - Structure needs to be seen as valid
    - Trust will be started here. Will vary across provinces
- In a federal system – the federal government/agencies have to set the agenda.
    - getting people to talk to each other – feds should make this work
    - Ag + Agrifood Canada has the money
    - PHAC coordinate
- Need to overcome fear – that there will be proper management, that it will be worthwhile for pig farmer.
- Work with other governments
- Need to make case/argument that its important to human health

How can these strategies be implemented and evaluated (i.e. indicators)?

- Key players need to have a shared vision and understanding
    - Identify key players and identify the end goal
    - Common understanding of key goal
    - Need to understand the importance of this (advocacy) and have a shared vision and understanding
    - Identify benefits for each key player, education.
    - Clear roles, terms of references. Whose responsibility is the 'response'?
    - Shared tangible outcomes

- Find out who the key players are- occupational, human health, etc. And what other work is going on.
    - Work has already started, federal working group of CMOH and CVO. Terms of references and goals. Not part of anything, doesn't have resources, think tank. H1N1 work, momentum decreasing but can build on what groups started. Diffuse, not well organized.
        - Build on existing networks/work – momentum is gone.
- private organizations (e.g. McCain)
- Start with demonstration project (proof of concept) in one province to see how it would work – build relations, see how it works, evidence that it works. . Federally led from the start. Work with provincial swine producers, e.g. Manitoba pork producers. Mindful that provinces are different, things will work different in different provinces/territories.
- Making connections with EU and USDA, other groups.

Challenge #2 : Structure and leadership model to move these
What are some strategies to overcome this challenge?
• Needs to be seen by everyone as valuable, legitimate and accessible. How do you structure it so everyone feels they have a stake in it? Creating a national framework that is similar in all provinces (e.g. involvement of agriculture in MB but not in other provinces) • Has to begin with the federal system – getting people to talk, work together and make it work. Direction has to come from Health Canada to CFIA and others. Public health needs to advise animal side. • PHAC wild bird surveillance with partners. • Money is at Agrifood (not CFIA). Can't expect swine industry to make swine flu their 'own' but they have the resources.
How can these strategies be implemented and evaluated (i.e. indicators)?

Breakout Session 1c – Partnerships and future directions

1.	What are some examples of existing linkages/partnerships between human and animal public health at the local, provincial and national levels?
	• CMOH and CVO federal working group • Quebec – Salmonella enteritidis (SE), industry involved. Province and CFIA, testing done in provincial lab. Why it works: SE outbreak in eggs – pressure on industry, ministry wanted to put labels on eggs which provided impetus for producers to participate in surveillance program. High concern. Found out what the real prevalence of the disease is. Ministry sets money aside to help producers. Eggs are sent to pasteurization, clear out farm and repopulate. Surveillance planning done with epidemiologists. Shared concern across sectors, market concern and public health concern. Helps to proceed on biosecurity. Evaluate the program to see how it works • West Nile (federal group, coordinated by PHAC). Why did it work: lots of changes to talk to people, everyone thought it was important. Fear. • Brucellosis and tuberculosis. Long terms engagement, 1940's and 1950's. One of the main successes in Canada. Strong political commitment. Benefit to industry (cattle trade), public health.
2.	What are other possible synergies between human and animal public health?
3.	What are the next steps for human and animal public health with regard to swine surveillance? How can NCCID help in the process?

4.	What are some specific gaps in swine surveillance that NCCID can help fill?
	• Explore current structure and efforts, identify structure gaps and common vision • Inventory on who is doing what, resources, existing structure - gaps in authority, sustainability knowledge • Advocacy for whole-government approach – CFIA has limited mandate • Clarification on who "owns" zoonotic diseases and related public health efforts • Identify stakeholders, what their mandates are, and then identify unifying mandate

Breakout Group 2

Breakout Session 1b – Ways to overcome challenges

Challenge #1 : Trust and Uncertainty about outcomes
What are some strategies to overcome this challenge?
Focusing on the producer and veterinarian. Need industry leadership – associations look to industry for leadership. Packing industry has problems. Trust issues go both ways – human health assumes people in industry are hiding things. Animal health and public health don't trust each other all the time. Public Health doctors primarily have these trust issues. In government, there is a culture of mistrust of industry throughout public health on the human health side. Broader mistrust in the broader population re: global resistance, there is a lack of understanding by public health officials. Are they telling us stuff which would impact us? You are not telling us about stuff when you find it so we don't trust you. The human health folks think that animal health folks overreact, and animal health thinks human health under react. If a human health official closes a school, you affect a few thousand people. If a veterinary official closes a farm, we've interrupted an entire market. We've identified the problem, how do we overcome that? Need to go upstream into education and this is on the human and agricultural side. Why is important to do these things and take these steps. This is the way agriculture works… we understand how you do it but, we are hesitant because it is a bigger deal. Medical training varies and does not necessarily inform animal health training. The repercussions of those systems are important and the need to understand those systems is needed. A phased approach. We need a database or a surveillance system that will provide information about long term trends and building information around that. Once trust is established, you can move into more ambitious goals. Let's develop models that support common data. Animal Health folks don't tell the PH folks where an outbreak is because that's confidential and vice versa. How do we pull together and share that information. One World, One Health - a creation like this would provide an entity for both sides to report to. Common shared data information that is secure and legal. Groups want to share information but because of privacy issues we can't. We'd like to have a forum to do so.

We need to use a carrot approach. We need to provide a value to people who are going to contribute to the database. “Here is the situation in Canada and here are the current vaccines.” This would go a long way in getting more viruses to be sequenced. Notifying PH about confidential issues “personal care homes did not divulge information regarding disease breakouts,” It was noted that if you are not identifying outbreaks frequently, then a proper job is not being done as there is likely to be a lot of them.

Same with animals. Show the value to your business and beyond the value to your business, and this has to be done publicly. There has to be value for all participants. If the business doesn’t get any value then whomever benefits should have to bear costs. If you call veterinarians - tests, typing , sequencing...There are many hurdles to be crossed to get to the samples tested and then there are also legal barriers to get all of the testing done and then you have to have legal authority to share the test results. If it is for the Public good – public should pay. Private good, private pays.

It could be a question of coordinating groups with government and industry who can meet and discuss the issues. If meetings reap rewards like healthy herds, then it will be more palatable to industry.

If you have a cross sectional study but no money and no tools to implement, then it is a question of what comes first because they need/have to come at the same time.

Communication – usually easier to communicate about a specific topic then broad topics. Even coming to a meeting. Farmers, producer , veterinarians, it is hard because of time and funding. Carrots approach works. Framework – educate, create an environment that is safe, address economics, enticement or enforcement might be needed. And evaluation, you always have to include evaluation and it should be built in or it is difficult to do.

Surveillance definition is “to communicate results to whoever needs to know.” We have to think about who needs to know. We have surveillance for influenza in place. Do we have to provide information to government bodies and industry? If we are going to have surveillance then we should complete the surveillance loop and provide information back to these bodies.

Any other way to overcome mistrust once we’ve created a safe house?

Looking at Science and Technology, and Health. Even in government they don’t talk. Is there any way that departments within their own government can get on the same page so that each department has a coordinated message that they are bringing out. Do we need some sort of a common policy? Coordination? A barrier is this inconsistency, Minister of Environment will say close the windows, Minister of? Will say open the window.

Saskatchewan had the novel H1N1 assorted virus that was investigated. Minister of Health and the Minister of Agriculture participated and they were consistent. One spokesperson for each communicated and nobody was getting mixed messages. We’d rather have the whole body doing things.

We need mechanisms to present to all key players and everybody needs to buy into it. We need doctors and vets to tell us what the good information is to share. For vets, associations would be a good forum. CVO’s get together once a year to talk about stuff. Is there an opportunity for medical and veterinary associations to hold a joint conference?

Other associations, swine producers. A good start would be to get the two professions together. MHO has met with veterinarians. MMA would be a good connection. We need industry in, the question is when? Strategically, it is important to get the health and vet communities talking at the higher levels. A target specific shared meeting. What about at the educational level?

Do docs ever talk to vet students? Do vets ever talk to doc students? Educational aspect/The Calgary Veterinary college. Has a successful model. They really are integrating human public health into veterinary medicine. 99 percent of our population lives in urban centres and they don't have a clue about what goes into an egg or milk?

In Quebec is there is educational component for zoonoses? We have groups talking together. It does not go to the students. Maybe it will.

How can these strategies be implemented and evaluated (i.e. indicators)?

Challenge #2 : Framework/leadership/structure.

What are some strategies to overcome this challenge?

How do we create the right structure to do this? We do have shared jurisdictions. Is that true in animal health as well? For federally reportable diseases, but for just about everything else, it is provincial responsibility. In an outbreak, feds take the lead and provincial orgs support it. It was probably identified at the provincial level though. Once confirmed, zones, responses, are pulled together – staff from across the country. We don't have the support in Ontario. What if it is not reportable? It is not clear what to do.

Emerging diseases are not on the list. We have emerging list, what if it is not on that list, we have no authority to ask third parties for information. There is a gap for many zoonotics and some are, and are not reportable. There are different levels of reporting because government is worried about burdening industry. If there are labs that track and upload notifiable disease reportings, and if the information can be monitored and shared legally, then that would be very helpful.

How do we overcome no national home for diseases that are not notifiable. Encourage or make mandatory. Canadian Animal Health Surveillance Network includes uploading animal health files in an effort to pool data in one place so we know what is going on. Legally, it's easier with the pilot to do the concept and structure to be able to pull that data from provincial labs to identify trends.

CNPHI is supposed to be able to look at trends but is used more as an alert. Public health laboratory, human health testing is sent to the provincial level and then some goes to the national level. How would somebody in NS know what is happening in AB. If you subscribed to CNPHI, you would be alerted to that.

Syndromic surveillance is not working – not in place. It has the capacity but is not being used. We have had some attempts at these systems but they're not fully integrated. A recent attempt at a summary of swine H1N1 data and to have it formatted in a palatable way for everybody involved came up against a lot of resistance and the data was rendered useless. Quebec data is good and it looks like they are

worse off when in fact it is because they are doing more.

Who leads? PH, Animal health, human health. The Prime Minister. You have three different ministers? How do you create a new agency? Do we create some other framework? If it is a government agency, it would not be neutral. Government has to be the catalyst. Government has to provide that leadership. If you use the lab in Winnipeg as an example. What is the intent – do the labs communicate. Do we need to expand the PHAC to include animals – in the acronym?

They could readily share but there is so much legality in who owns data and who can share and how do we legalize data?

It would be a phenomenal place to start at the provincial, laboratory level and work at these issues.

Could we learn from other countries? How do they do it? In the states, there were two people given authority in a recent crisis and it worked. When government organizations get involved things fall apart. The Prime Minister has to answer the questions and people don't know or care who exactly was at fault. How do we come up with policy that is driven from the bottom up that will get the job done?

If we were going to recommend something that the NCC could do "We need this to happen".

What about this CCHWC model? Could we use this? Can we clone TED? It is his personal strength at getting people to work together.

Health and Agriculture are the key players. Minister of Health and Minister of Agriculture should create a task force. Essentially one world, one health in MB is a good model for a **think tank neutral centre** – an information clearing house that synthesizes objective information, and collate and distribute messages to various departments without judgement. Puppeteering them from behind the scenes would be a fantastic idea, but how do we make that happen.

The decision has to be at the ministerial level to do it but then we need the provincial officers to keep it going. Do we go to David and Brian or the health minister? If we talked to Brian Evans, he would be all over this but we don't know if he has any influence over the minister?

It would be thrown out if it was identified at costing huge dollars. How do we get at least to the deputy minister? There has to be political will. If you don't do this, this terrible thing will happen (some disease). The proportion of voters from agriculture is small and they get trumped. Important to not pit industry against each other. Brian Evans and David Butler Jones somehow need to take money they have and create this safe environment, they obtain buy-in.

We agree that it is a high level decision but need an approach. Brian and David might be able start something. There is better sustainability at a senior bureaucratic level. It may be sustainable but for how long? We aren't sure how to do this. We need a high level approach for buy in and we need examples. We need to think about what we are recommending. Since MB has a model, we can look at that and we need to identify the benefit. What issues would public health like to see out of a surveillance system? We do zoonotic surveillance for pathogens but to surveillance for all zoonotic pathogens and catch these things that have a huge economic impact, this economic impact will influence higher level bodies. It is hard to show the value if it is something unknown. If you start with "influenza" then it is easier to demonstrate the value of your system because it is known.

If we had a system that was monitoring H1N1 then it may show that pathogens are not there very often. This is economically advantageous because the surveillance can show what isn't there as well and this is a benefit.

CIPARS
CNPHI
CAHSN – used the same structure and engineer as CNPHI. Has it been able to get by whatever is holding CNPI back? It is reporting to CFIA but there is not much value coming back to the provinces. It keeps coming back to benefit to all.
Provinces and Territories feed up the federal agencies. We need a revolving communication and can we create a common set of analyses tools for instance, so he doesn't have to create a whole bunch if we have a similar format, we can create and share tools. These have been truncated initiatives. They have not been developed the way they should have been. A couple of billion dollars will be spent on Panorama. Animal health people choke at the money being spent.
C-enternet – looks at enteric viruses from food. Can anybody see that or see the report?
CVO/CMOH meeting annually coordinated by the two secretariats.
Sub committees report to CVO's and there is some dialogue but it is limited and there is no funding. It happens because we like each other and know each other. It's bad when you know everybody by voice – the group is so small.
Examples on the diagnostic side?

CAHLN – Canadian Animal health Laboratories Network.

What can NCCID do?
Initiate dialogue
We are not practicing MOH, no veterinarians. We have no biases, other than writing a paper in collaborating. Synthesizing information – we'd have to think what? Arranging a meeting with DBJ and Brian Evans?
Another meeting?
Who else should be here and target higher level people to get this ball rolling. In addition to building momentum of the One Health movement in Canada, effort/attention must be spent to promote the uptake of the One Health approach. Is NCCID the right group to talk to DBJ or Brian Evans. Suggest you write a paper and add weight to the argument for creating a framework. Include organizations that would be involved and present to the two chiefs as the message from these diverse groups being taken to them by NCCID.

The academia here has access to sequencing information. WE can do a lot of work between animal and people surveillance and address questions.

How can these strategies be implemented and evaluated (i.e. indicators)?

Breakout Session 1c – Partnerships and future directions

1.	What are some examples of existing linkages/partnerships between human and animal public health at the local, provincial and national levels?
2.	What are other possible synergies between human and animal public health?
3.	What are the next steps for human and animal public health with regard to swine surveillance? How can NCCID help in the process?
4.	What are some specific gaps in swine surveillance that NCCID can help fill?

Breakout Group 3

Breakout Session 1b – Ways to overcome challenges

Challenge #1 : Trust and uncertainty about action to outcome
What are some strategies to overcome this challenge?

• Promote the use of pilot projects (around the broader One Health issue) to figure out how to work together
  ○ Start to "play together"
  ○ Among government groups and between government groups and other stakeholders
  ○ Start with the small projects, so you get to know each other and learn how to work together in crises
  ○ Clearly define issues
  ○ Scope project down to achievable pieces (defines "win-win")
  ○ Involve all levels – need to build trust at the bottom
  ○ Identify "what's in it for me" for all the groups
• Swine surveillance without cost to industry
  ○ If it's a PH issue, PH should be responsible
• Surveillance without penalty to industry
• Ensure industry of anonymity
  ○ Third-party management of surveillance, like traceability systems (non-government – managed by industry or company vets)
• Support sick leave for workers
• Communicate/define direct and indirect advantages (to industry)
  ○ Creates empirical knowledge base to demonstrate when they aren't implicated – this builds trust with industry

- Create inventory of lessons learned from existing initiatives

How can these strategies be implemented and evaluated (i.e. indicators)?

Pilot Project

- Start regionally – challenge a particular region(s) to try it
- Some provinces are already trying it (Quebec) – learn from their challenges and initiatives
    - Create inventory of lessons learned from existing initiatives
- Clearly identify objective of this surveillance
- Evaluation built in from the beginning
    - Robust list of lessons learned through pilot project
    - Create "checklist" of what new projects need to be aware of
    - Compliance (as an evaluation method)
- Make it clear that it's "integrated" surveillance, around the broader PH issue (not just swine)
- Eventually build toward federal

Challenge #2 : Need for framework/leadership/structure

What are some strategies to overcome this challenge?

- Identify champions
    - From multiple jurisdictions
    - Multiple actors
- Need one champion/group to bring it all together – "alpha champion"
- Ensure vision remains in the forefront (leadership vs. management)
    - Don't get sucked into the details of how to work together
    - Keep the big picture in mind
- Learn from and adapt good international examples (e.g. CDC APHIS for influenza surveillance)
- Human public health to assume some (or all) of the responsibility (and cost) for swine/animal surveillance
    - Industry already takes care of the production-limiting factors
    - If the purpose is to ensure public health, they need they take charge (resources)
- Recognize the indirect benefit (i.e. if surveillance shows that swine farms aren't the problem, it can be their benefit)

How can these strategies be implemented and evaluated (i.e. indicators)?

Breakout Session 1c – Partnerships and future directions

1. What are some examples of existing linkages/partnerships between human and animal public health at the local, provincial and national levels?

- BC - BCCDC , agriculture, and wildlife partner on surveillance West Nile, Salmonella, AMR, and annual zoonotic conference
    - Force collaboration on 3 influenza outbreaks, 1 non-anaplasma, 1 non-TB*
- NB – Agriculture, health, natural resources for rabies
- MB – avian influenza response protocol - CVO, emergency measures, federal workplace safety

	and health, CFIA, health, poultry boards* • BC – health and local health authorities on food (agriculture isn't responsible for food) • CAHSN – animal health surveillance • CSCHAH – lab in Winnipeg* • CCWHC – wildlife health centre • CAHN – CA animal health • CNPHI – human data • MAPAQ – subtype diagnostic for influenza virus (animal, except human)* • MAPAQ – funds research at vet school for leptospirosis • NSERC research chair (QC) – funded by provincial industry association, NSERC,____ - Salmonella • C'Enternet – pilot site testing of animals and humans and environment • CIPARS – AMR on-farm, abattoir, production (?) • Joint risk assessment between PHAC and CFIA on pandemic risk – with external consultations* • Federal pilot on Trichinella surveillance – and many other disease examples (West Nile, etc.) • There are many examples of connections/collaboration at local levels – most of which we probably don't know about * Relevant to influenza
2.	What are other possible synergies between human and animal public health?
3.	What are the next steps for human and animal public health with regard to swine surveillance? How can NCCID help in the process?
4.	What are some specific gaps in swine surveillance that NCCID can help fill?

	• Facilitate a pilot project
	  ○ Provide resources for the evaluation
	• National process to put a "spotlight" on the surveillance pilot project
	• Build trust – stakeholder meetings to address trust issue - third party to bring together stakeholders
	  ○ Work out issues of anonymity, outcomes, etc.
	• Facilitate discussion – definition, outcomes, aims, needs, etc. of surveillance
	  ○ Expansion of a meeting of this type
	• Find or be the "alpha-champion"
	• Provide $$

Appendix 5 – PPM Breakout Group Templates

Primary Prevention on Swine Farms: Its Role in the One Health Approach to Prevention and Management of Influenza

Breakout Group 1

Breakout Session 2a – Challenges

1.	How do primary prevention measures (PPM) on swine farms fit into the One Health approach to controlling influenza? What are the objectives of swine farm PPM in One Health?
	• PPM- biosecurity? Or healthy herd as well? Prevention activities on farm
2.	**What are the challenges with implementing PPM on swine farms as part of the One Health approach?** (e.g. logistical, jurisdictional, human resources and training, reporting infrastructure etc.)

Breakout Session 2b – Ways to overcome challenges

Challenge #1 : Evidence: gathering, generating, standardizing communication
What are some strategies to overcome this challenge?
Need to balance creating standardized practices with recommended practices adaptable to different situations. <u>Knowledge Creation</u> Need to conduct gap analysis: what are the best practices for transmission interruption (probably including other species, particularly avian)? What are the cost-benefits of the different practices? Look not only at literature, but also at practice (interviews with people, grey literature). Some issues to consider: • Has to be appropriate for the situation • Is infection control enough for reducing influenza rates? • Lack of evidence – some groups doing work, what is quality of data? • Some areas have a lot of research/evidence, others not. Not all observational studies or trials- some mathematical modelling articles. • Are there evaluations of programs that worked? • Need to have knowledge-to-action research. Also need to advocate for CIHR Funding for this topic (animal health research is mostly funded through NSERC). <u>Knowledge translation</u> • Create knowledge products to disseminate evidence to industry, workers, public health – ensure pieces are appropriate to audience. • All the information/evidence may all be available out there, but if it does it is fragmented and

needs pulling together.

- Advocacy for evidence-based medicine funding pot for swine
- Creating other venues and opportunities for people to share information.
- Need for pilot projects to illustrate effectiveness of practices.
- Transportable, generalizable results (for areas other than swine)
- Use existing sources of information –e.g. industry magazines- for dissemination

Engaging people

- In research –could provide tax benefits for participation in research.
- Practice-based research – finding out what farmers want to know and researching that.
- Engage producer groups - can support them in their research or facilitate gathering of best practices.
- For adopting evidence based practices – evaluation on site, marketing ('certifying' pork)
- NO one is pulling it all together across the country – only networking if you know the people. Key people (leaders, champions)on projects who have big social networks
- Post-doctoral fellowship is too short, need to be longer or retain after training as regular staff?
- Collaborative research, engaging people

How can these strategies be implemented and evaluated (i.e. indicators)?

Implementation

- Advocate for research funding: e.g. NSERC/CIHR collaborative health research program – highlight practical applications. Proactive.
- Creating partnerships, research consortiums to have the people/intellectual capacity to do the research.
- PHAC money to pay for networking, getting people together. Increased funding to have animal health component.

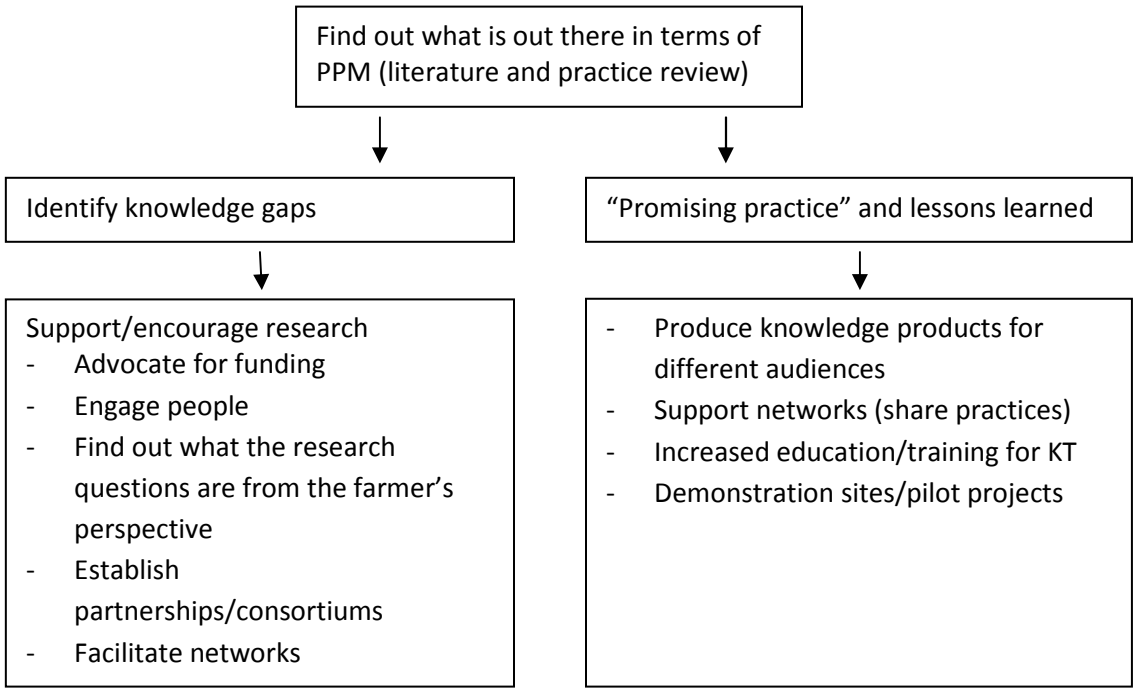
Evaluation

- Process – are we able to engage people?
- Changes in practices
- Track publications, behavioural changes, engagement

Breakout Session 2c – Partnerships and future directions

1.	What are some examples of existing linkages/partnerships between human and animal public health at the local, provincial and national levels?
	• NCCID consultation • Informal collaborations reaching out to vet schools and universities • Centre for Coastal Health • Manitoba zoonotic committee
2.	What are other possible synergies between human and animal public health?

3.	What are the next steps for human and animal public health with regard to PPM? How can NCCID help in the process?
4.	What are some specific gaps in PPM that NCCID can help fill?
	• Scoping review of current situation – what is the evidence for the effectiveness of biosecurity measures, review of literature and practice. Probably targeted towards influenza, but open to broader scope. • Pilot projects: involve both human and animal health. Question of scale – run for long enough, and at enough sites to have sufficient power. • Advocacy for funding for One Health research. • Training veterinary and agriculture community on KTE. Work with partners to incorporate into their work/courses already being taught. At CVME – session on knowledge translation for practitioners. • "Warehouse" for results, sponsor follow-ups. • Facilitate networks, getting success stories etc



General

- Situation of workers on pig farms – often immigrants, anti-vaccination, no benefits and no sick days, etc. Don't access services, don't even know if they have cold
- Also other workers – truckers, handlers….
- How does it impact the bottom line for producers? They aren't implementing influenza control programs unless it's impacting their herd, their livelihood.
- Adapting biosecurity measures to level of risk (at farm) - need for monitoring to know what that is.
- Tracking infection – was there connection with animals (or vice versa). Case follow up
- Link between animal and human surveillance/systems. If a serious case of influenza is detected, can it be linked to a specific swine farm or does patient live in a geographical area where there is a lot of pigs? This can serve as trigger for intensive surveillance or biosecurity measures. Not cost effective otherwise- always influenza in swine population (much like human population) that does not harm people or pigs.

Breakout Group 2

Breakout Session 2a – Challenges

1.	How do primary prevention measures (PPM) on swine farms fit into the One Health approach to controlling influenza? What are the objectives of swine farm PPM in One Health?
2.	**What are the challenges with implementing PPM on swine farms as part of the One Health approach?** (e.g. logistical, jurisdictional, human resources and training, reporting infrastructure etc.)

Breakout Session 2b – Ways to overcome challenges

Challenge #1 : Worker disempowerment/compliance - STACIE AFTERNOON SESSION
What are some strategies to overcome this challenge?
Lack of ESL education? These workers who are immigrants working at Maple Leaf – are there regulations governing the company? Some institutions must have some measures in place. Example - There is a temporary agricultural worker (fruit). We don't know if these are permanent residents in the swine industry or seasonal and this impacts disempowerment. Social benefits are few and far between for the immigrant worker. Can regulations be developed for a specific industry? Can they look at flexible policies – no sick time except in time of threat could policies be different? This could be difficult with small farms. If there are 3 ill employees out of ten – they will go back early. If illness is not severe and workers go back quickly, they may still transmit illness. In terms of contingency planning – can they focus on key activity areas? Is this possible with swine

farmers? No, many farms have only the bare essentials for their daily operation, and any material or human resources that are not used in practice or are not mandated by policy are perceived luxuries. They don't like outside workers who could also contaminate the herd. Single operator does not always have a contingency plan, i.e. Illness.

Is a contingency plan part of biosecurity protocol? No

Biosecurity protocols could keep track of how many workers they have and what they do in case of emergency. How do you compensate for workers who could become a part of contingency plan? Industry is developing a biosecurity plan.

CFIA has a national biosecurity group – but national standards would help a lot.

Do we have a form for self assessment? It is voluntary in Ontario. It should move to widespread adoption.

In Quebec there is a document written by INSPQ. It will also assist with information on how to manage your workers. (This document was mentioned by Donald Tremblay).

If training is not done in this sector, then we should be looking at other sectors and model successful training.

Also, an understanding between all workers. Some workers are unaware or ignore the implications of their actions when they ignore biosecurity protocols.

Change Management – has to be grassroots up. What are the community-based incentives to make change? Maybe even looking at meat packing plants –

The community is well aware of biosecurity principles but, not One Health. The challenge might be when you go to add on something else, a zoonotic disease, how do you do it? Educate the community to create buy-in. How does that translate to the worker? Could have financial incentives or bonus to the worker, i.e. profit-sharing.

How do we translate this to a system approach? i.e. governing activity of backdoor workers. These workers would need protocols to follow, as contracted to work, and working within the biosecurity plan. Would this call for a cultural shift?

Video-recording? Set up video cameras through shower facility. This is part of the audit but may not be empowering.

A study in pig barns looked at this and workers complied when in the presence of a visible camera. Camera can also be used for animal welfare purposes. Some slaughterhouses keep a video feed. Encouraging compliance through: incentives, education, monitoring (camera). Are we shooting too high to imagine the worker being empowered, is it realistic?

If there is no sick leave, you cannot feel empowered. Conditions for workers in crowded housing impact on health of humans and animals involved. Determinants of Health are very important.

A biosecurity process should be detailed with logistics accounted for and evaluated. Perhaps some minimum biosecurity standards in the industry. In Ontario where everybody needs to wash their hands and clothes and then enter a barn. In One Health, we could think about minimal biosecurity standards. Something adoptable by 99 percent of the industry. Commonsense measures. Ex. Basic attention to details such as clean coveralls which are not torn. There are clear auditing processes in food processes. Should it go further upstream?

On Farm Food Safety programs – have processes in place but getting to some sort of certification would be a goal.

Shift in culture is occurring – farmers did not want any help or intrusion but an example is a farmer running a filter from their barn was noted (filtering outgoing air). This is no benefit to the farmer so a good example of shift in culture.

Initiative in Ontario by producers. There is insurance for producers when their animals are sick. You have to have good biosecurity to have good premiums for this insurance.

Immigrant populations are encouraged to come and work but experience minimal support once they are here.

What can NCCID do?

Scan of regulations and prepare background paper

National biosecurity standards – support

Partner to promote worker training – a lot of workers are seasonal. Look at statistics, how many, range, how far they come from, characterize demographics of work force. Promote training of the workforce to better manage swine including biosecurity, and industry involvement to lead that type of an initiative. Industry Associations. If we can do that across the nation. Many decisions are done at the company level but no information is compiled in a standard way.

One strategy – clarify legislation that governs immigrant workers.

- Promote business continuity planning.

NCCID could clarify regulations for agricultural workers/seasonal/immigrant – health coverage, sick leave.

How can these strategies be implemented and evaluated (i.e. indicators)?

Breakout Session 2c – Partnerships and future directions

1.	What are some examples of existing linkages/partnerships between human and animal public health at the local, provincial and national levels?
2.	What are other possible synergies between human and animal public health?
3.	What are the next steps for human and animal public health with regard to PPM? How can NCCID help in the process?
4.	What are some specific gaps in PPM that NCCID can help fill?

Breakout Group 3

Breakout Session 2b – Ways to overcome challenges

Challenge #1 : Human trigger ramps up a swine farm/biosecurity response

- Linking the level of biosecurity "strictness" to match risk (e.g. with increased human illness in an area, you increase PPM)
- Question: Should we do this?
  - Hasn't worked in other countries
  - Incubation period (in humans and animals)
  - Defining which risks should trigger biosecurity
  - Is there evidence to link more strict biosecurity to increased public health?
- Routine vs. Increased biosecurity
  - Routine: need to define this before we really know what we mean by "enhanced" – defined by industry guidelines for control of endemic diseases, not really potential for human illness/risk
- Swine → swine, human → swine, swine → human

What are some strategies to overcome this challenge?

- Industry guidelines (these already exist to deal with endemic diseases) … so more is needed to address human illness/risk
- Contingency plan in place in the event of severe human illness with possible link to swine
  - Trigger: human health OR animal health
  - Result: increased biosecurity
  - Requires: standardized definitions, diagnostics, reporting

- Communication plan/structure
  - Before plan is implemented
  - During implementation
  - Evaluation
- National swine surveillance (with characterization), examined in relation to human surveillance systems
  - Compilation of existing databases
  - Develop ability for comparative diagnostics (beyond general PPM issues)
  - Needs to be linked to a decision – a priori analysis and decision rules to link to increased biosecurity
- Sick plan
  - Pay people to stay home
  - Having "supply teacher" to call to fill the holes
- Global intelligence (e.g. events in other countries)
  - Is this a trigger for increased biosecurity?
  - There is a lot of "noise" so when does it become a trigger?
  - e.g. visitors/visiting from other countries, import/export
- Slaughter industry
  - Is increased biosecurity required here as well?
  - By-product testing
- Enhanced biosecurity of the industry?
  - Example of vet conference in China, where vets from Canada were quarantined to prevent contaminating swine during h1n1

Summary

- Define animal health or human health triggers to set off increased biosecurity
  - Develop ability for comparative diagnostics
  - Syndromic (e.g. emergency room/hospitalizations, ongoing) and sentinel
  - Existing systems (build on the successes from H1N1)
- Standard definitions
- Contingency plan
- A way to communicate the plan, actions, and results
- What about international health issues? Do they need different triggers/plans/communication/etc?

How can these strategies be implemented and evaluated (i.e. indicators)?

- Syndromic surveillance (ensure existing, ongoing systems are in place)
- Sentinel human/animal surveillance
- Urban and rural
- All these help to develop baseline

Breakout Session 2c – Partnerships and future directions

1.	What are some examples of existing linkages/partnerships between human and animal public health at the local, provincial and national levels?
	• Human PH • Animal PH • Swine industry • Laboratories • North American Pandemic Preparedness Plan (Canada, US, Mexico) • Slaughter industry
2.	What are other possible synergies between human and animal public health?
3.	What are the next steps for human and animal public health with regard to PPM? How can NCCID help in the process?
4.	What are some specific gaps in PPM that NCCID can help fill?

	• Position paper on what the human surveillance systems would have to look like in order to act as an effective trigger
	  ○ Focus on linking human illness to swine operations
	  ○ If you wanted to build something with national scope, what would that have to look like? Pan-provincial, international?
	  ○ Sustainability
	  ○ How this is linked to swine (e.g. spatial, occupational issues)
	• Retrospective evaluation of previous initiatives
	  ○ Could we have predicted events?
	  ○ Walkerton, anti-diarrheal example
	• Human PH to help subsidize costs of enhanced biosecurity (not with a focus on influenza, more general approach)
	  ○ Somewhat covered by Growing Forward (money for farms to reduce production-limiting endemic diseases, not pandemic or emerging diseases)
	  ○ Not NCCID role directly, but maybe support