

Briefing Note 2

Canadian Research Expertise on Global Governance of AMR and Related Infectious Disease Threats

Issue

Our goal was to determine what Canadian research expertise exists on the role of global governance arrangements, structures and institutions addressing AMR and related infectious disease threats. This was accomplished by conducting a literature review and a search of Canadians funded to conduct research on the subject at hand. Expertise was limited to individuals working on AMR and related infectious disease threats outside of any level of government, i.e. principally academics.

Background

Literature search

Literature reviewed was limited to publications from years 2000 to early 2018. To qualify as 'Canadian Research Expertise', articles accepted for review were limited to those authored by at least one Canadian. The search methodology is presented in Table 1.

Scopus Search

63 hits – 18 relevant

PubMed Search

348 hits – 25 relevant

Google Scholar

300 hits – 10 relevant

Of the total 53 articles reviewed, only 11 of these truly demonstrated expertise in AMR governance issues in Canada and 17 in infectious disease governance in Canada. The issues they address are noted below and in Tables 1 and 2.

Search of CIHR supported research in Canada

A search was conducted of the Canadian Research Information System, and specifically CIHR funding, to establish expertise in the global governance of AMR and related infectious diseases threats. The search resulted in 48 potentially relevant projects. 12 projects by 11 experts made the final selection. These are listed in Table 3 below.

Findings

Literature review

Our review of global governance of AMR literature revealed Canadian expertise on the following themes:

- Accountability
- Barriers to governance

Briefing Note 2

- Capacity
- Economic considerations
- Intersectoral action & One Health
- Security
- Stakeholders
- Surveillance and stewardship
- Transparency

The principal arguments made by the experts on each of these themes are summarized in Table 1.

Our review of global governance of related infectious disease threats revealed Canadian expertise on the following themes:

- Accountability
- Canada's role
- Developing countries
- Global governance
- Global trade
- International treaty
- Intersectoral governance & One Health
- National governance
- One Health
- Reporting capacity
- WHO

The principal arguments made by the experts on each of these themes are summarized in Table 2.

Search of CIHR supported research in Canada

Expertise identified from funded CIHR projects relevant to the global governance of AMR and other infectious disease threats is bundled thematically in Table 3. Projects demonstrate expertise in stewardship, health system governance, intervention strategies, data, surveillance and capacity-building. Canadian co-principals or investigators involved in the projects are also listed.

In addition, CIHR assembled a panel of academic experts for a multi-stakeholder forum on antimicrobial stewardship in November 2016. Their expertise was on research gaps and innovation for antimicrobial stewardship in different settings.

Table 3: CIHR Funded Research on Governance of AMR and Related Infectious Diseases

Stewardship

John Conly: Antimicrobial Stewardship Assistant Application Design to Combat AMR
Operating Grant: Joint Programming Initiative on Antimicrobial Resistance

Briefing Note 2

Co-investigator: John Maynard

David Fisman: OPEN Stewardship: An Online Platform for Expanding Antibiotic Stewardship
Operating Grant: Joint Programming Initiative on Antimicrobial Resistance

Co-investigators: Amy Greer

Makeda Semret: Impact of Prescription Quality, Infection Control and Antimicrobial Stewardship on Gut Microbiota Domination by Healthcare-Associated Pathogens (PILGRIM)
Operating Grant: Joint Programming Initiative on Antimicrobial Resistance

Health System Governance

Steven J. Hoffman: Learning from SARS and H1N1 to Strengthen Health System Governance, Information Sharing and International Cooperation during Health Emergencies
Planning Grants – Priority Announcement: Infection and Immunity

Co-investigators: Colleen Flood, Julio Frenk, John Lavis, Trudo Lemmens

Suzanne Hindmarch: Indigenizing AMR Governance
Catalyst Grant: Global Governance AMR & Related Infectious Disease Threats
Co-investigators: Malcolm King, Amanda May LaVallee, Kelley Lee

Shannon Majowickz: Comparative assessment of social-ecological resilience and transformability to limit AMR in one health systems
Operating Grant: Joint Programming Initiative on Antimicrobial Resistance

Global Governance

Ronald Labonté: Global Health Diplomacy: An explanatory multi-case study of the integration of health into foreign policy
Operating Grant

Co-investigators: Arne Ruckert, Vivien Runnels

Ronald Labonté: Mapping Canadian Knowledge of, and Involvement in, the Global Governance of Anti-Microbial Resistance and Related Infectious Diseases
Catalyst Grant: Global Governance AMR & Related Infectious Disease Threats
Co-investigators: Suzanne Hindmarch, Kelley Lee, Steven McBride, Andrew Morris, David Patrick, Arne Ruckert, Scott J. Weese, Kumanan Wilson, Alex Wong

Briefing Note 2

Intervention Strategies

Aidan Hollis: Aligning industry incentives with AMR control goals: Exploring the feasibility of an antibiotic susceptibility bonus for drugs to treat Gram-negative infection

Operating Grant: Joint Programming Initiative on Antimicrobial Resistance

Edward Topp: Intervention of Antimicrobial Resistance Transfer into the Food Chain

Operating Grant: Joint Programming Initiative on Antimicrobial Resistance

Data/Surveillance/Capacity-Building

Claudia Emerson: Integrated human data repositories for infectious disease-related international cohorts to facilitate personalized medicine approaches to infectious disease research

Team Grant: Canada-EU Data flagship collaboration

Louis-Patrick Haraoui: Building an Interdisciplinary Research Centre on the Global Governance of Antimicrobial Resistance in Conflict

Catalyst Grant: Global Governance AMR & Related Infectious Disease Threats

Co-investigators: Ahmad Khan; Dewachi Omar Sabaa, Simon Levesque, Suerie Moon, Michael Mulvey, Clinton Murray, Vihn-Kim Nguyen

CIHR Multi-Stakeholder Antimicrobial Stewardship Expert Forum, 17-18 Nov. 2016

Panel on research gaps and innovation for antimicrobial stewardship in different settings

Nick Daneman, John Conly, Lindsay Nicolle, Warren McIssac, Scott McEwan

Search Strategy:

The search was conducted of the Canadian Research Information System, and specifically CIHR funding on 5 March 2018. Searching on 'All Fields', the search was conducted for 'global governance'. This rendered 40 hits. Master's and doctoral student research projects were excluded. A review of the projects reduced the number of relevant research projects to 8, undertaken by 6 Canadian scholars. Another search of 'All Fields' with the search terms 'infectious disease governance' was also conducted. This resulted in 41 hits with no new projects appearing which had not already been listed in the search for 'global governance'. An additional search was made of successful projects funded under CIHR's JPIAMR Operating Grant, resulting in 7 hits which were all relevant.

Briefing Note 2

Table 1: Summary of Canadian Expertise on AMR Governance

Author/Year	Governance Issue	Principal Arguments Indicative of Areas of Expertise
Hoffman et al., (2015); Hoffman & Behdinan (2016); Gulati et al., (2016); Van Katwyk et al.,(2016)	Accountability	<ul style="list-style-type: none"> • Accountability for state actions/inactions taken to address AMR is necessary for the wider global governance of AMR • Role of an international treaty (to help promote global compliance) • Reconciliation of stakeholder interests a challenge to any treaty • States unlikely to support international agreements unless provisions benefit domestic stakeholders; must be convinced that benefits of a treaty outweigh the costs and potential harm. • Surveillance and reporting are entirely voluntary; this undermines accountability, enforcement and compliance to AMR/AMU approaches • Global antimicrobial regime lacks clear leadership and remains fragmented
Hoffman et al., (2015); Hoffman & Behdinan (2016); Gulati et al., (2016); Van Katwyk et al., (2016); Mendelson et al., (2016)	Barriers to governance	<ul style="list-style-type: none"> • Weak health systems capacity diminishes effectiveness of AMR governance • Consistent lack of healthcare funding results in diminished capacity • Lack of surveillance and effectiveness data • Enforcement of GLASS • Industry (pharmaceutical) barriers: Pharma has refrained from developing new/better antibiotics owing to low profitability, and expensive regulatory requirements
Mendelson et al., (2016); Van Katwyk et al., (2016)	Capacity	<ul style="list-style-type: none"> • Capacity needs to be built in the areas of surveillance, laboratory diagnostic, human and technical skill improvement, particularly in LMICs • Few countries have infrastructure reporting mechanisms in place to provide meaningful input or to qualify for inclusion into GLASS • LMICs need support in the area of documenting consumption and the types of antimicrobials in their markets

Briefing Note 2

<p>Hoffman et al., (2015); Hoffman & Behdinan (2016); Mendelson et al., (2016)</p>	<p>Economic considerations</p>	<ul style="list-style-type: none"> • Domestic economic interests shape misalignment in AMR governance and AMU regulation; since nations are incentivized to maximize their short term interests, they are less likely to impose antimicrobial limits costly to industry and state economy • Costly public health strategies • Global funding mechanism could promote new business models and provide for incentives for new R&D and innovation for new treatments and IPC control measures • Antimicrobials are a scarce resource in LMICs and oversupplied in wealthier countries where they are not used appropriately • Without financial aid, LMICs will be unable to put in place interventions for AMR oversight • 'Hub-and-spoke model' where countries with greater laboratory and surveillance capacity support regional neighbours with less capacity could work
<p>Van Katwyk et al., (2016); Gulati et al., (2016); Hoffman et al., (2015); McEwen & Collignon (2018)</p>	<p>Intersectoral action</p>	<ul style="list-style-type: none"> • Misalignment of interests and incentives between industries and stakeholders compound the challenge of achieving widespread intersectoral collaboration • Misalignment of interests is also found between institutional leaders significantly engaged in addressing AMR globally (e.g. WHO and FAO ; these institutions have different policy fora, different powers and different delegations with different priorities) • One Health approach to stewardship requires some alignment of activities in the various sectors (human, veterinary, agriculture) to achieve the overall goal of preserving antimicrobial effectiveness for both humans and animals • Global AMR regime lacks clear leadership and remains fragmented •
<p>Birnbaum (2015); Hoffman & Behdinan (2016)</p>	<p>Security</p>	<ul style="list-style-type: none"> • Urgency for global collective action and governance on AMR is framed as a security issue, globally

Briefing Note 2

Majowicz et al., (2018)	Stakeholders	<ul style="list-style-type: none"> • Large number of provincial and federal stakeholders (and ministries within each of these) involved as well as the government and private stakeholders in the issue of antimicrobial use and resistance in the Canadian food chain
Rennert-May & Conly (2016); Birnbaum (2015); Hoffman et al., (2015); Gulati et al., (2016); Mendelson et al., (2016)	Surveillance (data) and stewardship	<ul style="list-style-type: none"> • Lack of capacity in collection of hospital pharmacy data in Canada • In Canada, several P/T have AMR stewardship programs in place, yet a lack of standardization across jurisdictions and inconsistent data collection processes for in- and out-patients remains a problem. • Lack of program standardization across Canada when it comes to tackling AMR • Federal government does not regulate protocols for healthcare surveillance within the different provinces/territories, making it difficult to obtain consistent information across the country • Sub-optimal prescription policies /use (e.g. patients come to expect prescriptions/ingrained behaviours; misuse of drugs by clinicians and patients – needlessly, too frequently, or not to completion of treatment) • Globally, few countries have a national task force or strategy for containment of resistance, surveillance, or enforcement of policies such as limiting the availability of antibiotics to prescription only • Weaknesses of GLASS (e.g. dependent on governments to agree to participate; few LMICs have the mechanisms in place to provide meaningful input; few countries have sufficiently robust infrastructure to monitor). •
Gulati et al., (2016)	Transparency	<ul style="list-style-type: none"> • Transparency as a necessary feature for global collective action and governance of AMR

The literature search was conducted on 17 April 2018 on Scopus and PubMed. Search parameters were:

(TITLE-ABS-KEY ("Canad*") AND TITLE-ABS-KEY (hiv OR aids OR sars OR ebola OR zika OR germ OR bioterrorism OR "One Health" OR tuberculosis OR malaria OR antimicrobial

Briefing Note 2

OR "infectious disease*") AND TITLE-ABS-KEY ("governance" OR "governing" OR "international treaty" OR "collective action")

Search parameters for the search of Google Scholar were: "Canada" AND "governance" AND "antimicrobial resistance"

Bibliography

Birnbaum, D. (2015). Antimicrobial resistance and stewardship. *Clinical Governance: An International Journal*, 20(1), 33–39.

Gulati, N., Nyong'o, J. P., Pinto, K.-J., Roy, É., & Sauvé, C. (2016). *Global Health Law Clinic: Using International Instruments to Address Antimicrobial Resistance* (Global Health Law Clinic Publication Series) (pp. 1–32). Ottawa, Canada: University of Ottawa. Retrieved from http://globalstrategylab.org/files/globalstrategylab/files/global_health_law_clinic_who_report_new_website.pdf

Hoffman, S. J., & Behdinan, A. (2016). Towards an International Treaty on Antimicrobial Resistance. *Ottawa L. Rev.*, 47, 507.

Hoffman, S. J., Caleo, G. M., Daulaire, N., Elbe, S., Matsoso, P., Mossialos, E., ... Røttingen, J.-A. (2015). Strategies for achieving global collective action on antimicrobial resistance. *Bulletin of the World Health Organization*, 93(12), 867–876. <https://doi.org/10.2471/BLT.15.153171>

Majowicz, S. E., Parmley, E. J., Carson, C., & Pintar, K. (2018). Identifying non-traditional stakeholders with whom to engage, when mitigating antimicrobial resistance in

Briefing Note 2

foodborne pathogens (Canada). *BMC Research Notes*, 11, 170.

<https://doi.org/10.1186/s13104-018-3279-8>

McEwen, S. A., & Collignon, P. J. (2018). Antimicrobial Resistance: A One Health Perspective.

Microbiology Spectrum, 6(2). <https://doi.org/10.1128/microbiolspec.ARBA-0009-2017>

Mendelson, M., Dar, O. A., Hoffman, S. J., Laxminarayan, R., Mpundu, M. M., & Røttingen, J.-A.

(2016). A Global Antimicrobial Conservation Fund for Low- and Middle-Income Countries. *International Journal of Infectious Diseases*, 51(1), 70–72.

<https://doi.org/10.1016/j.ijid.2016.09.016>

Rennert-May, E., & Conly, J. (2016). Antimicrobial stewardship: a Canadian perspective.

International Journal of Health Governance, 21(3), 165–179.

<https://doi.org/10.1108/IJHG-02-2016-0011>

Van Katwyk, S. R., Danik, M. É., Pantis, I., Smith, R., Røttingen, J.-A., & Hoffman, S. J. (2016).

Developing an approach to assessing the political feasibility of global collective action and an international agreement on antimicrobial resistance. *Global Health Research and Policy*, 1(1), 20. <https://doi.org/10.1186/s41256-016-0020-9>

Briefing Note 2

Table 2: Summary of Canadian Expertise on Related Infectious Disease Governance

Author/Year	Governance Issue	Principal Arguments Indicative of Areas of Expertise
Arya et al., (2009)	Accountability	<ul style="list-style-type: none"> • SARS outbreak revealed confusion about liability and legal responsibilities • Recommendations for better allocation of resources and the improved division of responsibilities over public health
Saheli & Ali (2006); Owens (2015)	Accountability	<ul style="list-style-type: none"> • Despite the advantages it can offer, collaborative work has the potential to obscure accountability (seeks to minimize conflict, must take into consideration interests of all government levels, seeks to ensure confidentiality) • Federal and provincial conflict about how much money each order of government must spend on health services contributed to ineffective intergovernmental relationship • Problems stemming from the lack of jurisdictional responsibilities. Example: The question of funding to deal with the SARS outbreak was a significant problem as local health units had difficulty accessing funds from municipal governments, while the federal government was reluctant to provide emergency funding. Problem also arose in relation to data ownership among different levels of governments during the outbreak. • WHO's poor coordination of international Ebola outbreak response activities (huge number of organizations involved, with poor coordination and duplication of efforts)
Owens (2015); Edge et al., (2013) Saheli & Ali (2006)	Canada's role	<ul style="list-style-type: none"> • Underwhelming support by Canada for the Global Outbreak Alert during the Ebola epidemic in West Africa: frequent logistical problems hampered efforts to control the Outbreak. Canadian medical officers, public health nurses, public health inspectors could have helped but were not there. • Canada's national response to H1N1 was impaired by lack of health human resources, standardized processes for rapidly setting priorities, and availability of contingency funds

Briefing Note 2

		<ul style="list-style-type: none"> SARS outbreak in Toronto – suffered from lack of surge capacity, information technology, and inadequate capacity for epi investigation
Edge et al., (2013)	Developing countries	<ul style="list-style-type: none"> Many lack adequate research, workforce, laboratory or infrastructural capacity to support broad-spectrum pandemic responses
Esmail & Kohler (2012);	Drugs/Pharma	<ul style="list-style-type: none"> Drug access inequities, including the cost of drugs, corruption, and drug misuse
Otterson et al., (2016); Lough (2015); Edge et al., (2013); Isasi & Nguyen (2005); Owens (2015); Brown (2015); Walji (2015); Lough (2015)	Global governance	<ul style="list-style-type: none"> Need for contingency fund to support emergency response in LMICs as well as donor countries Contingency fund established at WHO following 2009 H1N1 (swine flu) in Mexico; member states asked to contribute, but few have In 2016, WHO established the Emergency Preparedness and Response Centre, along with a contingency fund to support emergency responses; member states have largely not contributed extra funding. Challenges for pandemic planning: 1) multiple players with diverse interests are able to influence outcomes; and 2) all-inclusive approaches remain elusive for decision-makers to design and implement States often have competing interests and act out of self-interest; governments are so busy coordinating responses to domestic issues that they may have little time or concern to devote to issues of global health security Coordination challenges between domestic and international partners impair decision-makers' ability to adequately respond to the variability of pandemics WHO versus state sovereignty and state interests; during SARS outbreak, WHO issued travel advisory against SARS affected areas, including Toronto. It was accused by Health Canada of exceeding its remit; preferred to portray SARS as a containable local problem. Delicate balance between respect for national sovereignty of a country and the negative impact of travel advisories, especially in countries heavily reliant on tourism. Test of the public health order/global governance will come when international officials seek to assert

Briefing Note 2

		<p>authority in areas in which states - especially powerful countries - have divergent interests</p> <ul style="list-style-type: none"> • WHO criticized heavily for its lack of authority and ineffectual capacities to lead emergency outbreak responses, showcased particularly in its response to the Ebola epidemic in West Africa • Need to enhance WHO's emergency response leadership. Strategies include streamlining internal procedures to speed up emergency response; helping countries to create a resilient health system; encouraging countries to report outbreaks early; continuing research and development; and asking member states to contribute more financial support • Following the inadequate Ebola crisis response, the WHO set up the Global Health Emergency Workforce, which brings together experts in public health and medicine to quickly respond to an outbreak • WHO Global Outbreak Alert and Response Network Team (GOARN) allows WHO to call in experts to help with an international health outbreak; interlinks 120 existing networks for the detection, verification and containment of epidemics in real time
<p>Brown (2015); Vogel (2014); Saheli & Ali (2006); Hoffman & Røttingen (2013); Edge et al., (2013)</p>	<p>Global trade</p>	<ul style="list-style-type: none"> • Insufficient and inadequate global outbreak response is due in part to the hesitation among nations to disclose an epidemic for fear of introducing trade and travel bans • Some countries do not comply with travel and trade restrictions that are damaging to their economy, and as a result, disease outbreaks are not reported in a timely manner • Improve global coordination and policy coherence (e.g. via task forces, working groups, high-level forums) and encourage the establishment of partnerships between Member States of shared borders for improved clarity about decision-making authority processes, to better manage trans-border trade and other economic activities during pandemics
<p>Hoffman & Røttingen (2013); Hoffman & Behdinan (2016)</p>	<p>International treaty</p>	<ul style="list-style-type: none"> • Discusses the prospects of a Framework Convention on Global Health; instrument of this nature would be able to articulate national and global responsibilities for health and set binding commitments and address the current fragmentation and underperformance of

Briefing Note 2

		<p>the WHO. Costs would need to be considered, along with risk of increasing regime complexity.</p>
<p>Butler-Jones & Wong (2016); Lee & Brumme (2013); Stephen & Stemshorn (2016)</p>	<p>Intersectoral governance & One Health</p>	<ul style="list-style-type: none"> • Multidisciplinary approach to infectious disease control necessitates intersectoral collaboration • Little attempt so far to create a single designated global level institution for One Health • Inadequate inter-agency support & coordination: OIE references the approach and included it within its Fifth Strategic Plan (2011–15), while the FAO and WHO hardly mentions One Health in public communications • Reality is high degree of reductionism (institutions working in silos limited to their existing mandates and activities) and fragmentation • High-level global support for research and training will be required to strengthen the One Health initiative, enough to catalyze change in global health governance • In order to strengthen One Health capacities to address disease, most countries need new forms of governance to prepare for the complex challenges and multi-actor responses
<p>Edge et al., (2013)</p>	<p>National governance</p>	<ul style="list-style-type: none"> • Need to improve surveillance as well as integrating top-down surveillance programs with bottom-up approaches for monitoring risk and enabling sharing of information that would otherwise be difficult due to legal barriers across sectors and ministries. Interprofessional and technological collaboration is also emphasized for greater coordination and sharing of data. • Challenge of pandemic governance in a federated country (e.g. 2003 SARS outbreak in Toronto demonstrated an unruly intergovernmental relationship as jurisdictional authority was challenged, division of responsibilities was unclear, and healthcare funding was surrounded in conflict. Lack of jurisdictional responsibilities also arose in relation to data ownership among different levels of government during outbreak.) • Challenges of provincial scale and urban/rural governance; municipalities are dependent on upper level policy frameworks and financing without much autonomy for local agencies and institutions

Briefing Note 2

Edge et al., (2013)	Reporting / reporting capacity	<ul style="list-style-type: none"> • Absent or inadequate technical skills and capacity to report and share information • Difficult in times of emergency when multiple actors and sectors are meant to come together to share information and co-manage responsibilities across jurisdictions
Arya et al., (2009)	Reporting / reporting capacity	<ul style="list-style-type: none"> • Reporting of a disease must not lead to punitive measures. For example, the reporting of a case of mad-cow disease leads to culling of heard
Brown (2015); Saheli & Ali (2006)	WHO	<ul style="list-style-type: none"> • WHO's ability to declare an international epidemic emergency • WHO's powers and capacities to issue travel advisories

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Bibliography

Arya, N., Howard, J., Isaacs, S., Mcallister, M. L., Murphy, S., Rapport, D., & Waltner-Toews, D.

(2009). Time for an ecosystem approach to public health? Lessons from two infectious disease outbreaks in Canada. *Global Public Health*, 4(1), 31–49.

<https://doi.org/10.1080/17441690701438128>

Brown, C. (2015). Global health response to crises needs reform. *Canadian Medical Association*

Journal, 187(11), E343. <https://doi.org/10.1503/cmaj.109-5115>

Briefing Note 2

Butler-Jones, D., & Wong, T. (2016). Infectious disease, social determinants and the need for intersectoral action. *Canada Communicable Disease Report, 42–Suppl 1*, S18-20.

<https://doi.org/10.14745/ccdr.v42is1a04>

Edge, J., Hoffman, S., & Gauvin, F.-P. (2013). *Issue Brief: Strengthening National Health Systems' Capacity to Respond to Future Global Pandemics* (pp. 1–102). Hamilton, Canada:

McMaster Health Forum. Retrieved from

https://books.scholarsportal.info/en/read?id=/ebooks/ebooks1/gibson_chrc/2014-04-25/1/10840945

Esmail, L. C., & Kohler, J. C. (2012). The politics behind the implementation of the WTO Paragraph 6 Decision in Canada to increase global drug access. *Globalization and Health, 8*. <https://doi.org/10.1186/1744-8603-8-7>

Hoffman, S. J., & Behdinan, A. (2016). Towards an International Treaty on Antimicrobial Resistance. *Ottawa L. Rev.*, *47*, 507.

Hoffman, S. J., & Røttingen, J.-A. (2013). Dark sides of the proposed Framework Convention on Global Health's many virtues: A systematic review and critical analysis. *Health and Human Rights, 15*(1), E117-134.

Isasi, R. M., & Nguyen, T. M. (2005). The Global Governance of Infectious Diseases: The World Health Organization and the International Health Regulations. *Alta. L. Rev.*, *43*, 497.

Briefing Note 2

- Lee, K., & Brumme, Z. L. (2013). Operationalizing the One Health approach: The global governance challenges. *Health Policy and Planning, 28*(7), 778–785.
<https://doi.org/10.1093/heapol/czs127>
- Lough, S. (2015). Lessons from Ebola bring WHO reforms. *Canadian Medical Association Journal, 187*(12), E377-378. <https://doi.org/10.1503/cmaj.109-5125>
- Ottersen, T., Hoffman, S. J., & Groux, G. (2016). Ebola Again Shows the International Health Regulations Are Broken: What Can Be Done Differently to Prepare for the Next Epidemic? *American Journal of Law & Medicine, 42*(2–3), 356–392.
- Owens, B. (2015). Ebola needed better coordinated Canadian response. *Canadian Medical Association Journal, 187*(12), E365. <https://doi.org/10.1503/cmaj.109-5106>
- Salehi, R., & Ali, S. H. (2006). The social and political context of disease outbreaks: The case of SARS in Toronto. *Canadian Public Policy, 32*(4), 373–385. <https://doi.org/10.3138/G276-2087-2838-R510>
- Stephen, C., & Stemshorn, B. (2016). Leadership, governance and partnerships are essential One Health competencies. *One Health, 2*, 161–163.
- Vogel, L. (2014). Ebola epidemic outpacing response: MSF. *Canadian Medical Association Journal, 186*(14), E523-524. <https://doi.org/10.1503/cmaj.109-4890>
- Walji, M. (2015). Ebola crisis revealed “major fault lines.” *Canadian Medical Association Journal, 187*(9), E267. <https://doi.org/10.1503/cmaj.109-5043>