UNDERSTANDING CONVENTIONAL AND NOVEL APPROACHES USED TO

ADVANCE EVIDENCE-BASED ILLICIT DRUG POLICY

by

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Abstract

A considerable amount of research has shown traditional illicit drug policies represent a critical source of inequity and ongoing health-related harms on a global scale. The harms associated with these policies have spurred several calls for "evidence-based" policy reform whereby policies that criminalize drug users be replaced with public health approaches. These calls for policy reform, and the persistence of criminal justice based approaches, have raised questions about the strategies and tools scientists, researchers, academics and/or health practitioners may mobilize to support this objective (herein referred to collectively as scientists).

In this context, the primary objectives of this thesis were to: 1) synthesize what is known about conventional activities and strategies scientists use to advance evidence-based drug policies and 2) to describe and evaluate in detail the Vienna Declaration campaign, the largest scientist-led mobilization to support evidence-based illicit drug policy to date, and 3) to generate insights into strategies that may support the advancement of evidence-based illicit drug policy, especially as they related to public and political discourse.

This work reveals scientist-led efforts to promote evidence-based drug policy have not traditionally made use of the Internet and related tools. Findings from an analysis of the Vienna Declaration campaign reveal that the Internet and social media are important dissemination tools that support science-based efforts to advance evidence-based drug policy. Given the deficit of research in this area and long-standing limitations to scientists' proficiency engaging the public, media, and policymakers, the thesis concludes additional research is needed to better understand the tools and strategies available to scientists working in this area. It speculates that such a research agenda may also serve as a culturally appropriate way of engaging scientists and influencing their future knowledge translation efforts.

Preface

Chapter 2 is based on work originally conducted as part of a Directed Studies (INDS 530C) under the supervision of Dr. Evan Wood. Review objectives were set in consultation with co-authors Drs. Candis Callison, Rima Wilkes, and Evan Wood. I led the review and drafted the manuscript, consulting with Dr. Wood to resolve any inconsistencies. The study was supported by the US National Institutes of Health (VIDUS: R01DA011591, ACCESS: R01DA021525). This research was undertaken, in part, thanks to funding from a Canadian Institutes for Health Research Health Communications Award that supports my work and a Tier 1 Canada Research Chair in Inner City Medicine that supports Dr. Wood.

Chapter 3 is based on my work as a lead coordinator of the Vienna Declaration campaign working under the supervision of Dr. Wood. With respect to this chapter, I was responsible for study design, data collection, and coding as well as drafting the manuscript with contributions from co-authors Drs. Callison, Werb, Wilkes, and Wood. This research was undertaken, in part, thanks to funding from the Canada Research Chairs program through the Canadian Institutes for Health Research Health Communications Award that supports Michaela Montaner; a Tier 1 Canada Research Chair in Inner City Medicine that supports Dr. Wood; and the Canadian Institutes of Health Research and the Trudeau Foundation which support Dr. Werb.

Sections 1.1, 1.4, and 1.5, and chapter 4 were conceptualized and written by myself independently, with feedback on final drafts from Drs. Callison, Wilkes, and Wood. No part of this thesis required ethical approval.

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AIDS	acquired immune deficiency syndrome
EBM	evidence-based medicine
HIV	human immunodeficiency virus
IAS	International AIDS Society
PWID	people who inject drugs

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Dedication

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Chapter 1: Introduction

1.1 Overview

Globally, a growing wealth of research has shown traditional illicit drug policies represent a critical source of inequity and ongoing health-related harms for persons who use drugs (1-6). Specifically, criminal justice, as opposed to public health, approaches have been the international community's preferred response to the health and social harms associated with drug use, production, and distribution. As described in Sections 1.2 and 1.2.1 respectively, these policies have resulted in a range of unintended consequences and spurred several calls for "evidence-based" policy reform. This large and growing body of research, coupled with academic and other calls for policies that incorporate research evidence, has raised questions, detailed in Section 1.3, about the strategies and tools used by scientists, researchers, academics or health practitioners (herein referred to collectively as scientists) may mobilize to effectively conduct knowledge translation in this area. As described in Section 1.5, this provides the basis for the present thesis' analysis of what is empirically known about scientist efforts to advance evidence-based illicit drug policies and how future efforts may be constructed to capitalize on tools and strategies not yet well evaluated in the research literature.

1.2 Policy context and implications

As described above, despite intentions to protect public health and safety, current illicit drug policies have resulted in a range of unintended consequences that effectively undermine those objectives (1-6). For instance, the criminalization of drug use, production, and distribution, has resulted in record incarceration rates, disproportionately affecting of racial minorities and subjecting already marginalized groups to increased risk of contracting the human

immunodeficiency virus (HIV), drug use initiation, violence, and crime (7). The focus on criminalization of people who use illicit drugs has also been associated with government resistance to implementing certain public health and medical responses to severe drug addiction that are perceived to condone drug use despite ample evidence that these responses may actually mitigate the harms of drug use and promote drug use cessation more effectively than alternative approaches (8,9). Additionally, the criminal justice response has also contributed to and perpetuated a massive underground market for illicit drugs. The United Nations Office on Drugs and Crime estimates this hidden, illegal economy is worth an estimated $350 billion USD annually, which fuels crime, violence, and corruption globally, and is associated with the destabilization of entire countries, such as Colombia, Afghanistan, and Mexico (10).

1.2.1 HIV/AIDS

One area where there have been major concerns with the lack of evidence-based policy has been national and international responses to HIV infection among persons who inject drugs. Globally, it is estimated that injection drug use accounts for approximately one in three new HIV infections outside sub-Saharan Africa (11). Among the estimated 16 million people who inject drugs (PWID) living worldwide, three million are believed to be HIV seropositive (12). Of concern, despite a trend towards declining HIV incidence internationally, in some countries with populations of PWID, HIV incidence has increased by as much as 25% in recent years due, in a large part, to injection drug use (11). In areas such as central Asia and eastern Europe, HIV prevalence rates have reached as high as 70% among populations of PWID (11).

In this context, a range of evidence-based public health measures have been shown to reduce HIV infection among PWID including sterile syringe provision, methadone maintenance

therapy and other forms of addiction treatment. The implementation of HIV prevention interventions, often collectively referred to as "harm reduction," are now included as key aspects of international guidelines by the World Health Organization and other United Nations-affiliated organizations such as the United Nations Office on Drugs and Crime, and Joint United Nations AIDS Programme. Despite this, many policies aimed at addressing drug related harms among PWID continue to rely on non-evidence based criminal justice approaches (13) that may actually increase HIV risk (14).

Rather than address problems associated with illicit drug use, evidence suggests that policies that rely on drug law enforcement often serve to stigmatize people who use illicit drugs, driving them away from health services, while promoting unsafe drug use practices and hindering access to HIV treatment, which ultimately fosters increased risk of HIV transmission (14-16). In particular, studies have shown drug law enforcement-based drug policies can increase HIV risk behaviors such as sharing contaminated needles as well as the risk of overdose among PWID (14,15). Additionally, enforcement-based drug policies have not been associated with lower levels of supply or demand for illicit drugs (17-19). For instance, as mentioned earlier, in the Russian Federation, which relies heavily enforcement-based responses to illicit drug use, it is estimated that 1 in 100 adults are now HIV-infected, primarily via injection heroin use (20). In fact, despite a Cochrane Collaboration Review categorically endorsing the methadone maintenance therapy as an effective, evidence-based medicine for reducing heroin-related harms (21), and the inclusion methadone on the World Health Organization's list of essential medicines (22), this treatment remains illegal in the Russian Federation.

1.3   Knowledge translation

The application of scientific evidence to questions of policy and practice has become an increasing focus in public health. As described in chapter 2, it is widely agreed that publication in peer-reviewed journals is an insufficient knowledge dissemination practice (3,23-28). Specifically, while scientific articles are critical basis of research transfer efforts, they are often physically inaccessible or, at times, unintelligible or irrelevant to policymakers and the general public in their traditional format (27). Recognizing this reality, the concept of "knowledge translation," has emerged as a prevailing framework for conceptualizing and facilitating the transfer of research to public health practice and policy (13,28-31).

Knowledge translation is defined by the World Health Organization as "the synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health" (32). Tactics conventionally associated with knowledge translation include incorporating stakeholders in the research process (31,33,34), presenting findings in a manner that corresponds to policymakers' questions and priorities (27,31,35), and dissemination of research results via the mass media (24,36).

A critical element of any knowledge translation effort seeking to influence policy change is dissemination. Research has long shown policy agenda setting, including problem definition, policy priorities, and policy options, are shaped by public opinion and the media (37). Indeed, contemporary illicit drug policy issues are no exception, and media engagement and other means of influencing public opinion, have been identified as important opportunities to influence drug policy (38,39), especially for scientists seeking to advance evidence-based policy (40,41).

Importantly for knowledge translation efforts seeking to influence public policy and discourse, the production of news and how people consume it is changing rapidly. According to a study by the Pew Internet Project, while newspapers, specifically, continue to be "critical to civic life in the United States", between 1991 and 2010, the percentage of Americans who "got news yesterday" from a print news source dropped from 56 to 31%, lower than TV and radio which dropped from 68 to 58% and 54 to 34% respectively (42). Notably, in 2010, (the first year for which data was collected,) more Americans (44%) reported "getting news" from an online source than print news or radio (42). Correspondingly, online news publications have become a mainstay of the news industry and, in the last decade, online versions of newspapers have begun replacing what were originally daily print news publications (43). Furthermore, where the editor of a newspaper once served as the curator of a person or population's news source, they now share the privilege with friends, celebrities, organizations, and others individuals "follow" via personal accounts on online social network sites (44).

These online social networks and websites, driven by user-generated or -curated content, are part of a larger family of "social media websites" that are challenging the news media's traditional role as a content curator and generator. With 945 million (45) and 241 million (46) monthly active users respectively, Facebook and Twitter have emerged as two of the most powerful information-sharing platforms in the world, occupying spots 1 and 10 respectively of the top 500 most visited sites online – rivaled only by search engines, e-commerce, and other social media websites (47). In addition to sharing updates of a personal nature, or news from online news sources, users of these sites fuel them with content from other social media sites that facilitate the generation and distribution of user-generated content, such as pieces of writing, images, online videos, music, and more.

While these changes to information gathering and sharing have been recognized in the public health and medical literature as an area deserving of capacity building and research (48), studies to date have focused disproportionately on clinical care settings (49), public health informatics (50), and social epidemiology (51). Despite the relevance of news media, public opinion, and the potential relationship between the two to drug policy reform, the knowledge translation literature concerning scientists advocating for evidence-based illicit drug policy has barely addressed this area of inquiry. Furthermore, the well-documented and ongoing changes to how news and information are produced and distributed over the past decade have not been evaluated in the context knowledge translation efforts to intervene in policy/public discourse in the area of illicit drug policy.

1.4 Policy change

As noted earlier, the unintended health, social, and economic consequences of conventional drug policies have been well documented across research disciplines and have resulted in multiple calls for "evidence-based" illicit drug policy reform (9,52-57). As will be described in chapter 3, one such call was the Vienna Declaration (2010), a scientific statement summarizing the large body of research showing how the criminalization of people who use illicit drugs has fuelled the HIV epidemic and contributed to a range of unintended, adverse health and social consequences described above (4). The Declaration was among the first of a number of calls since 2010, and the only major one led by scientists, that spurred a broader global discourse around illicit drug policy reform. Since then there has been modest progress towards reforming drug laws away from criminal justice based approaches. For example, in 2012, Washington and Colorado, two U.S. states, became the first jurisdictions in the world to legalize marijuana, followed by

Uruguay in 2014. At the international level, global illicit drug policy watchdogs assert that consensus at the United Nations level is fracturing, and that there is reason to believe the 2016 United Nations General Assembly meeting to review existing international drug conventions will, however subtly, open the door to further international drug policy reform (58). While this progress signals a willingness to rethink traditional approaches to drug control, changes have been limited predominantly to these settings and exclusively to marijuana regulation, with little meaningful involvement or leadership from the scientific community.

1.5   Research objectives

With the longstanding discordance between evidence and illicit drug policy on the one hand, and the range of public health and safety concerns on the other, questions about how scientists may effectively influence evidence-based public discourse and policy pertaining to illicit drugs are exceedingly relevant. This thesis strives to fill that void. Chapter 2 seeks to determine, for the first time in a systematic fashion, what is known about scientist-led knowledge translation efforts in the realm of illicit drug policy. Chapter 3 seeks to document and evaluate the dissemination strategy of The Vienna Declaration Campaign, one of the largest known mobilizations by scientists to self-organized and advance evidence-based responses to illicit drug policy. As described in chapter 4, taken together, these two studies advance academic understandings of effective knowledge translation in the context of illicit drug policy development, provide a basis for the development of practical strategies to support the development of scientist-led knowledge translation in this area and highlight a number of areas for further action and research.

Chapter 2: Scientist-led knowledge translation in illicit drug policy

2.1 Introduction

Emphasizing a criminal justice approach to address the health and social problems posed by illicit drugs has recently been the subject of substantial criticism (1-6). Indeed, a great deal of academic work and commentary have concluded with calls for "evidence-based" illicit drug policy reforms at the local, national, international, and global level that emphasize public health and human rights and not criminal justice-based approaches (9,52-57).

The concept of evidence-based policy borrows substantially from the practice of evidence-based medicine (EBM). EBM is defined as the integration of "individual clinical expertise with the best available external clinical evidence from systematic research" (59). This practice is guided by a five-step process requiring the (a) identification of the scientific question of interest followed by the careful (b) review and (c) synthesis of relevant medical research literature to (d) identifying the best course of action which, once reconciled with clinical expertise, is (e) carefully applied and rigorously evaluated (31,60-62). As Kohatsu *et al* (2004) describe, "the success of EBM has led to a broader adoption of evidence-based approaches in a number of fields and has fostered the development of [evidence-based public health]" wherein scientists work with policymakers (almost exclusively) to translate their research to policy (24,29,61,62). However, applying this model to questions of health policy, inclusive of illicit drug policy, presents a number of challenges owing to the complexity of the interventions, multiple stakeholders, and intersecting social issues, among various other considerations.

As described in chapter 1, in public health, scientific publication in peer-reviewed journals is often necessary to establish quality evidence upon which to base policy. However, as

a knowledge dissemination practice it is widely recognized as insufficient (3,23-28). Instead, knowledge translation, or "the synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health," has emerged as a prevailing framework to increase the likelihood that research advances will be translated into policy (32). Some strategies that have been identified as important factors in developing awareness of evidence among policymakers, an openness to policy development or change, and/or the adoption of new policies, include integrating stakeholders and end-knowledge-users in the development of research studies (31,33,34), adapting the presentation of research findings in a manner consistent with the needs of policymakers (27,31,35), and disseminating scientific findings in the lay media (24,36).

Despite the need for global illicit drug policy reform based on evidence from public health research (63-65), little is known about whether and how research is effectively transferred to illicit drug policymaking settings. Importantly, the literature that does exist has not been systematically reviewed. In an effort to support evidence-based knowledge translation strategies in this area, the objective of this narrative review is to synthesize literature describing whether and how research is effectively transferred to illicit drug policymaking contexts.

2.2   Methods

This review sought to identify prevailing understandings of the relationship between evidence and policy in illicit drug policy development and the manners in which research is disseminated or advanced by scientists. Secondary objectives of the review were to identify barriers to and facilitators of use of research evidence, including factors, other than research, influencing policy-making related to illicit drug issues.

The search strategy for this review involved an initial systematic review of articles published since 1980 (61). Only empirical studies, commentaries, editorials, and letters appearing in academic, peer-reviewed publications were considered. Eight databases were searched (PubMed, MEDLINE, PSYCHINFO, Academic Search Complete, CINAHL, Communication & Mass Media Complete, History of Science, Technology & Medicine, and International Political Science Abstracts) with a range of terms to capture any studies related to illicit drug policies (See Appendix A for complete search terms). Subsequently, titles and abstracts of all items were screened to remove duplicates and identify potentially eligible studies based on the inclusion and exclusion criteria. Reference lists from retrieved articles were also reviewed. In cases of uncertainty, articles were reviewed and inclusion decided upon by consensus between myself and Dr. Evan Wood (further details of Dr. Wood and other supervisors contributions are available in the Preface). All articles deemed potentially eligible were retrieved in full-text. Full-text articles were screened independently using a predesigned and piloted eligibility assessment form. Details of excluded studies and reasons for their exclusion are documented in Table 1. Data from all included studies were extracted by the first author using a pre-designed form (see Appendix B). Data were extracted to describe the regional and disciplinary character of study and commentary on evidence-based illicit drug policy development and summarize empirical findings and prevailing academic views on knowledge translation in the context of evidence-based illicit drug policy development.

2.3   Results

Preliminary searches identified 2465 records eligible for abstract scan. Of those, 59 were selected for detailed review and 15 were eligible (for exclusion justifications see Table 1).

Table 1 Justification for excluded studies

Justification	Number (n=37)	Citations
Does not explicitly address research transfer	19	(66-77)
Broadly makes the case for and/or describes policy reforms/issues	10	(8,57,78-85)
Makes suggestions for knowledge translation/research transfer based on theory only OR draws exclusively on case studies from outside illicit drug policy context	8	(41,86-92)

Table 2 Articles by publication

Journal title	Number	Citations
Addiction	2	(13,36)
Canadian Journal of Sociology	1	(93)
Canadian Medical Association Journal	1	(29)
Contemporary Drug Problems	1	(94)
Drug & Alcohol Review	2	(60,95)
International Journal of Drug Policy	4	(1,3,95,96)
International Journal of Health Promotion & Education	1	(26)
Journal of Drug Issues	1	(97)
Open Medicine	1	(24)
Policy Studies	1	(98)

The 15 eligible studies came from ten different journals, eight of which had a disciplinary focus on medicine or drug issues in addition to two publications that were broadly focused on sociology and policy (Table 2). Nearly three quarters of the articles were published since the year 2000 (Figure 1). Two articles were primarily opinion pieces and the remaining thirteen were dedicated to case studies, empirical research, or some combination thereof (Table 3). The case studies or commentary were mostly focused on national (as opposed to state or municipal) policies. Countries represented in the sample were Switzerland, Britain, the Czech Republic, the United States, Australia, and Canada (Table 4).

Figure 1 Distribution of articles over study period
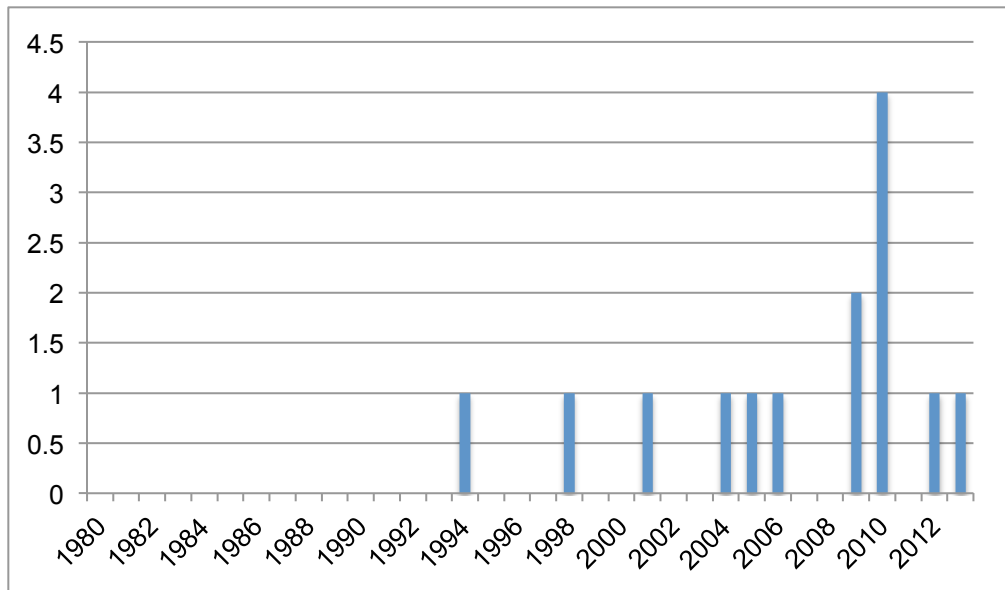
Table 3 Articles by study type

Study type	Number	Citations
Case stud(ies)	10	(1,3,29,36,60,93-95,97,98)
Case study – empirical research hybrid	3	(26,96,99)
Case study – opinion hybrid	1	(24)
Opinion	1	(13)

Table 4 Articles by country of focus

Country of focus	Number	Citations
Australia	7	(26,36,95,96,98,99)
Canada	5	(3,24,29,93,98)
Czech Republic	1	(97)
Switzerland	1	(1)
US	2	(13,94)
Britain	1	(94)

2.3.1 The relationship between evidence and policy

Several themes emerged from the eligible studies. A number of articles acknowledged a tension between the notion of evidence-based policy and democracies that are, by definition, values-based (95,96). On that basis, some studies suggested research should aim primarily to *inform* policy development or implementation and allow space for values-based policies (13). Broadly

speaking, non-evidence-based policy was understood as problematic in three instances: where evidence was blatantly misrepresented or ignored (24,29); when policy was purported to be evidence-based, but was not (13,94); or when a specific policy was proven to be causing serious harm (3). In light of these complicated scenarios and the nuanced relationship between evidence and policy, articles generally discounted a "rational" view of policymaking whereby research evidence guides policy agendas or options (93,94,99).

A survey piece by Ritter *et al*. (2010) summarized a range of policy frameworks, beyond the technical/rational model, explaining the various uses of research evidence in illicit drug policymaking and implications for knowledge translation activities. They included:

- **Incrementalism:** policy-making as a process of small adjustments to existing policies (1,26)

- **Models about power and interest groups:** public policy as the outcome of pressure from many/diverse interest groups (1,13,24,29,60)

- **Advocacy coalitions frameworks:** policy agenda-setting/making as result of actors operating with a shared beliefs/values who demonstrate a non-trivial degree of coordinated activity over time (1,3,26,29,60,95)

- **Multiple streams model:** three independent streams operate simultaneously to influence policy agendas/making (problems, politics and policy processes) with specific events triggering a coalescence leading to policy action (36,93,94,96-99)

All articles in the review evoked or evaluated one or more of these theories directly or indirectly.

2.3.2 Technical aspects of knowledge translation efforts: materials and activities

Studies also offered generic lists of knowledge translation materials and activities, a subset of which were directly evaluated or discussed in the article's original contribution (as opposed to a literature review). This subset is reflected in Table 5. Studies emphasized effective knowledge translation activities hinged on high quality research with explicit policy relevance (1,24), participation in a variety of meetings and conferences (3,26,29,93,95), and coalition work (1,3,24,29,60,95,96).

Table 5 Knowledge translation activities undertaken by scientists

Activity	Citations
Generating quality, policy relevant research	(1,3,13,24,26,29,36,94-99)
Participating in meetings and conferences (specialized or otherwise)	(3,26,29,93,95)
Participating in a coalition or engaging in some form of persuasive advocacy	(1,3,24,29,60,95,96)
Serving as an expert adviser/consultant/witness in government or legal proceedings	(24,36,60,93,96)
Engaging with the media (via press releases, interviews, editorials, etc.)	(24,36,93,99)
Building relationships with knowledge-users	(26,36,96,99)
Producing plain language summaries, backgrounders	(24,93)
Making oral presentations	(1-6,24,26)
Teaching university classes	(3,13,36,93)
Maintaining a website	(24,93)
Writing political commentary to appear academic journals	(24,29)
Working through professional associations	(29,94)
Engaging in civil disobedience	(1,60,95)

2.3.3 Qualitative aspects of knowledge translation efforts: power, relationships, and rhetoric

Multiple studies noted the importance of sustaining knowledge translation activities over time (1,98) and ensuring their messaging and delivery took into account the political and social complexity of the target audience (26,36). Building nuanced, lasting relationships or trust between scientists and a range of knowledge users (including, but not limited to, policymakers,)

was also identified as a means of building evidence-based policy momentum (26,36,96,99), particularly in the face of political opposition (3,24,29). Multiple articles identified a need for persuasive advocacy, at the forefront of which was a focus on rhetoric and messaging (3,26,60,93,96). In the context of relationship-building, many studies commented on the importance of scientists being cognizant of others perceptions of themselves as scientists and science more broadly and how that may change depending on the audience with which they engaged, with implications for rhetoric and messaging (13,26,36). For example, on the individual level, Treloar (2005) highlighted the need for scientists to mind power relations at play when presenting findings or making recommendations to different or diverse audiences (e.g., health care professionals *versus* policymakers *versus* people who use illicit drugs, or a combination thereof). More broadly, Reuter (2001) commented that perceptions of scientists in the illicit drug field as "left wing" may need to be addressed to overcome or improve the marginalization of science in U.S. illicit drug policy. This concern is echoed by Ritter (2012) who called repeatedly for research into knowledge translation strategies that are at once effective but do not threaten scientific integrity (95,99).

Noting that the standing of scientists varies by location and circumstance, and may be constrained by scientific ideals regarding "advocacy," some articles noted scientists are not the only purveyors of research. As described below, other actors in the illicit drug policy arena, via a range of knowledge translation activities, may mobilize as or more effectively than scientists to encourage evidence-based policy and/or address obstacles described below (24,99).

2.3.4 Barriers and facilitators

Beyond those aspects of knowledge translation focused on improving communication between research and policy elements, where scientists have a reasonable degree of control or agency, this body of literature dedicated considerable attention to external forces shaping the policy development context and, by extension, knowledge translation considerations.

2.3.4.1 Political culture

As alluded to above, a number of studies noted that the political standing of science, scientists, and illicit drug issues (together and separately) holds implications for evidence-based policy development. For example, studies from Switzerland and Vancouver attributed the development of novel harm reduction approaches in those settings in part to the positive political standing of supportive and vocal scientists in the country and city respectively (1,3). Conversely, scholars examining national illicit drug policies in Canada speculated that over recent decades, the defunding of governmental science organizations (93) and the treatment of scientific process (29) may signal a broader devaluation of science in national policymaking. Notably, commentary on American illicit drug policy revealed that despite substantial investment in drug use research, specifically, and evidence-based policy rhetoric, U.S. illicit drug policy is also problematically inconsistent with the best available evidence (13,94). Similarly, some articles suggested the stature of illicit drug issues historically and in-the-moment also had implications for the depth of policy deliberations, potentially limiting opportunities for scientists to effectively present or mobilize evidence (36,60,93,94).

2.3.4.2 Politicization

The nature of "politicization" and its role as a barrier or facilitator to evidence-based policy was also regularly discussed. Articles described scenarios where research products or advice was "politicized" either in the sense that it was solicited by government to guide policy (1,29,60,96-98) or "made political" by partisan interventions (36).

Notably, research embedded in political process was not universally associated with evidence-based policy outcomes. For example, studies reported instances of governments ignoring or disputing evidence contained in their own reports (94), knowingly using research masquerading as independent, academic, peer-reviewed literature to undermine the results of government-sponsored evaluations (29), and using research selectively to reinforce a political position (36). In cases where research recommendations were mostly followed by the commissioning government, there was little discussion of specific knowledge translation activities (1,60,96-98).

Even in those cases reporting reasonably effective relationships and evidence-based policy outcomes, limitations to working with government were noted. These included: the range of policy options for consideration (96) and which "expert advisors" were invited to participate or contribute to various stages of policy deliberation (36,60).

2.3.4.3 Interest groups

In addition to policymakers and scientists, studies identified a number of groups who play influential roles in illicit drug policy development, or the discourses that shape it (1,3,24,29,36,60,93-96,98,99). Depending on the circumstances of the policy situation, people who use illicit drugs and law enforcement were two groups who, whether aligned or opposed to

scientists and policymakers, were described as operating as either catalysts or inhibitors of evidence-based illicit drug policy development and having considerable influence in media or broader public discourse shaping the policy environment.

A number of studies documented mobilizations by people who use illicit drugs in support or opposition to existing or proposed policies affecting their health or criminality (3,24,26,93,98). Some observed people who use illicit drugs are so notable an interest group that whether they were consulted or represented in the policy development process (36), or perceived the policy outcomes to be acceptable (26,93,98) was associated with whether or not the policy was adopted. As per the above, studies also observed whether or how research is presented to those groups may have implications for whether or how they mobilized it in public or political discourse (24,26,98).

Many studies also identified the important role law enforcement plays in illicit drug policy development (1,3,29,60,94,96,98). For example, when faced with the enormity of the HIV epidemic (1,3), or other pressing social concerns (96,98), police forces were open to an evidence-based discourse and willing at least to consider alternative, evidence-based approaches to addressing the harms associated with illicit drug use. In other cases, law enforcement groups sought to override public health approaches supported by scientists in favour of criminal justice responses (60), at times, systematically (24,29).

Other relevant interest groups included, but were not limited to: issue groups comprised primarily of civil society groups for or against a specific measure (e.g., establishment of a supervised injection facility, the legalization of cannabis) (1,3,29,94), service providers (3,24,26), business (13,29), professional associations (2,4-6,29,93), the general public (1,36,59,61,96,98), family groups (3,29,31,61,62), and "policy communities" (61,62,94). Forces

that were not interest groups but identified as having similar potential in terms of their ability to facilitate or impede evidence-based illicit drug policy development were international illicit drug conventions and individuals representing the affiliate organizations or agencies (1,28,31,34,98,100-102) and journalists or the news media more broadly (3,13,23,25,27,28,36,93-99,103).

Several articles considered how interest groups came together to influence policy outcomes directly by participating in policy processes or indirectly by influencing public opinion (1,3,26,28-31,60,95), however, in light of the breadth of issues, variety of actors, and diversity of tactics, there was no conclusive finding as to their impacts. With respect to tactics, however, a handful of studies suggested research evidence could be mobilized by those advocacy coalitions whose objectives were aligned with evidence-based policies, regardless of whether they were motivated by the evidence-base for their position (24,31,36,95).

2.4   Discussion

The present review found evidence-based policy to be described as a likely unattainable ideal. Instead, evidence-informed policy was identified as a more realistic objective in democratic settings. This literature emphasized that effective knowledge translation activities hinge on high quality research, presented in a manner sensitive to target audiences and their political viewpoints. Dissemination tactics took a variety of forms, and among those emphasized, were participation in a range of meetings and conferences, as well as "coalition work" internal to the scientific community as well as externally. Political culture, politicization of research and a variety of interest groups were identified both as potential catalysts or barriers to evidence-based policy outcomes. Although it has been widely documented that knowledge translation initiatives

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in the public health setting are generally limited by training opportunities, resources, and lack of institutional incentives (27,104-106), in light of these obstacles and the general political controversy that appears to characterize illicit drug issues, these training deficits may be felt acutely in this area. In this regard, scientists working in this area may benefit from training in knowledge translation principles and tools specific to the illicit drug policy setting.

Based on the literature reviewed here, there are two key conclusions regarding the content and dissemination of illicit drug research to policy development settings that may guide future training in this area. With respect to content, messaging in support of research transfer to policy development should take into account the political sensitivities of the target audience. In terms of disseminating messages, a mixed approach appears advisable. This would entail traditional models of research transfer (e.g., direct exchange between scientists and policymakers) and/or making research findings available to aligned interest groups to leverage in their own advocacy or coalition work (see for example: 41,87,107). While growing this academic literature would also be beneficial and, arguably, a culturally appropriate way of influencing scientists' own knowledge translation efforts, hands on training, mentorship, and peer support strategies embracing the above concepts may also encourage the type of sustained, effective knowledge translation interventions that are needed (4,106-109).

In this regard, an emerging body of research on factors influencing illicit drug policies shows that dissemination of evidence through media (61,110) and the public sphere (27,95,96) may influence decision makers directly and via public discourse (111). Despite the potentially important role played by the "Internet" and media outreach in policy development (27,110,111), specific evaluation or commentary regarding how knowledge translation efforts may capitalize on these outreach tools was negligible (24).

2.5 Limitations

This review has a number of limitations. First, because all studies were principally case studies, commentaries, or some combination thereof, it is important to note that the analysis offered here is based on expert observations and limited empirical data were available. Second, the fact that the majority of the eligible studies came from western(-ized) settings also limits the generalizability of our findings to other settings, especially countries such as Russia where, as described previously, the discordance between science and illicit drug policy has resulted in particularly negative health outcomes (8,112,113). Third, because the study was restricted to those articles that specifically considered knowledge translation activities in the drug policy context, other articles that may have covered the topic peripherally or via case studies concerning licit drugs, were not eligible for the review. Fourth, studies here are limited to policy development and do not consider implementation outcomes.

2.6 Conclusions

Despite the well-described discordance between evidence and policy in the area of illicit drugs, more research is required to better describe effective strategies to support evidence-based policy reform. This narrative review describes various strategies and considerations for the development of knowledge translation initiatives seeking to influence the development of evidence-based illicit drug policy. Findings suggest there are a range of factors at play conditioning the impact of science and scientists on evidence-based drug policy development. While there is substantial literature dedicated to describing the deficit of evidence-based illicit drug policy, there is considerably less work evaluating strategies to improve uptake of science in policy. To advance knowledge in this area, as well as a culturally appropriate strategy to influence effective

knowledge translation efforts, the replication of existing studies in other settings and evaluations of new tools should be a focus of research going forward.

Chapter 3: An empirical analysis of an online, international, scientist-led effort promoting evidence-based illicit drug policy

3.1 Introduction

As revealed in chapter 1, it has been well documented that the publication of peer-reviewed scientific studies is often inadequate to foster active policy reform (23,25,27). Chapter 2 described a number of strategies beyond peer-review publication commonly deployed by scientists, such as participation meetings and conferences (3,26,29,93,95), and coalition work (1,3,24,29,60,95,96) and highlighted the unique role coverage of scientific findings in the lay media (e.g., newspapers, magazines, etc.) plays in developing public (39,114,115) and political (27,35) interest in evidence-based policies. With the rise of online news media and social networking websites, the last decade has seen considerable changes to information gathering and sharing patterns, with important implications for how public opinion is shaped (116) and, by extension, to the promotion of evidence-based policies. Specifically, the proliferation and popularity of online news media websites and social networking platforms such as Facebook and Twitter has created an environment wherein audiences have ready access to a range of news sources spanning regions, issues, and perspectives, which they are able to easily share with others.

Currently, there is little academic understanding of the role of digital news and social media in traditional knowledge translation efforts seeking to advance evidence-based public discourse and policy. This study therefore seeks to describe the dissemination strategy of the Vienna Declaration, the largest mobilizations of scientists to advance evidence-based drug policy

to date, and to assess which elements of that strategy were most effective in driving audiences the Vienna Declaration website. The objective in doing so was to determine the extent to which these and other online mechanisms may assist in building support for evidence-based health policies by connecting online audiences with Internet-based knowledge translation efforts.

3.2   The Vienna Declaration

In response to the discordance between scientific evidence and illicit drug policy, particularly with respect to implications for HIV prevention among people who inject drugs (PWID), in 2010 the International AIDS Society (IAS) convened the biennial International AIDS Conference in Vienna, Austria to raise the profile of injection drug use as the driving force behind HIV transmission in the region, particularly in Eastern Europe (117). The conference is one of the largest public health conferences in the world, attracting approximately 20,000 delegates. As mentioned above, in advance of the International AIDS Conference, together with the International Centre for Science in Drug Policy and the BC Centre for Excellence in HIV/AIDS, the IAS convened an international writing committee of experts in addiction, HIV/AIDS, and related fields to draft the Vienna Declaration, a scientific statement calling on policymakers to adopt evidence-based approaches to curb the spread of HIV/AIDS among PWID and to address the other unintended consequences of drug law enforcement-based illicit drug policies (4). The document was adopted as the official conference declaration and configured as an online, sign-on statement (see: www.viennadeclaration.com). Working together with communications staff from the various supporting organizations, representatives of the writing committee developed a dissemination strategy leveraging news media, social media, and organizational networks, the

objective of which was to drive traffic to the Declaration website, where visitors could endorse and share the Declaration.

Before and during the AIDS conference (July 18-23, 2010), Vienna Declaration updates were disseminated widely to the media via four descriptive press releases sent directly to reporters or editors verbally over the phone or distributed online via personal or mass emails. Upon issue, media releases were posted to the Declaration website, which also featured the Declaration text, endorsement form, blogs by high-level endorsers, relevant news coverage, and background information describing the Declaration, its objectives, and the association between HIV transmission and the criminalization of injection drug use (Table 6 presents a list of blogs, media releases, and key dates in the campaign). Links to these materials, as well as relevant online videos, graphics, and news coverage, were disseminated by organizers via mass emails, Facebook, and/or Twitter on an almost daily basis. A subset of these materials were further disseminated by news media and supporting organizations via websites, emails, and social media, and, in the case of news outlets, broadcast and print news (Table 8 presents an overview of all dissemination activities).

During the study period, the Vienna Declaration was featured in over 200 news stories in publications including the *New York Times*, *The Guardian*, the *Wall Street Journal*, and the *LA Times* (118). During this time, the Declaration was also endorsed by approximately 17,000 individuals and 400 organizations including seven Nobel Laureates, thousands of scientists, and a diversity of health, faith-based, and civil society organizations, law enforcement leaders, and judiciary from around the world. A range of past and present policymakers also endorsed the Declaration, among them former presidents of Colombia, Brazil, and Mexico, and Georgia's First Lady, Deputy Chairman of the Parliament and the Minister of Labour, Health and Social

Affairs. Notably, four Canadian municipalities also endorsed the Declaration, among them Toronto, the largest city in the country.

3.3 Methods

Visits to the Declaration website and their origins were recorded through Google Analytics, a free Google service providing a detailed statistical overview of visitor activity on websites (119). Google Analytics records the number of visits to a website and, wherever possible, their origin. For this analysis, all visits between June 26 and August 31, 2010, were reviewed and categorized as either referral, direct, or search traffic. Referral traffic is defined as visits to the website originating on an external website; direct traffic is defined as visits originating with the visitor typing in the website's URL into a web browser; and search engine traffic is defined as visits facilitated by a search engine. For referred traffic, Google Analytics provides a list of websites that sent traffic to the Declaration website and the number of visits that were sent. Of the three traffic sources, referred traffic provides the most concrete insight into where online individuals were exposed to Declaration content and from where they visited the Declaration website. Referring websites were subsequently reviewed and categorized as news media, social media, organizational, and "other", and further sub-categorized corresponding to specifics of each referral type (see Table 8 for a full list of sub-categories). By contrast, other traffic sources (i.e., direct traffic and search engine traffic,) only reveal when individuals visited the Declaration site and do not offer insight into what the visitor may have been exposed to when they made the choice to visit the Declaration website.

Once categorized, we calculated the proportion of visits each traffic source and category of referral traffic directed to the website. We used Pearson's *R* Correlation to assess potential

Table 6 List of Vienna Declaration media releases and blogs

Date	Content of blog or media release
10-06-26	**Blog** post by Dr. Michel Kazachkine (Executive Director, Global Fund to Fight AIDS, TB, and Malaria)
10-06-28	**Media release** describing the launch of the Vienna Declaration and its aims
10-07-06	**Blog** post by Paisan Suwannawong (Director, Thai AIDS Treatment Action Group)
10-07-08	**Blog** post by Dr. Pedro Cahn (Immediate Past-President, International AIDS Society)
10-07-12	**Blog** post by Dr. Adeeba Kazmarulzaman (Head of Infectious Diseases, University of Malaya, Kuala Lampur, Malaysia)
10-07-13	**Media release** describing endorsements from the former presidents of Brazil, Mexico, and Colombia and other Latin American dignitaries
10-07-16	**Blog** post by Fernando Henrique Cardoso (Former President of Brazil)
10-07-18	**INTERNATIONAL AIDS CONFERENCE BEGINS IN VIENNA**
10-07-18	Two separate **blog** posts by Drs. Julio Montaner (AIDS 2010 co-Chair) and Evan Wood (Vienna Declaration Writing Committee Chair)
10-07-22	**Media release** describing endorsements of various representatives of the Georgian government, in addition to two separate blog posts by Drs. Norm Stamper (Ret. Chief of Police, Seattle) and Elly Katabira (President, International AIDS Society)
10-07-23	**INTERNATIONAL AIDS CONFERENCE CONCLUDES IN VIENNA**
10-08-03	**Blog** post by Anya Sarang (President, Andrey Rylkov Foundation)
10-08-23	**Blog** post by Stephen Lewis (Former UN Special Envoy for HIV/AIDS in Africa)
10-08-26	**Media release** describing the City of Toronto's endorsement of the Vienna Declaration

Table 7 Overview of dissemination activities

	N	# of days	% of days	Per post
Dissemination activity	-	**50**	**73.53**	-
Twitter				
Posts	472	49	72.06	-
Re-tweets	367	45	66.18	0.78
Favourites	9	8	11.76	0.02
Interactions	276	45	66.18	0.58
Facebook				
Posts	58	33	48.53	-
Likes	1570	33	48.53	27.07
Comments	202	29	42.65	3.48
Shares	9	6	8.82	0.16
Interactions	1839	32	47.06	31.71
Email				
Sent emails	11	5	7.35	-
Clicks	6203	5	7.35	-

Table 8 Overview of traffic sources

	# of visits	# of sites	% of all visits	average visits / referral site
All visits	**52961**	**n/a**	**100**	**-**
Direct traffic	23755	0	44.85	-
Search traffic	3656	34	6.90	-
Referral traffic	25550	910	48.24	-
News referrals	**2534**	**104**	**4.78**	**24.37**
News websites (broadcast)	260	10	0.49	26.00
News websites (all other)	1904	75	3.60	25.39
Journal websites	100	11	0.19	9.09
Other news coverage	270	8	0.51	33.75
Organization referrals	**6061**	**148**	**11.44**	**40.95**
Drug-focused websites	2182	59	4.12	36.98
HIV/AIDS-focused websites	3303	43	6.24	76.81
Other health-focused websites	229	18	0.43	12.72
Other organizations' websites	347	28	0.66	12.39
Social media referrals	**14133**	**96**	**26.69**	**147.22**
Blogs	1630	67	3.08	24.33
Social bookmarking websites	1021	3	1.93	340.33
Social networking websites	11229	19	21.20	591.00
Facebook	10134	6	19.13	1689.00
Twitter	957	4	1.81	239.25
Other social media websites	253	7	0.48	36.14
Other referrals	**4523**	**562**	**8.54**	**8.05**
Commercial websites	336	13	0.63	25.85
Email clients	2040	405	3.85	5.04
Elected officials' websites	52	5	0.10	10.40
Forum websites	1326	66	2.50	20.09
Government agency websites	164	11	0.31	14.91
Other/unknown websites	605	62	1.14	9.76

statistical correlations between visits directed by referral, direct, or search engine traffic and days during which new content (e.g., press releases or blogs) was published on the Declaration website, or on days during which specific dissemination activities were undertaken (e.g., Facebook posts, Twitter posts, or the circulation of campaign emails).

3.4 Results

3.4.1 Website traffic

With respect to website traffic, during the study period, there were 52,961 visits to the

Declaration website. (Figure 2 provides an overview referral traffic patterns over the course of

the study period noting days new content was issued by the campaign.) In total, 48.2% of visits

were attributed to referral traffic, 44.9% to direct traffic, and 6.9% to search engine traffic. As

shown in Table 8, when referral traffic by category is considered as a proportion of all traffic to

the Declaration website, 4.8% of visits to the website ($N = 2,534$) came from 104 news media

websites, 11.4% ($N = 6,061$) from 148 organizational websites, 26.7% ($N = 14,133$) from 96

social media websites, and 8.5% ($N = 4523$) from 562 "other" websites (e.g., personal websites

that had no discernable affiliation with a website, service, or blog; website translation

applications, etc.). Notably, Facebook, a popular social networking website, accounted for 18.7%

($N = 10,132$) of all visits to the Declaration website, more than any other single referring

website. (Figure 3 provides and overview of traffic via social media, organizational, and news

websites over the course of the study period noting days new content was issued by the

campaign.)

3.4.2 Correlations between new content, dissemination activities, and site visits

Table 9 presents correlations between new content, dissemination activities, and site visits. This

provides insight into what influences visits via search and direct traffic sources which are

otherwise not attributable to any one aspect of the communications strategy. All findings

Figure 2 Visits to www.viennadeclaration.com by traffic type
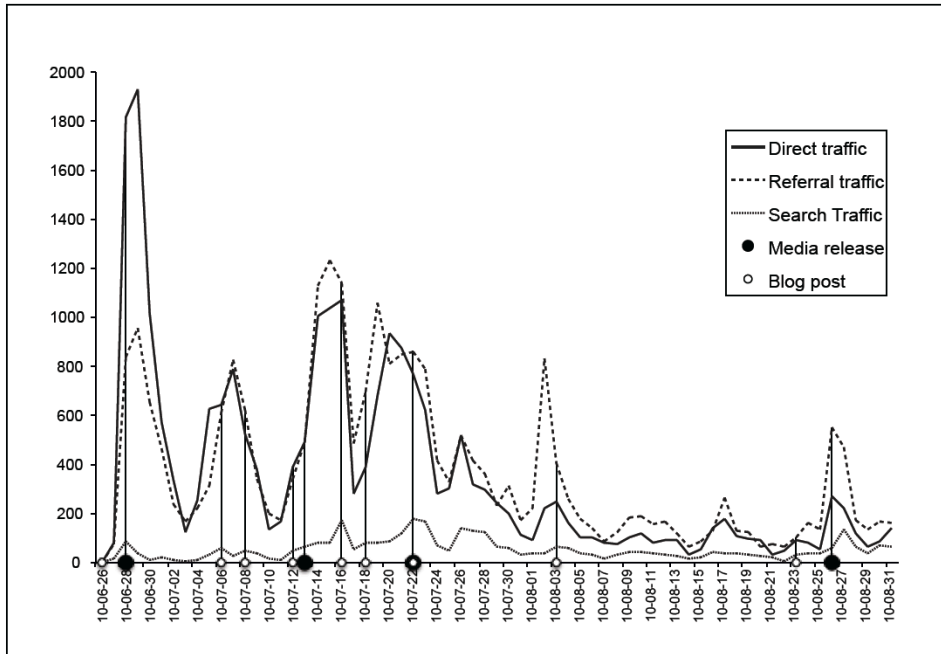
Figure 3 Visits to www.viennadeclaration.com by website source
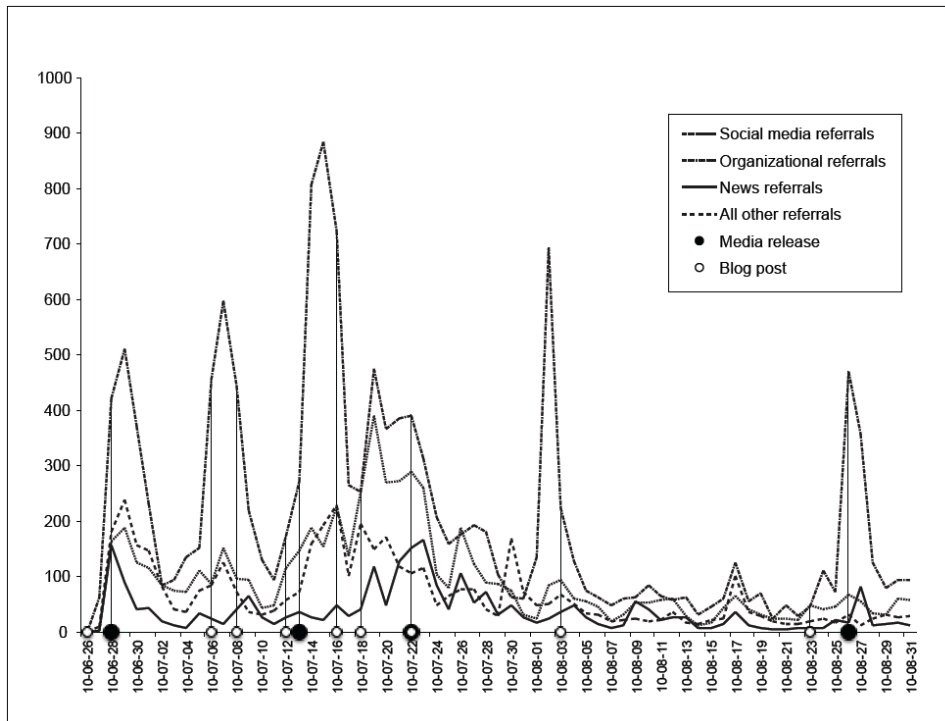
reported herein were statistically significant at the $p < 0.05$ level. New content was significantly associated with increased direct traffic and referral traffic, though not significantly associated with search traffic. When new content was disaggregated to media releases and blogs, media releases were found to be associated with increased traffic across all three traffic types. New blog posts were not significantly associated with increased traffic. Dissemination activity per day was significantly associated with changes in overall and direct traffic visits. Posting to the Declaration Twitter account was significantly associated with increased web traffic of any type to the Declaration website, as well as with direct, referral, and search traffic sources specifically. Retweets (*i.e.,* people sharing tweets from the Declaration Twitter account) were also associated

Table 9 Correlations between content publication or dissemination activities and traffic sources

	All	Direct Traffic	Search Traffic	Referral Traffic
New content	**.269**[*]	**.244**[*]	.234	**.263**[*]
Media release	**.301**[*]	**.311**[*]	**.267**[*]	**.247**[*]
Blog post	.158	.105	.211	.191
Dissemination activity	**.254**[*]	**.247**[*]	.189	.231
Twitter activity	**.273**[*]	**.265**[*]	.202	**.249**[*]
Posts	**.462**[*]	**.455**[*]	**.259**[*]	**.424**[*]
Retweets	**.368**[*]	**.310**[*]	**.253**[*]	**.398**[*]
Favourites	.119	.067	.135	.164
Interactions	**.367**[*]	**.307**[*]	**.255**[*]	**.399**[*]
Facebook activity	.116	.161	-.009	.057
Posts	.216	.273[*]	-.009	.141
Likes	.036	-.007	.057	.082
Comments	.095	.058	.099	.126
Shares	-.052	-.056	-.015	-.045
Interactions	.044	.000	.063	.088
Email activity	**.309**[*]	**.352**[*]	.002	**.247**[*]
Number sent	**.473**[*]	**.561**[*]	.124	**.334**[*]
Number of clicks	**.476**[*]	**.513**[*]	.093	**.403**[*]

*. Correlation is significant at the 0.05 level (2-tailed).

with all types of traffic. Facebook posts were significantly associated with increased direct traffic visits, though all other Facebook activity was not significantly associated with visits from other web traffic sources. Significant associations were observed between direct and referral traffic and email activity, including the number of emails sent by the Declaration team on a given day and the number of clicks those emails received. No email activity was associated with increased search traffic to the Declaration website.

3.5   Discussion

This study describes a public education campaign centered around the Vienna Declaration, the official conference declaration of one of the world's largest public health conferences. An analysis of daily website visits and their sources found there were over 50,000 visits to the Vienna Declaration website and, of the identifiable traffic sources, the largest proportion came from social media websites (21.20%), specifically Facebook (19.13%). However, activity on the official Vienna Declaration Facebook account – measured both in terms of posts and user-responses – was not associated with overall traffic to the website. Findings indicate referrals came directly from Facebook in substantial volume and that posting on the Declaration's official Facebook page was significantly associated with direct traffic. Twitter did not directly refer a large volume of visits to the website, however, posting to the Vienna Declaration Twitter account was significantly associated with visits to the website.

Despite the Vienna Declaration often being featured on high profile news media websites (e.g., New York Times) news media referrals accounted for only a small proportion of referrals to the website (4.8%). In contrast, media releases were associated with all types of traffic to the website, though the publication of blogs on the Vienna Declaration website was not. The

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Declaration received a considerable amount of media coverage over the study period and it was not customary for those news articles appearing online to link back to the Declaration website. However, the fact that the issuing of media releases was associated with traffic to the website while blogs were not, suggests there may be some important differences between how campaign-issued blogs versus media releases are disseminated to, perceived by, or consumed by individuals and traditional news media.

In 2010, on Google's list of the top 1000 websites globally, social media websites Facebook, YouTube, BlogSpot, and Twitter held places 1, 2, 7, and 15 respectively with the first emergence of news media websites ranking at 48, 60, 86 (BBC, CNN, and Huffington Post, respectively). At that time, on average, social media websites reached approximately 32% of the total Internet population, compared to news websites, which reached an average of 2.6% of the same population (120). This discrepancy between social and news media websites persists today (47), and has practical implications for knowledge translation efforts. Specifically, while news media websites may not have as large an online audience, studies have long shown mainstream news media influence public discourse as well as policy agendas and outcomes in a number of public policy areas (121), including illicit drug policy (122-125). In the present study, while news media websites were not sending as much traffic to the Declaration website as organizational and social media websites, news media website content was posted regularly to the Vienna Declaration Facebook and Twitter pages and shared widely on social media platforms. Even though news media websites were not a top driver of traffic to the website, they may have therefore acted as indirect referral mechanisms or served other important functions such as elevating the profile of the Declaration in the eyes of the public and decision-makers. Given their greater audience reach, social media websites have an increased potential for

referrals than news media and organizational websites. Indeed, the potential of online news stories and websites to serve as effective knowledge translation tools may rely, at least in part, on sharing via such channels – by media outlets, organizational networks, supporters, as well as the knowledge translation effort itself (126).

3.6   Limitations

This study has several limitations. First, although the Declaration website was translated into seven languages, this study only considers data from the English-language Declaration website, and findings presented here are limited only to that aspect of the campaign. Second, due to limitations of website and sign-up form configurations and compatibility, specifics of website visits (time on website, pages viewed per visit, etc.) and precise time of endorsement either were not accurately recorded. As a result, this study cannot offer insight into qualities of the visits directed by the different traffic sources, only their occurrence. Third, search and direct traffic accounted for approximately 50% of all visits, because these traffic types give no clue as to what spurred these visits, we cannot determine which aspect of Declaration dissemination strategy, if any, they may be attributed to. Finally, while referrals originating on organizational websites and news media website referrals only accounted for 11.4% and 4.8% of visits to the Declaration website respectively, the contributions of these entities may not be fully illustrated in the analysis above. For example, much the same way that the Facebook or Twitter accounts of the Declaration were configured as clearinghouses for Declaration updates, so too are the Facebook and Twitter accounts of many news media outlets and organizations. As such, it is possible that the impact of news media coverage on traffic to the Declaration site was obfuscated by inclusion within traffic originating from Facebook and Twitter.

3.7   Conclusions

In summary, the present study found that within a two-month period, the Vienna Declaration website was visited over 50,000 times. Further study of these visits revealed social media websites were the largest identifiable source of traffic. Furthermore, despite limited referrals from news media websites, the posting of press releases on the Declaration website was associated with increased visits, suggesting that media coverage (on- or off-line) may contribute indirectly to direct engagement with online knowledge translation campaigns. These findings should be useful for future scientific efforts seeking to leverage news media, social media, and organizational networks in public education efforts to advance evidence-based public discourse and policy.

Chapter 4: Conclusion

What follows offers a summary of the findings and unique contributions of this thesis, its limitations, and proposals for future lines of inquiry. These proposals strive to further advance the new insights generated by this thesis in the interest of improving upon understandings of how scientists may mobilize effectively to promote evidence-based policy in this area and others where the discordance between evidence and policy is similarly problematic.

4.1   Summary of findings and unique contributions

The primary objectives of this thesis were to 1) synthesize what is known about conventional knowledge translation activities and strategies scientists use to advance evidence-based drug policies and 2) to describe and evaluate in detail the largest scientist-led mobilization to support evidence-based illicit drug policy to date, and 3) combined, generate insights into knowledge translation strategies that may support the advancement of evidence-based illicit drug policy, especially as they related to public and political discourse.

4.1.1   Current approaches to knowledge translation in this setting

As described in chapter 1, it is well established that illicit drug policy development is heavily conditioned by the media and public opinion, particularly in western settings (38,39,41,110). Accordingly, chapter 2 provided an inventory and systematic qualitative assessment of a range of knowledge translation strategies used by scientists to advance evidence-based illicit drug policy. A systematic review of 2465 publication records generated from eight databases, identified 15 relevant articles describing such efforts. The analysis revealed a variety of strategies are used by

scientists seeking to advance evidence-based drug policy (Table 5) and that their effects are conditioned by a number of qualitative aspects.

While policy relevant research is the most commonly reported knowledge translation activity identified in the study sample, in many respects, it is a necessary precursor to the variety of other activities, which are likely selected and deployed as they correspond to the knowledge translation objectives. Indeed, the diversity of the tools described in the literature may be proof of the fact that scientists are cognizant of those qualitative aspects described above, and are tailoring their knowledge translation efforts to the unique cultural, political, social, economic, or other aspects of their policy setting.

4.1.2   The Internet, social media, and knowledge translation

The Internet and its associated array of relatively affordable online publishing and dissemination platforms (many with remarkable audience share) represent an opportunity for dissemination and engagement activities supporting the development of evidence-based drug policy. Indeed, chapter 3 provides some empirical support for such a strategy.

Chapter 3 consists of a case study describing in detail, for the first time, the largest-ever mobilization by scientists to advance an evidence-based approach to illicit drug policy. This analysis of the Vienna Declaration offers a detailed overview of the communications strategy, timeline, materials, and tools associated with a web-based knowledge translation campaign. It also puts forward a methodology for disaggregating and empirically evaluating website traffic to identify how different aspects of a communications strategy facilitate direct engagement with primary knowledge translation materials. Using this approach, the study provides the first empirical evidence of social media's relevance to scientist-led knowledge translation and

science-based dissemination efforts. Specifically, the work reveals that despite considerable on- and off-line media coverage and organizational support, the majority of identifiable web traffic came via social media channels. Here, social media websites, specifically Facebook, were the largest identifiable sources of traffic to the site. As well, the study revealed the posting of new content to the Declaration website, more so media releases, was significantly associated with increases in site visits.

4.2   Limitations

As with all research, the work contained in this thesis has its limitations. Specific issues are described throughout the text, however, the generalizability of findings was a limitation common throughout the work and is discussed here in detail. Section 4.3 follows with a range of research priorities that seek to address these shortcomings and further address the research objectives outlined above.

All but two studies reviewed in chapter 2, as well as the material presented in chapter 3, are based on case studies and, as a result, the generalizability of findings to other settings is limited. In both instances, claims as to the contributions and potential contributions of various knowledge translation tactics to efforts seeking to influence evidence-based illicit drug policy are limited to their original settings, providing only hypothetical insights into broader trends. This is due in part to the non-standardized nature of the variables in question, as well as to the diversity of the cases considered. While chapter 3 seeks to improve upon the noticeable lack of quantitative study in this area and advance measures that are comparable across web-based knowledge translation efforts seeking to influence evidence-based drug policy, without comparison studies the findings remain limited in their generalizability.

4.3   Directions for further research

Despite the well-described discordance between evidence and policy in the area of illicit drugs, further research is required to 1) better describe effective strategies to support evidence-based illicit drug policy reform, 2) improve the generalizability of existing observations and theories and 3) reconcile existing academic understandings with current information-sharing and -seeking realities.

While case studies have provided samples of knowledge translation strategies and conditions on their effectiveness, attempts to quantify the scope of interventions and their impacts (e.g., website visits, citations of materials in policy discourse/documents, and so on) are few and far between. Furthermore, despite the well-documented modifying effect of new Internet communications technologies on the distribution of news by media outlets and information-seeking behaviors of individuals, and the well-documented influence public opinion and media coverage have on drug policy agendas and policy responses (38-40,125), it is concerning more research has not addressed the potential role of web-based or -supported knowledge translation efforts.

The scale up of academic study, especially quantitative work, should be a priority for researchers in this field. One starting point would be to replicate existing studies. Another would be to take an experimental or research-based approach to knowledge translation efforts already going forward. Indeed, in recent years there have been a variety of scientist-led efforts to influence evidence-based illicit drug policy – web-based and otherwise – that go entirely undocumented by the academic literature that may serve as natural experiments (19). Whatever the approach or methods, future efforts should strive to standardize measurements and outcomes so comparisons of similar efforts and, eventually, synthesis is possible.

4.4   Closing

As described above, a growing wealth of research has shown traditional illicit drug policies represent a critical source of inequity and ongoing health-related harms for persons who use drugs around the world (1-6). Internationally, criminal justice approaches have been the preferred response to the health and social harms associated with drug use, production, and distribution. The harms associated with these policies have spurred several calls for "evidence-based" policy reform, such as The Vienna Declaration, whereby policies that criminalize drug users would be replaced with public health approaches. These calls for reform, have raised questions about the strategies and tools scientists, researchers, academics and/or health practitioners may mobilize to support this objective.

In this context, the primary objectives of this thesis were to: 1) synthesize what is known about conventional activities and strategies scientists use to advance evidence-based drug policies and 2) to describe and evaluate in detail the Vienna Declaration campaign, the largest scientist-led mobilization to support evidence-based illicit drug policy to date, and 3) to generate insights into strategies that may support the advancement of evidence-based illicit drug policy, especially as they related to public and political discourse.

Accordingly, the narrative review in chapter 2 describes various strategies and considerations for the development of knowledge translation initiatives seeking to influence the development of evidence-based illicit drug policy. The review clearly demonstrates a range of factors condition the impact of science and scientists on evidence-based drug policy development. It also revealed that while there is substantial literature dedicated to describing the deficit of evidence-based illicit drug policy, there is considerably less work evaluating strategies

to improve uptake of science in policy and surprisingly little consideration of the role of Internet communication technologies.

Chapter 3 sought to address both these shortcomings via a comprehensive description and analysis of the web-based Vienna Declaration public education campaign. Study findings revealed that the Internet and social media were relevant dissemination tools in the context of the campaign and suggesting they may be relevant dissemination tools in other efforts to support science-based efforts to advance evidence-based drug policy. Specifically, the study found that within a two-month period, the Vienna Declaration website was visited over 50,000 times. Further study of these visits revealed social media websites were the largest identifiable source of traffic. However, despite limited referrals from news media websites, the posting of press releases on the Declaration website was associated with increased visits, suggesting that media coverage (on- or off-line) may contribute indirectly to direct engagement with online knowledge translation campaigns.

Combined, these findings advance academic understandings of effective knowledge translation in the context of illicit drug policy development and provide a basis for the development of practical strategies to support the development of scientist-led knowledge translation in this area, especially for those efforts seeking to leverage news media, social media, and organizational networks in public education efforts to advance evidence-based public discourse and policy. Given the deficit of research in this area and long-standing limitations to scientists' proficiency engaging the public, media, and policymakers, additional research is needed to better understand the tools and strategies available to scientists working in this area. While the potential of peer-reviewed research to improve knowledge translation efforts in real-

time may be limited, such a research agenda may serve as a culturally appropriate way of influencing scientists' future knowledge translation efforts.

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Appendices

Appendix A Search Terms

(policy

OR

policies

OR

legislation*

OR

guidelines

OR

protocol*)

AND

("illegal drug*"

OR

"illicit drug*")

Since 1980

Appendix B Data extraction sheet

CITATION		
ELIGIBLE?	**YES NO**	**EXCLUSION JUSTIFICATION:**
ALL ARTICLES		
1. **First author**		
2. **First author country**		
3. **Title**		
4. **Publication year**		
5. **Journal - title**		
6. **Journal - discipline**		
7. **Article type**	empirical research case study opinion	
8. **Article aims**		
9. **Relevant review objectives**	1 2 3 4	
10. **Country/State/City**		
11. **Policy level**	municipal province or state federal supranational	
12. **Policy focus**	[summarize]	
FOLLOW-UP		
13. **Aims**		
14. **Policy focus**		
15. **Key findings**		
16. **Limitations**		