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Exchanging expertise and constructing boundaries: the development of a transnational knowledge network around heroin-assisted treatment

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Abstract

Over the last twenty years, supervised injectable and inhalable heroin prescribing has been developed, tested and in some cases introduced as a second line treatment for limited groups of entrenched heroin users in a number of European countries and Canada. Based on documentary analyses and eleven key informant interviews, this paper investigates the growth of 'expertise' and the sharing of knowledge between scientific stakeholders from different countries involved in researching and developing this area of treatment. Drawing on Stone's concept of the 'knowledge network' (Stone, 2013) and Gieryn's theory of 'boundary-work' (Gieryn, 1983), the analysis demonstrates the collective power of this group of scientists in producing a particular form of knowledge and expertise which has accrued and been exchanged over time. It also illustrates the ways in which this type of science has gained credibility and authority and become legitimised, reinforced and reproduced by those who employ it in both scientific and political debates. Boundaries were constructed by the knowledge network between different types of professions/disciplines, different forms of science and between the production of science and its consumption by non-scientists. The uniformity of the knowledge network in terms of their professional and disciplinary backgrounds, methodological expertise and ideological perspectives has meant that alternative forms of knowledge and perspectives have been neglected. This limits the nature and scope of the scientific evidence on which to base policy and practice decisions impacting

on the work of policy makers and practitioners as well as the experiences of those in treatment who are most affected by this research and policy development.

Key words: knowledge network, boundary-work, scientific stakeholders, heroin-assisted treatment, drug policy, science

Introduction

In the last twenty years, supervised injectable (SIH) and inhalable heroin prescribing has been developed, tested and in some cases implemented for limited groups of entrenched heroin users as a second-line treatment in a number of European countries and in Canada. This form of prescribing differs from that under the old ‘British system’ where the heroin prescription was taken away from the clinic setting and injected in an unsupervised context (Strang et al, 2012). The new developments in supervised heroin prescribing have been based on over two decades of intensive research, mainly in form of randomised controlled trials (RCTs), to test its effectiveness on a range of outcome measures. These began with the Swiss studies from 1994-1996 (Perneger et al, 1998; Rehm et al, 2001), followed by the Dutch trials from 1998-2002 (van den Brink et al, 2003; Blanken et al, 2010), the German trial from 2003-2005 (Haasen et al, 2007), the Spanish trial from 2003-2006 (March et al, 2006), the British trial from 2005-2008 (Strang et al, 2010), the Canadian trial from 2005-2008 (Oviedo-Joekes et al, 2009), and more recently the Belgian trial from 2011-2013 (Demaret et al, 2015). The evidence and expertise in this area have accumulated with each successive trial and demonstrated that heroin-assisted treatment (HAT) is more effective than oral methadone in reducing street heroin use, physical and mental health problems and criminal behaviour for methadone refractory heroin users (Strang et al, 2012). Based on this international evidence, the Danish National Board of Health concluded that there was no need to launch their own

trials of supervised injectable heroin (National Board of Health, 2008). From March 2009, HAT was permitted in Denmark and the first clinic opened in Copenhagen in 2010. Denmark, Germany, the Netherlands and Switzerland have approved supervised heroin-assisted treatment as a second-line treatment and SIH clinics have been integrated into local treatment services.

Heroin-assisted treatment has been politically controversial in all of the countries that have conducted trials. It has been described by Khan et al (2014: 200) as ‘one of the most controversial practices in clinical medicine despite its documented effectiveness’. This relates to the stigma associated with heroin as the perceived ‘hardest drug’ and the related stigmatisation and marginalisation of those who use it. It also is linked to paradox of treating those who are dependent on heroin with the very drug of dependency - heroin. Although HAT attracts much political attention, only a small proportion of heroin users receive such treatment. For example, in countries where HAT has been integrated into the treatment system, it accounts for between five and eight per cent of those enrolled in substitution treatment (Strang et al, 2012). Several researchers have outlined the multiple challenges, barriers and restrictions involved in designing and conducting RCT research in this area, particularly in relation to negotiating the tensions between the demands of science and politics (Trujols and Iraurgi, 2009; Gartry et al, 2009; Small, Drucker et al, 2006; Wodak et al, 2002). Against this challenging backdrop in each country, the scientists conducting the trials have relied on their epistemic authority and scientific integrity to counter the political challenges to the research and implementation of HAT. Science and scientists have played increasingly important roles in the acceptance and growth of HAT.

Drawing on Stone’s concept of the ‘knowledge network’ (Stone, 2013) and Gieryn’s theory of boundary-work (Gieryn, 1983), this paper explores the development of the transnational

network of scientists involved in the development of HAT across Europe and internationally, the ways in which the expertise and knowledge in this area has been constructed, exchanged, mobilized and transferred between key actors in the different countries and how the scientists have engaged in different forms of boundary-work to demarcate their expertise and knowledge from other forms. The paper begins by examining the concepts of knowledge networks and epistemic communities, followed by a description of the research design and methodology employed in the study. It then explores the ways in which expertise, ideology and interests were defined within the knowledge network around HAT, how this knowledge and expertise has been exchanged and transferred inside and outside the network and the ways in which the scientists have engaged in ‘boundary-work’ to demarcate ‘science’ from ‘non-scientific activities’.

Knowledge networks, epistemic communities and boundary-work

The existing literature exploring the ways in which scientific evidence has been developed and invoked in the debates around heroin-assisted treatment has focused mainly on national case studies, for example in Denmark (Jepson, 2001; Houborg, 2010) and in the Netherlands (Dehue, 2002), and the mapping of the network of HAT researchers through co-authorship analyses (Houborg and Munksgaard Anderson, 2015). Research attention has not been directed towards the *group* of scientists from the various countries involved in the trials and their *collective* roles in the production, exchange and translation of this knowledge and expertise. Such qualitative analysis is important for understanding which forms of knowledge and expertise are defined as legitimate and credible and become reinforced over time through the mobilisation and transfer of scientific results and practices between scientists and other actors. This paper draws on concepts and theories from both the fields of

global governance and the sociology of scientific knowledge. In order to explain the networking activities of the group of scientists involved in the development of heroin-assisted treatment transnationally, Stone's concept of the knowledge network will be employed (Stone, 2013). Gieryn's theory of boundary-work (Gieryn, 1983; 1999) will be applied to illuminate the social processes involved in the development and mapping of the science around HAT by the knowledge network.

Knowledge networks are not necessarily policy-focused, but they are engaged in advancing science around a specific topic or issue and concerned with "'codified' forms of knowledge produced by recognised intellectuals in the form of research and analysis" (Stone, 2003: 8). They produce, exchange and translate knowledge across national boundaries. Knowledge networks can take different shapes over time and many are not permanent entities. Inclusion in networks depends on 'official recognition of expert authority as well as more subtle and informal processes of validating scholarly and scientific credibility' (Stone, 2002: 2). The expertise, scientific knowledge, professional experience and credentials of the actors in knowledge networks give them epistemic authority and credibility to inform policy and practice. The temporal aspect of the knowledge-policy interface is important as the influence of knowledge networks and knowledge actors may shift over time. As Stone (2012: 3) argues, influence rests in the aggregate contributions of wider networks of researchers who develop knowledge and evidence over time, rather than resting on individual contributions of lone scholars. This paper will explore how the knowledge network around HAT developed, the ways in which their knowledge and expertise was constructed and diffused between the different countries and how the aggregate contributions of the knowledge network built up over time and influenced the development of policy and practice.

The emergence of epistemic communities has become increasingly important within drugs policy-making at the European level (Elvins, 2003). Epistemic communities are actor based, so attention is focused on the source of ideas and the development of supranational ‘expert’ networks in particular policy and practice domains. These communities aim to attain an authoritative voice in issue areas, generate ‘multistakeholder dialogue’ and build consensus – with resultant implications for policy and practice at national level. Haas (1992: 3) defines an epistemic community in the following way: “a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area.” Epistemic communities normally include professionals from a range of disciplines and backgrounds, but they must have shared normative and principled beliefs, causal beliefs, notions of validity and a common policy enterprise (Haas, 1992: 3).

As Demortain (2011) argues, Haas’ conceptualisation is compelling because it offers three layers of explanation. First, the authority of science underpins the framework. The influence of scientists is dependent on them embodying scientific method, prestige and authority. Where uncertainty surrounds policy problems (eg. drugs), epistemic communities provide knowledge to compensate for this uncertainty. Second, the notion of ‘community’ is important because it increases co-ordination between policy makers and scientists. Third, the involvement of professionals enhances the codification and authority of specialised expert knowledge. Scientists within epistemic communities act as ‘experts’ in the policy world. Politicians and bureaucrats may turn to experts and their ideas at particular junctures. However, the influence of experts only materialises when there is a connection between these two worlds (i.e. the scientific world and the policy world). In this perspective, the production of scientific knowledge is viewed as external or separate to politics and policy-making processes.

Demortain (2011) highlights various difficulties with epistemic communities. For example, identifying shared beliefs present methodological challenges. Such expert communities are not stable because scientific knowledge is not contained in the boundaries of well-defined groups. It is disputed, unstable and transient. Actors beyond the academy, such as government officials, funders, university administrators and publishers, may influence scientists. This affects the content and type of research designed, commissioned, funded, conducted and published. These actors can play important roles as both gateways and gatekeepers to the types of knowledge produced. Government agencies negotiate the meaning and location of the boundaries and acceptability of science (Berridge, 2006). As Stone (2013: 191) argues, the ‘authorship of knowledge’ extends beyond the scientists to a wide range of stakeholders who participate in and affect these processes. Knowledge is thus co-produced between scientists, policy makers and other actors.

Within post-positivist scholarship, the boundaries between science/experts and policy making are blurred. Backstrand (2004) argues that there is a constant re-evaluation of the status of expert knowledge and the boundaries between scientific and non-scientific knowledge, expert and lay knowledge, and global and local knowledge. Science, research and knowledge operate inside politics rather than outside it. This links to Gieryn’s concept of ‘boundary-work’ and the ways in which the legitimacy, credibility and authority of scientific knowledge are maintained by establishing boundaries or borders between different types of professions/disciplines/scientists, between different forms of knowledge and science and between the production of scientific knowledge and its consumption by non-scientists. These forms of demarcation and boundary-work are not only analytical matters, but linked to material opportunities, resources and professional authority (Gieryn, 1983). When examining the processes of drugs policy governance, key questions include what counts as ‘expertise’, what counts as ‘evidence’, and who decides what counts? (Duke and Thom, 2014). Drawing on

these insights, this paper will explore the ways in which scientists in the area of heroin-assisted treatment engaged in boundary-work and demarcated between different professions/disciplines, different forms of evidence and knowledge, and scientific and political domains.

Research Design and Methodology

The current study was based on a qualitative design that included documentary analyses, questionnaires and semi-structured interviews conducted between August 2013 and April 2015. In order to identify the ‘knowledge network’ in this area, a literature review, documentary analyses and short survey provided the foundation for the study. The Cochrane systematic review of heroin-assisted treatment (Ferri et al, 2011) and the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) review of evidence and practice (Strang et al, 2012) were useful points of departure to identify the key studies and their associated scientists. The literature review and documentary analyses were followed by a short survey questionnaire to the six EMCDDA National Focal Point representatives in the countries that had trials and/or had implemented heroin-assisted treatment. These Focal Points are responsible for collecting and collating data on their national drug situations to feed into the European monitoring system and thus have an overview of drugs research and expertise in their countries. The participants who completed the questionnaire were asked to identify which ‘experts’ they considered to be part of this particular knowledge network on HAT both in their own countries and internationally and who they recognised as influential within it. The short questionnaire included both closed and open-ended questions.

On the basis of the literature review, documentary analyses and results of the survey to EMCDDA focal points, key informants were identified for interview. A total of eleven semi-structured interviews were conducted with a core group of scientists/researchers including eight trial scientists, one contributor to the Cochrane Drug and Alcohol Group, and two representatives from the EMCDDA. The interviews focused on the development of the network of scientists involved in HAT, how they interacted with each other over time, how they defined their expertise, and their roles in the production of knowledge and their influence on policy at international, European and national levels. Although semi-structured, the interviews also included open-ended discussion to allow participants to express their thoughts and experiences in their own way (Rubin and Rubin, 2011). The interviews lasted around one hour and either took place face-to-face in the respondent's place of work, by telephone or by Skype. All of the interviews were recorded and transcribed.

The research was carried out using the prescribed ethical guidelines at the Drug and Alcohol Research Centre, Middlesex University and ethical approval was obtained from the Social Work Ethics Sub-committee.¹ Respondents were provided with an information sheet about the project outlining the background, purpose and format for the study and asked to sign a consent form. Participants were guaranteed confidentiality and anonymity. The network of scientists in this area of treatment is very small. In order to protect their identities, all identifiers such as details about the organisation, institution, department and country of origin have been removed in order to ensure that information is non-attributable.

At the end of the fieldwork, interview transcripts and notes were read systematically and all themes and categories emerging from the data were noted and coded on the transcripts. Some

¹ The ethical guidelines adopted were the *Research Governance Framework for Health and Social Care* issued by the Department of Health (available from <http://www.dh.gov.uk/en/index.htm>), as well as the *Code of Ethics for Social Work* issued by the British Association of Social Workers (available from <http://www.basw.co.uk/>).

themes were derived from existing theory, literature and documents and had been covered systematically within the interviews while others were generated spontaneously and subsequently developed inductively during analysis.

Defining expertise, ideology and interests in heroin-assisted treatment (HAT)

The main scientists involved in HAT were identified through their publications, the review of evidence and current practices published by the EMCDDA in 2012 (Strang et al, 2012) and through questions in the interviews and questionnaires (See Table 1). Beginning with the Swiss trials in 1994, they acquired much knowledge and expertise through their development of this area of drug treatment and were viewed as the key experts due to their scientific knowledge. As one participant commented, they were seen to be the *‘producers of the science’*. Evans and Collins (2008) suggest that expertise is both social and performative in that experts are familiar with the formal aspects of knowledge along with the capacity to act and respond. They argue that expertise belongs to both individuals and communities and it is agreed, shared, transmitted and validated by a wider community.

Table 1: Main scientists involved in heroin-assisted treatment research		
Year	Country	Main scientists
1994-1996	Switzerland (cohort studies & 1 RCT in Geneva)	Prof. Dr Ambros Uchtenhagen Dr Jurgen Rehm Prof Thomas Perneger
1998-2002	Netherlands (2 RCTs)	Prof Dr Wim van den Brink Prof Dr Jan van Ree Dr Vincent Hendriks Dr Peter Blanken
2003-2005	Germany (multi-centre RCT)	Prof Dr Christian Haasen Prof Dr Michael Krausz Prof Dr Dieter Naber Dr Uwe Verthein
2003-2006	Spain (RCTs in Andalusia and Catalonia)	Dr Joan Carlos March Cerda Mr Manuel Romero

		Dr Eugenia Oviedo-Joekes Dr Miguel Casas Brugue Dr Jose Perez de los Cobos Dr Miquel del Rio
2005-2008	Canada (multi centre RCT)	Prof Martin Schechter Dr Eugenia Oviedo-Joekes Dr David Marsh Dr Suzanne Brissette
2005-2008	Britain (multi-centre RCT)	Prof Dr John Strang Dr Nicola Metrebian Dr Nick Lintzeris Dr Teodora Groshkova
2011-2013	Belgium (experimental, RCT)	Prof Dr Marc Ansseau Prof Dr Andre Lemaitre Dr Isabelle Demaret Dr Christian Figiel

Within the group of principal investigators leading the trials, medical backgrounds and especially psychiatry dominated. The exception was the Canadian trial led by an epidemiologist and a psychologist. In most cases, the scientists conducting the trials were also clinicians. In line with their expertise, the approach followed a medical model with similarities to treating diseases like cancer. The goal was to provide an alternative treatment for those who were treatment refractory in opioid substitution treatment (Strang et al, 2012). In the interviews with the trial scientists, boundaries were drawn between the different professional, disciplinary and methodological backgrounds of the scientists involved in HAT research and others within the drugs field. In relation to the dominance of psychiatrists over other types of treatment researchers, one trials scientist commented that this was related to their professional authority and position,

“...Their status is just in general lower than psychiatrists and they don’t have a strong professional and scientific position...there was quite a lot of money that the governments were giving to these trials, millions...It has to do with perceived professionalism and being confident with the methodology of randomised control trials.”

Jepson (2001) also has emphasised the importance of expertise in the Swiss and Dutch trials, particularly the medical professions. The scientists involved had high professional and scientific standing and were viewed as authoritative, legitimate and credible. Inclusion in knowledge networks is based on recognition of expertise by peers and other professionals and ‘commitment to certain journals, conferences or other gatherings and organs that help bestow scholarly, ideological and scientific credibility’ (Stone, 2013: 44). The respondents also emphasised the importance of peer review in high impact medical journals to increase the credibility and acceptability of the findings. These ‘products of expertise’ (McCann, 2008) in the form of publications, presentations, reports, and websites were important in the circulation of knowledge both inside and outside the knowledge network. Moreover, these products of expertise help to sustain, reinforce and reproduce the epistemic authority of the science over time (Gieryn, 1999).

In some countries, the notion of expertise extended beyond medicine, psychiatry and experience in conducting RCTs. For example, in Canada, because the trial was not initiated by the government, the researchers had to gain the support of the government, funders and wider community. This process involved sensitive negotiations with the city of Vancouver, Health Canada, the local communities and the media (see Gartry et al, 2009). Similarly, in order to move HAT from a scientific experiment to a routine treatment in some of the European countries, additional work and expertise was needed including registering injectable or inhalable heroin as a medication for opioid dependence with the European Medicines Agency (EMA), ensuring the inclusion of HAT on the list of provisions to be paid by health insurance in some countries, providing advice in order to revise the narcotics laws to provide the legal basis for HAT and in some cases arranging for the supply of prescription heroin for treatment purposes. These more tacit, practical forms of knowledge and negotiation were seen to be important by the scientists involved in the trials.

The motivation and interest on the part of the scientists to conduct work in this area was varied. Through their clinical work, some respondents had been working with heroin users who had not responded to conventional treatments (eg. methadone maintenance) and they were interested in exploring new ways of treating this small group. However, the authority, prestige and influence which comes from conducting research in such a controversial area may create incentives to draw the boundaries of science in certain ways (Gieryn, 1999). For example, one respondent outside the network of scientists, suggested that it was a mix of interests which motivated the scientists, but also linked to career progression and increasing their visibility and authority in the research world.

“It’s a mix of interests...they were convinced this was the way forward. They were all eager to get this study...to publish on a sexy topic and to have their name linked to this new topic...This is a clear interest of the research which is not just providing the patient with the best treatment available, it’s also to generate income, to generate the positive public image, the visibility as a scientist. If you can come up with a RCT on such a sexy topic, then it helps.”

However, contrary to the above view, one of the trials scientists suggested there was no mileage in doing this type of research for researchers career-wise due to the politics and difficulties in this area of treatment:

“We took a lot of criticism...As a career path, people should think twice before engaging in a heroin-assisted treatment study!”

From the interviews, it was clear that the knowledge network was influenced by certain ideologies and perspectives in their work. In particular, they emphasised that were working with an unpopular and stigmatized group in a difficult area of public policy infused with moral judgements where the provision of heroin to ‘drug addicts’ was seen to be immoral by

many sectors of society. One researcher referred to the group of trial scientists as ‘pioneers’ both in terms of advances in knowledge that they were making around this form of treatment, but also that they were prescribing the very substance of ‘addiction’ as treatment:

“They were pioneers because they were reverting the idea that treatment should take people out of the pleasure of the substance... The use of the same substance of abuse is a kind of paradigmatic revolution...moving the attention from the substance to the risk related to the use of the substance.”

The knowledge network was influenced by harm reduction oriented ideologies. One of the trial scientists commented on how the group involved in the work was very conscious not to criticise methadone programmes seen to be the starting point for treatment:

“So the fact that we were busy with something new, we were very aware that we shouldn’t talk bad about the old - the methadone. We were part of the same family...Everyone that was in this...let’s not call it a movement, but it was a kind of family that were doing these trials.”

Some scientists viewed themselves as explicitly part of the harm reduction movement through non-governmental organisations, such as Harm Reduction International (formerly known as International Harm Reduction Association). This organisation conforms to a type of transnational advocacy network that include non-governmental organisations, activists, and academics that help to shape the public debate (Stone, 2013). These types of networks are bound together by shared values, exchange of information and services and shared discourse. The emphasis is on the development of techniques and strategies of networking transnationally. They form around ‘principled beliefs’ or normative ideas that provide criteria to distinguish right from wrong. In contrast, epistemic communities form around causal beliefs based on cause-effect relationships. Knowledge networks, particularly epistemic

communities, are more 'exclusive' and 'scientific' in composition and attempt to assert their independence from government or vested interests on the basis of their 'expert' knowledge (Stone, 2013).

Linked to the harm reduction perspective, one of the key characteristics of the expertise within the network was seen to be 'pragmatism':

“Everybody working on heroin-assisted treatment, working, not doing advocacy, because the people that are doing advocacy, they have a more romantic idea about heroin-assisted treatment. But the people that actually do the work, we are pragmatic people.” (Interview with trials scientist)

Although the respondents discussed the ideology of harm reduction in relation to their work, there was also a distancing away from any overt political advocacy. Where there is uncertainty and controversy surrounding a policy problem (i.e. drugs), the chance for scientific knowledge to gain ascendancy and authority can be undermined (Demortain, 2011). Part of the pragmatic outlook of the scientists was the ways in which they emphasised their commitment and referral to the 'science' and their attempts to avoid becoming embroiled in moral and political arguments regarding drug use, criminalisation, and harm reduction. Some scientists who were interviewed stressed that it was important to stay neutral and as one trial scientist put it, *'to keep cool and stay on the science side of things'*. In effect, a boundary was mapped between the scientific domain and the political arena which needed to be maintained in order for the science to be seen as 'objective' and command assent in the political debate. Given the potential political conflicts and the need to adhere to international drug control laws, the first Swiss and Dutch trials with HAT were also constructed in scientific terms rather than employing harm reduction arguments. This placed the issue firmly in the hands of the medical researchers who were conducting

the trials (Jepson, 2001). They emphasised the ‘neutrality’ of their results in terms of wider drug policy. For example, one trials scientist argued:

“What we found from all those trials is pretty neutral to the debate about what should one do about heroin and its legal status and all that sort of stuff. It very specifically says that for the target group, this treatment can turn things around with this group who seem unturnable.” (Interview with trials scientist)

In policy areas of the greatest political controversy, some participants suggested that the science upon which decisions are based needed to be of the ‘highest quality’ in ‘scientific’ terms. For them, the RCT design was seen to be the most robust in determining the efficacy of new treatments. It may be that this view was linked to the history of the original Swiss studies and the critique that emerged from the WHO external panel that these studies did not meet the criteria of randomised controlled trials, making it difficult to disentangle the specific effect of the heroin treatment and socio-psychological interventions (see Ali et al, 1998). Such criticisms are the result of applying ‘traditional bio-medical criteria of scientific validity’ (Jepson, 2001: 259). As a result, the scientists chose to use what they perceived to be the most powerful research design (i.e. the so called ‘gold standard’ RCT) in subsequent trials, with the hope that the results could not be questioned by policy makers and politicians on methodological grounds.

Knowledge networks are perceived as sites of authority which emphasise a particular form of knowledge that is codified, technocratic and secular (Stone, 2013: 45). Social practices in the networks provide their ‘products’ (i.e. ideas, publications and analyses), with scientific objectivity and technocratic neutrality. These scientific products create ‘communication codes’ that construct some types of knowledge as more persuasive and reliable. Participation in such networks is restricted by boundary drawing which excludes other forms of knowledge

and expertise (e.g. experiential knowledge) which does not conform to techno-scientific criteria (Stone, 2003). In the case of HAT, boundaries were drawn between the form of knowledge generated through the RCTs and the perspectives and knowledge of the patients involved which have rarely been prioritised or captured in the existing research (see Houborg, 2010; Boyd and NAOMI Patients Association, 2013). This was acknowledged in the EMCDDA review (Strang et al, 2012) and recognised by all of the trial scientists. One of them commented:

“What would generally be viewed as the ‘high quality science’ I think is pretty good for a rather difficult treatment to apply. To be able to do randomised trials in this sort of area involves quite a lot of creativity...where it’s been weak in particular is around the nature of the experience of being in the clinics...However, what was required was a graph that said here’s what happens if you use the treatment and here’s the improvement you get...the political context shaped the focus of the primary papers...it also depends on the funding climate.”

With the exception of a few qualitative studies that have explored the experiences of patients (e.g. Romo et al, 2009; Blanken et al, 2010), the focus in this area of treatment has been almost exclusively on RCTs to determine its effectiveness in medical terms at the individual level. The evidence is limited by the artificial, clinical setting of the RCT and issues such as HAT’s potential as a means to regulate heroin markets, the role of heroin in marginalised communities and the meaning of heroin within the wider economic and social contexts remain unexplored (Dehue, 2002; Wakeman, 2015).

Developing a knowledge network: exchanging and transferring knowledge and expertise

The notion of the ‘invisible college’ (Crane, 1972) describes the informal and professional interactions through international conferences and journals between scientists in various parts of the globe. Advances in communication technology (i.e. email, Skype, electronic publishing and social media) have facilitated global exchanges in knowledge and the diffusion of ideas and expertise. The scientists involved in the HAT trials formed a tight network that interacted transnationally over time. Some of their interaction has been at a distance through email and telephone calls, but they have also written papers together, presented their work at annual conferences together, visited the treatment sites in the different countries and sat on each other’s advisory or steering groups for the trials. For example, the Dutch team asked the Swiss to sit on their International Advisory Board for their trial. Both the Swiss and Dutch lead scientists sat on the Advisory group of the German study and the German and Dutch scientists were involved in the design of the Belgian study. These advisory groups provided the opportunity and an official mechanism to exchange ideas, experience and expertise in terms of planning and conducting the trials. It was important to the scientists that the different trials were comparable so that the evidence would build up over time. There was also an emphasis on ensuring that the trials complemented each other and that each trial added a new dimension or question to be answered (e.g. the German trial added different types of psychotherapy to injectable heroin, the UK trial added urine testing and included injectable methadone and the Canadian trials added injectable hydromorphone).

The network was not a formal or an official structure, but developed to support and help each other. They shared their knowledge, expertise and evidence of setting up and running the trials with each other in some cases to help to counteract the political resistance to the trials. Because they were working in a controversial area with a highly stigmatised group, they experienced isolation in their own countries and needed each other’s support and advice to deal with the resistance to their work:

“Maybe we weren’t threatened or attacked so much, but it was the feeling that it could happen. That created some kind of an old fashioned comradeship... and that definitely went beyond the scientific. Let’s be fair after we did the first randomised trial, the great intellectual thinking is not the most important thing anymore....it was a strong feeling of solidarity and comradeship which is ideologically driven.” (Interview with trials scientist)

“They created a network and they helped each other...because they were quite often isolated in their country, sometimes bearing the burden of political debate wasn’t an easy situation, they were encouraged to be closer to each other than in other fields of research where groups are more in competition and less collaborated” (Interview with scientist)

The scientists were attuned to the political nature of the research. Increasingly, over time they began to see their research in the aggregate, rather than as separate individual contributions. They were conscious not to compete with each other, in contrast to other areas of science where intense competition between scientists exists (see for example, Collins, 1974). The collaboration and cooperation between the scientists was also related to the fact that each team was representing a different country and they were not directly competing for the same research grants. As these comments illustrate, their collaboration and the complementary nature of the trials were important in showing a united front and ensuring the knowledge was communicated and transferred between themselves and to those in the policy arenas:

“Compared to the rest of science, there was a very close collaboration. I remember a request from Denmark to speak in front of the Danish Parliament. Most of the time we would call one or two of the others and say, ‘Are you invited too and maybe we could go there together and make sure we get a strong message out’ ...A very strong feeling

was always there, let's not play the game of who did the best trial.” (Interview with trials scientist)

“It isn't that we don't have any competitive capabilities, but there was a lot of scientific academic generosity and a recognition that this was a collective endeavour. From the outset we knew that it was a very difficult political and public question that we were answering.” (Interview with trials scientist)

The collaboration and ‘comradeship’ between the research teams was facilitated by face-to-face visits to each other’s countries and trial clinics. These meetings and visits were important in terms of the scientific and practical preparation for the trials. Similar to McCann’s (2008) work on policy mobilities and expertise, the importance of physically seeing first-hand the clinics in operation helped to lay the ground work for acceptance, support and exchange amongst the research teams. If HAT could be achieved in one country, then this provided confidence and inspiration that it could be achieved in another country. For example, prior to the Swiss study, a delegation from Switzerland visited the clinic of Dr John Marks in Liverpool who prescribed heroin to patients (Uchtenhagen, 2009). In the two years of development leading up to the Dutch trial, the Dutch and Swiss research teams collaborated intensively. This took the form of face-to-face meetings and site visits to both countries. The Dutch team visited the Swiss study group led by Prof Uchtenhagen and the Swiss team visited the Netherlands several times. The purpose of the visits to Switzerland was not just in terms of scientific questions to ensure that the results could be compared, but also in relation to practical questions around implementation.

The trial scientists also referred to inviting each other to presentations when they had findings to present. These face-to-face/peer-to-peer meetings helped to facilitate an exchange and transfer of the knowledge and evidence in this area. The geographical proximity of the

different European countries facilitated this networking and exchange of knowledge. The Canadian scientists were geographically distant from this network, but managed to work with the Europeans through email correspondence and meetings at international conferences. One of the principal investigators of the Canadian trial, Dr Eugenia Oviedo-Joekes, also had been one of the researchers on the Spanish trial which helped to facilitate the exchange and transfer of knowledge to the Canadian team.

The knowledge network was successful in terms of building up the evidence around HAT and exchanging and transferring this knowledge and expertise between the different research teams. If other countries required advice and expertise in this area of treatment, they supported them. This was in the form of both evidence in terms of outcomes for heroin-assisted treatment versus other modes of treatment but also more ‘tacit’ forms of knowledge and expertise. As one trials scientist commented:

“From observations of the experience of countries that have tried to introduce it, they do get the support and the ‘know how’, the expertise from countries who have been running this treatment for some time, to introduce it.”

The production of this knowledge was not completely separate from the social and political worlds of policy and practice. Members of the knowledge network were drawn into the policy process as ‘reputational intermediaries’ (Stone, 2003) or knowledge brokers to communicate and translate knowledge. This was evident when scientists in the knowledge network were invited to provide advice and present evidence relating to HAT to the Danish government. Similar to the work on policy translation, this highlights the power and the authority of the network to shape, transform and mediate the knowledge around HAT to new sites and contexts (Lendvai and Stubbs, 2007; Freeman, 2009).

All respondents agreed that there was no longer a need for more RCTs on HAT. The aggregate evidence base regarding positive outcomes for the treatment was robust. Moreover, because the clinical protocol and procedures for the treatment are so rigid, it is easily transferable between countries. However, different countries respond to the issue of transferability in different ways. For example, after establishing an expert group, conducting evaluations of the existing evidence from the trials conducted elsewhere and making visits to the existing clinical sites, Denmark implemented HAT without their own RCT. They concluded that based on the similarities between Denmark, Switzerland, Holland and Germany in relation to socio-economic conditions, treatment services and the population of heroin users, there was no need launch another RCT in Denmark (National Board of Health, 2008). They established a programme to train staff in the clinics to administer HAT and included instructors from the heroin clinics in Switzerland and England (Danish Health and Medicines Authority, 2013). The Danish case illustrates the mobilization and direct translation of the existing evidence and expertise on HAT. On the other hand, the Belgian government wanted their own evidence on HAT, so conducted their own trial despite the positive outcomes of six RCTs in different countries. From a cross-national perspective, Jasanoff (1990) examines how science gains legitimacy in different social and political contexts. The same science could have different effects in different political cultures. For example, at present, Switzerland, the Netherlands, Germany and the UK have some form of heroin-assisted treatment as part of their treatment provision. In Spain and Canada, despite trials demonstrating positive outcomes, HAT has not been implemented due to political resistance. As one of the trials scientists argued:

“...the science had moved them from being an idiosyncratic practice into being an evidence-based treatment...that’s what you want to achieve by a good bit of science, to

be able to answer the question one way or the other...Individually and collectively they achieved that. Whether the government and the public choose to implement it...you have a duty to contribute to that discussion, but whatever the public and politicians decide, doesn't alter what the science found."

Conclusion

The group of scientists involved in HAT formed a transnational knowledge network that worked across national boundaries to build an evolving evidence base and become a recognised site of authority. This was achieved through various modes of communication and interaction including face-to-face visits to the various countries and clinic sites, attending international conferences, as well as producing joint publications and reviews. Each study built on the previous one, generating layers of evidence, knowledge and expertise over time. The science was 'mobile' in the sense that it impacted on the development of each successive study to ensure comparability and complementariness. The mobility and transfer of science and knowledge in this area was facilitated by a small group of scientists from predominantly medical backgrounds, working with the same research design (i.e. RCT) and protocols and answering the same scientific question (i.e. whether HAT could be an effective second-line treatment for heroin users). The controversial nature of the treatment and political resistance to it encouraged the scientists to collaborate and not compete with each other. This common enterprise resulted in a network that supported and shared their expertise with each other.

The HAT scientists engaged in different forms of boundary-work which included demarcating between different professions, between different forms of knowledge/science and between the production of scientific knowledge and its consumption by non-scientists.

They were unified by their discipline (mainly psychiatry), their clinician-academic roles, their methodological approach and the ideological perspective underpinning their work. They produced a specific form of science within the network, characterised by the medical model and the RCT design, and excluded other knowledges that do not conform to this particular techno-scientific criteria. Other types of science or research were rarely included in the network and in particular, qualitative work on the experiences of patients and their families and the effects of HAT on the wider society in terms of crime reduction and the impact on heroin markets were neglected. Clear boundaries were drawn which demarcated the particular form of evidence and expertise generated through the knowledge network and other forms of evidence and expertise. As recognised by the scientists involved in synthesising the existing evidence (Strang et al, 2012), the voices, perspectives and expertise of the HAT patients and their families are missing from the existing research.

Knowledge networks both accrue and accredit authority (Stone, 2013). The products of their expertise in the form of publications in high impact medical journals were viewed as vital in terms of increasing the credibility, authority and acceptability of their findings. However, science and scientists are only influential in policy terms if their scientific findings ‘fit’ with the wider political, economic and social contexts at particular junctures in time. Individually, many of the HAT scientists had influence in their own country on the development and implementation of HAT, on drug policy more generally and in other countries through advisory posts and their work as knowledge brokers. Furthermore, their aggregate contribution can be seen through the Danish example where HAT was implemented without a trial in Denmark because the existing evidence base from the other countries was seen to be both robust and applicable.

Although the scientists involved in the knowledge network were influenced by harm reduction ideologies, they did not crossover into overt political advocacy when the debate

shifted from the scientific to the socio-political level. Acutely aware of the politics surrounding decisions regarding heroin-assisted treatment, the knowledge network appeared to see themselves in epistemic community terms in the sense that they communicated the science and knowledge around HAT as ‘objective truths’ which could be applied rationally in decision-making. For them, the science can be regarded as ‘neutral’ and a clear separation or boundary can be constructed between the production of scientific knowledge and political decision-making, thereby asserting their independence from the political arena based on their expert knowledge and professional authority.

The findings highlight the collective power of this group of scientists in producing a particular form of knowledge and expertise, how this has accrued over time, gained credibility and become legitimised, reinforced and reproduced by those who employ it in both scientific and political debates. The uniformity of the knowledge network in terms of their professional and disciplinary backgrounds, methodological expertise and ideological perspectives has meant that alternative forms of knowledge and perspectives have been neglected. This limits the nature and scope of the scientific evidence on which to base policy and practice decisions and impacts on the work of policy makers and practitioners as well as the experiences of those in treatment who are most affected by this research and policy development.

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