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# Boundary-spanning in academic healthcare organisations

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### ARTICLE INFO

#### Article history:

Received 8 December 2015  
Received in revised form  
22 December 2015  
Accepted 9 January 2016  
Available online xxx

#### Keywords:

Boundary-spanning  
Institutional logic  
Translational science  
Knowledge translation  
Medical innovation  
Healthcare

### ABSTRACT

Policy makers view academic healthcare organisations as important to healthcare innovation because they act as boundary-spanning organisations that integrate science and care institutional logics. Institutional logics are implicit and socially shared rules of the game that prescribe behaviour within a social group. This paper explores how individuals affiliated with academic healthcare organisations negotiate science and care institutional logics within their day-to-day work through a qualitative case study of research and healthcare within academic healthcare organisations in Vancouver, Canada. It highlights that there is less hybridisation of institutional logics than policy makers might hope: some researchers hosted in academic healthcare organisations are not part of the care institutional logic, others are not well integrated with the research institutional logic. Clinician–scientists often struggle to integrate the science and care institutional logics in their day-to-day work; other workers do integrate science and care institutional logics through experiments of nature but their research may not be viewed as high quality science. Because of poor hybridisation, academic healthcare organisations may not be as effective in facilitating healthcare innovation as policy makers assume.

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## 1. Introduction

Science is funded primarily on the promise of increased economic competitiveness in an era where science and engineering capabilities are seen as crucial in the new knowledge economy (Gibbons et al., 1994; Owen-Smith, 2001). Science policy makers encourage research collaboration between universities and the private sector as a condition for funding (Atkinson-Grosjean, 2006) and almost all research universities in the USA and Europe have established technology transfer offices that connect the university and private sector (Siegel et al., 2007). These policies draw on the assumption that strong connections between universities—seen as producers of new knowledge—and the private sector—seen as producers of new products—are necessary for economic development (Etzkowitz and Leydesdorff, 1999). The majority of previous innovation studies related to healthcare take this traditional innovation focus, concentrating on the private sector and product

development through analyses of biotechnology, pharmaceutical, and medical device innovation.

The focus on innovation—or the interrelated and more commonly used terms ‘translational science,’ ‘knowledge translation,’ and ‘implementation science’—within hospitals is relatively new, gaining popularity in the 1990s. Here improving health (not economic development) and translation from research to diagnoses and treatments in a linear fashion are often perceived as primary goals (Kerner, 2006; Khoury et al., 2007). Since the 1990s translational science has permeated policy documents and funding programmes (Lander and Atkinson-Grosjean, 2011).

This linear conception of translational science is in contrast to bi-directional innovation models (Kline and Rosenberg, 1986). An older model of translation within healthcare also exists based on ‘experiments of nature.’ This concept has a history in both the science and technology studies literature and within scientific and medical practice. Ben-David (1960), in his sociological study of roles and innovations in medicine, argued that experiments of nature involve analysing puzzles from clinical practice through the scientific research process. Good (1994) similarly described an experiment of nature as originating as a clinical problem and moving to the bench. Good was a clinician–scientist who is commonly regarded as the founder of modern immunology. He was also the most cited author in science from 1965 to 1978 (Cooper, 2003). Good based his research on experiments of nature in the 1950s and

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<http://dx.doi.org/10.1016/j.respol.2016.01.006>

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1960s at the University of Minnesota. Thus two models of translational science in healthcare that emphasise reverse directions exist: translational science focuses on bench to bedside translation while experiments of nature focus on bedside to bench translation (Lander and Atkinson-Grosjean, 2011).

Policy makers often perceive that healthcare organisations with academic affiliations are key to achieving translational science through their three pronged missions of care, training, and research (Gelijns et al., 2001). By enacting their tripartite mission, academic healthcare organisations act as boundary-spanning organisations between care and science institutional logics manifesting implicit and socially shared rules of the game that prescribe behaviour within a social group, thereby facilitating clinical translation (Lander and Atkinson-Grosjean, 2011). However, this boundary-spanning role brings with it potential tensions (Dunn and Jones, 2010). French et al. (2014) reviewed 372 papers describing managerial, institutional, political, or cultural aspects of academic healthcare organisations. They argued that the major gap in existing literature centres on understanding social and organisational processes within academic healthcare organisations. It is unclear how individuals within academic healthcare organisations negotiate differing institutional logics, how these institutional logics play out in their day-to-day work, and the different strategies for addressing tensions between institutional logics.

I explore these issues through a study of how people working within academic healthcare organisations negotiate their environment and are influenced by the care and science institutional logics. I investigate to what extent the two institutional logics are integrated within academic healthcare organisations, explore how organisational structures affect integration of these two institutional logics, and analyse whether the influence of the two institutional logics varies between individuals within organisations. I do this through a qualitative study of infection and immunity health research and healthcare within academic healthcare organisations in Vancouver, Canada.

The rest of the paper is organised as follows. I begin by outlining three relevant theoretical concepts: care and science institutional logics, boundary-spanning, and negotiating institutional tensions. I then outline the methodology used in this analysis. This is followed by a description of infection and immunity research and care in academic healthcare organisations in Vancouver. For individuals working within these organisations, I outline how the two institutional logics influence their day-to-day work. This is followed by a discussion and conclusion.

## 2. Institutional logics, boundaries, and tensions

In this paper I draw on three key interrelated theoretical concepts: institutional logics, boundary-spanning, and negotiating institutional tensions.

### 2.1. Care and science institutional logics

Institutional logics are implicit and socially shared rules of the game that describe behaviour in a rule-like way while being so entrenched in a social group that they become taken-for-granted as legitimate. Institutional logics form the basis of what is seen as legitimate behaviour. Legitimacy is conferred to institutional logics through several means including formal rules and regulations, social norms and values, and shared concepts of social reality and meaning (Lander, 2014; Scott, 2008). Institutional logics are embodied in practices and ideas. They can support certain practices while inhibiting others by setting bounds on rationality and restricting perceived opportunities and alternatives. This increases the probability of certain behaviour. Institutional logics are produced and reproduced by the ways that people behave and interact

(Deephouse and Suchman, 2008; DiMaggio and Powell, 1983; Dunn and Jones, 2010; Greenwood et al., 2008; Jepperson, 1991; Meyer and Rowan, 1977; Scott, 2008; Wooten and Hoffman, 2008).

Institutional logics originate in societal sectors—such as professions, corporations, the market, and family—where social groups cohere and share rules and beliefs (DiMaggio and Powell, 1983; Dunn and Jones, 2010; Friedland and Alford, 1991). Professional groups often create strong social boundaries between groups and coherent social and cognitive worldviews within them. Because of this, professional groups can have a dominant institutional logic that provides actors within the group with vocabularies, identities, and rationales for action (Dunn and Jones, 2010; Ferlie et al., 2005; Gieryn, 1983).

Dunn and Jones (2010) identify two main institutional logics within academic health centres: care and science. The purpose of academic health centres is to bring together and ideally integrate these institutional logics. Care institutional logics dominate healthcare professionals' work and science institutional logics dominate the work of academic professionals. Other individuals such as clinician-scientists—found at the nexus of these two groups—are ostensibly influenced by both institutional logics.

Scholars identify several cultural, cognitive, and normative differences between science and care institutional logics. Traditionally, the science institutional logic inhabits a privileged place in society (Gieryn, 1983). It builds on Merton's (1979) CUDOS—communalism, universalism, disinterestedness, and organised scepticism—as idealisations of the norms of the scientific professions and primarily focuses on generating theory using scientific methods. However, basic forms of research garner greater prestige than applied forms (Barley and Bechky, 1994; Calvert, 2001). Scientific grants and publications form the 'currency' and rewards within the science institutional logic (Ben-David, 1960; Haeussler and Sauermann, 2013; Lander, 2014; Löwy, 1987; Wainwright et al., 2006).

Patient care is the paramount goal of the care institutional logic; legitimacy and authority are derived from the science institutional logic, which is often called the 'science' of medicine (Dunn and Jones, 2010). Care work does not focus on how something works—the domain of the science institutional logic—but rather that it will work (Lander, 2014; Löwy, 1987; Wainwright et al., 2006). Scientific breakthroughs and international practice guidelines are not the primary drivers of care work, which instead draws on clinical experience, intuition, diagnostic testing, and patient preferences to enact the 'art' of medicine (Malterud, 2001; McDonald et al., 2013; Reay and Hinings, 2009).

These two logics enable the three-pronged mission of care (drawing from the care logic), research (drawing from the science logic), and training (drawing from the science logic for graduate students and the care logic for medical students, residents, and fellows) to exist within academic healthcare organisations. Other institutional logics—such as commercialism—are becoming increasingly institutionalised in the academic setting through technology transfer offices and related federal and organisational policy changes. Several other studies focus on the integration of science and commercial institutional logics (see for example Colyvas and Powell, 2006; Vallas and Kleinman, 2008). The commercial institutional logic is also increasingly integrated into academic healthcare organisations (French and Miller, 2012). This paper focuses on the interface between science and care institutional logics because these are the primary *foci* of academic healthcare organisations.

### 2.2. Boundary-spanning

Social boundaries demarcate different institutional logics (Gieryn, 1983); boundary-spanning attempts to break down the social boundaries between institutional logics. Boundary-spanning

work can occur at multiple levels such as problems, knowledge, activities, objects, organisations, and roles. It often encompasses the confluence of human and non-human actors around a specific problem. Boundary-spanning also involves 'obligatory passage points' that must be passed to gain access to the other side of the boundary (Callon, 1986; Latour, 1987; Law, 1992).

During boundary-spanning activities, boundary-spanning objects play an important role. Star and Griesemer (1989, p. 393) define boundary-spanning objects as objects that occupy several intersecting institutional logics and "satisfy the informational requirements of each of them." Because boundary-spanning objects span institutional logics, they help facilitate translation between individuals working within different institutional logics. In doing so, they become a common boundary without changing the institutional logics that they are spanning (Star and Griesemer, 1989). Patient samples have been identified as important and distinctive hospital-based boundary-spanning objects that bridge science and care institutional logics (French and Miller, 2012; Fujimura, 1996; Keating and Cambrosio, 2003; Lander and Atkinson-Grosjean, 2011; Wainwright et al., 2006). Patients can be separated from their samples within hospitals; these samples can be used in both care institutional logics—to perform diagnostic tests—and in science institutional logics—as a model for research (Keating and Cambrosio, 2003). French and Miller (2012) argue that hospitals act as obligatory passage points for individuals trying to gain access to patient samples.

Boundary-spanning organisations aim to encourage boundary-spanning activities, objects, and roles by incorporating elements from different institutional logics—and ideally breaking down the demarcation between institutional logics—within one organisation (Colyvas and Powell, 2006; Pache and Santos, 2013). Within boundary-spanning organisations, boundary-spanning individuals often work in multiple institutional logics. Academic healthcare organisations act as boundary-spanning organisations, integrating care and science institutional logics (Dunn and Jones, 2010; Gelijns et al., 2001). Within academic healthcare organisations, individuals with dedicated time to conduct research and care are expected to bridge the two institutional logics through their boundary-spanning role (Ben-David, 1960; Lander and Atkinson-Grosjean, 2011; Löwy, 1987; Wainwright et al., 2006).

### 2.3. Responding to multiple institutional logics

Multiple—and potentially conflicting—institutions often co-exist within the same organisation, sometimes leading to divergent concepts of what is legitimate behaviour and causing tensions between conflicting institutions (Meyer and Rowan, 1977). For the individuals located within boundary-spanning organisations, conflict, multiplicity, and fragmentation of institutional logics often exist leading to problems of identity and loyalty (Dunn and Jones, 2010; Pache and Santos, 2013; Star and Griesemer, 1989). Dunn and Jones (2010) argue that institutional pluralism works when philosophies, normative understandings, and values of logics complement each other or cohere; otherwise, competition between institutional logics is more likely. For the case of medical education within medical schools Dunn and Jones (2010) found that science and care institutional logics co-exist in uneasy tension that is difficult to resolve, moving through periods of balance and imbalance.

Different organisational responses can be used to negotiate institutional logics within boundary-spanning organisations. These include open conflict (Dunn and Jones, 2010), a shift to a dominant institutional logic (Dunn and Jones, 2010), decoupling (Orton and Weick, 1990; Meyer and Rowan, 1977; Thompson, 1967), compromising (Pache and Santos, 2013), and combining institutional logics (Colyvas and Powell, 2006; Pache and Santos, 2013).

During open conflict, segments of the organisation actively seek change (Dunn and Jones, 2010; Reay and Hinings, 2009). Over time, this conflict may lead to a shift towards a dominant institutional logic, ultimately providing individuals within an organisation with a single institutional logic and concept of legitimacy (Dunn and Jones, 2010; Suddaby and Greenwood, 2005; Washington and Ventresca, 2004). Decoupling can occur when certain components within an organisation—such as departments or individuals—become more influenced by one institutional logic while other components become more influenced by another (Orton and Weick, 1990; Thompson, 1967). This has traditionally been associated with a separation of normative and operational structures whereby one institutional logic is symbolically endorsed and another used in actual work practices (Pache and Santos, 2013). Decoupling can help resolve tensions between conflicting institutional logics but can also cause divergent behaviour within a single organisation (Meyer and Rowan, 1977).

Compromising entails crafting a balance between institutional logics, for example by conforming to the minimum standards of multiple institutional logics. This has the advantage of addressing conflicting demands while securing support of multiple groups; it may not be possible to secure consensus vis-à-vis compromise, leading to dissent from certain groups (Pache and Santos, 2013). Combining institutional logics involves bringing together their key aspects, which can either co-exist or ultimately lead to the creation of a new institutional logic through combination (Colyvas and Powell, 2006; Pache and Santos, 2013; Star and Griesemer, 1989).

Academic healthcare organisations implicitly aim for a combination of care and science institutional logics and the creation of a hybrid, bridging, institutional logic that facilitates translational science. This paper explores—in part—whether individuals working within academic healthcare organisations have created hybrid institutional logics or use other strategies to resolve the institutional tensions inherent in working within a boundary-spanning organisation through a case study of infection and immunity research and practice in Vancouver's academic healthcare organisations.

### 3. Methodology

Data used in this analysis were part of a larger study that looked at collaboration between individuals involved in infection and immunity research and development. These individuals were affiliated with Vancouver-based healthcare organisations, universities and firms. More details of this study and its methods can be found in Lander (2013, 2014). For the larger study, I interviewed a total of 38 participants between February and May 2011 with five additional interviews occurring between June and October 2012. Participants were sampled from a database of infection and immunity papers published between 2004 and 2011. This paper focuses on the 24 participants that I interviewed who were physically located within a healthcare organisation. Twenty-two of these interviews were in person, two occurred over the telephone. Twenty-three interviews were recorded and transcribed; recording equipment malfunctioned in one interview. I transcribed one interview myself; all others were professionally transcribed.

Interview questions were semi-structured. All interviews included basic demographic survey type questions related to an individual's educational and work background, organisational affiliations, and which organisation the participant considered 'home.' Additional questions explored participants' day-to-day work, research, and work related goals. Qualitative analysis began with field notes written within hours of each interview. To increase the reliability (Kvale, 1996), I checked my interview transcripts against the audio recording and expanded my field notes into a narrative as I verified transcripts, drawing from a condensation

approach (Kvale, 1996; Seidman, 1998). Using Atlas.ti, I developed themes and memos based on interview transcripts through an iterative exploration and expansion process. In addition to summaries of each interview, I created profiles for each participant outlining their roles in the tri-partite missions of research, care, and teaching; their educational background; short-term goals; and perceived relation to their affiliated university and healthcare organisation. Additional memos explored themes such as hybridity and the care and science institutional logics. I supplemented my interviews with analysis of related documents. The majority of these documents were organisational strategic plans, reports, and websites.

#### 4. Infection and immunity health research and care in academic healthcare organisations in Vancouver

Canada's major medical funding agency—Canadian Institutes of Health Research (CIHR)—maps the different forms of health research to its four pillars: biomedical; clinical; health systems and services; and the social, cultural, and environmental factors that affect the health of populations (CIHR, 2009). Different health research projects draw on assorted disciplinary traditions and occur along spectrums moving from cells to populations and from positivist tests of biological mechanisms to interpretive analyses of culture. Knowledge generated through health research projects can translate to application through multiple pathways, including to drug or medical device development, changes to clinical practice and healthcare organisation, or broader socio-cultural adaptation (Lander and Atkinson-Grosjean, 2011; Morlacchi and Nelson, 2011).

Infection and immunity research and care is focused on the body's defense against infection and different forms of immunity. Research includes the study of pathogens and their hosts, innate and adaptive immune responses, auto-immune disorders, allergies, inflammations, and host resistance or susceptibility. Clinical care focuses on preventing, identifying, and treating infection and/or immune responses. Governments have traditionally taken an active role in infection and immunity prevention, trying to control infectious disease through outbreak monitoring, improvements in sanitation, and vaccination programmes (Lander, 2014).

Academic healthcare organisations integrate science and care institutional logics. In Vancouver, affiliation agreements between healthcare organisations and universities formally integrate the science institutional logic into specific healthcare organisations and create organisations that span the boundaries between care and science institutional logics. These affiliation agreements ensure that healthcare organisations accept medical students for training. Affiliation agreements implement stipulations, outlined in the BC Hospital Act, that hospitals providing primarily acute care must supply facilities for giving clinical instruction to medical students and members of the teaching staff (Hospital Act, 1996). Affiliation agreements also mandate that hospitals provide reasonable academic space, including research labs and offices, for university staff and students. In return, the university is responsible for providing university appointments to health authority staff involved in teaching programmes in addition to their hospital affiliation (PHSA, 2002). This integrates the research and teaching mandates of universities into healthcare organisations (see for example Powell and Cranston, 2010). More details about the organisations involved in infection and immunity research and development in Vancouver can be found in Lander (2014).

#### 5. Research, teaching, care, and the two institutional logics

I interviewed participants that were involved in infection and immunity research and/or care and physically located within the

BC Ministry of Health, health authorities, and organisations administered by the health authorities. These organisations included general hospitals, tertiary care hospitals focused on specific diseases or populations, a centre for disease control, and a child and family research centre. Table 1 summarises various characteristics of each participant and includes their pseudonym, main organisational affiliation, job focus, job title, and education. Most participants are affiliated with multiple organisations. I determined the main organisational affiliation of participants based on the organisation where the participant spends the majority of their working time. Organisations are given pseudonyms (letters A–J).

As shown in Table 2, participants were physically located in 10 different organisations within Vancouver and often worked within different departments or centres within these organisations. The largest concentration of participants—six—was in Organisation E. Within this organisation one participant worked within an administratively independent centre physically housed within Organisation E. Five participants worked in Organisation G and were divided between two centres (three and two participants respectively). Four participants worked within Organisation B. Three participants worked within Organisation J. Participants in both Organisation B and J all worked in different areas from each other. Organisations A, C, D, F, H, and I each had one participant working within them.

Participants incorporated the tripartite mission of care, research, and training into their day-to-day work in different ways. Three of the individuals that I interviewed—Meghan, Donald, and Rhonda—were involved in administrative roles. Discussions with these individuals were helpful in gaining understanding of how academic healthcare organisations in Vancouver were structured and formally integrated care and science institutional logics into their structure. These participants were not actively involved in care, training, or research. All other participants were involved in at least one of the three missions and are the focus of the rest of this paper. Participants' care activities ranged from hospital physician to diagnostic testing, epidemiological surveillance, autopsies, and clinical practice guideline development. Research ran the translational spectrum; participants were involved in research that ranged from basic to applied research and to service evaluation. Participants ran biomedical wet labs and conducted epidemiological and public health analyses on topics spanning from drug efficacy to host defence against infection, disease surveillance, the impact of the environment on population health, and the impact of specific diseases on population groups. Research thus spanned the four CIHR pillars of health research: biomedical, clinical, health systems and services, and social, cultural, and environmental factors that affect the health of populations. Participants' applied work centred on diagnostic test validation, recruiting and running clinical trials, and service evaluation focused on exploring the efficacy and effectiveness of provincial health programmes. Teaching fell into three main categories: course instruction at UBC, supervision of graduate students and postdocs, and mentoring medical residents and fellows. Below I outline four main job *foci* of participants—research, clinician–scientist, service to research, and service. I discuss how individuals in each of these job *foci* used care and research institutional logics in their day-to-day work, negotiated tensions between these institutional logics, and worked with boundary-spanning objects.

##### 5.1. Researcher

I was surprised to find that one group of eight participants worked within academic healthcare organisations but were not involved in care activities in any way. These included five senior researchers, two lab managers, and one PhD student. Of the senior researchers, four—Gauis, Jessica, Sookie, and Tommy—had PhDs

**Table 1**  
Participants interviewed.

Name*	Job focus	Job title(s)	Org	Ed
Meghan	Administration	Chief administrative officer	F	MBA
Donald	Administration	Executive director	I	PhD
Rhonda	Administration	Director of operators	G	RN
Felix	Research	Professor	H	MD/PhD
Gauis	Research	Professor	G	PhD
Sookie	Research	Professor	E	PhD
Jessica	Research	Professor	G	PhD
Tommy	Research	Professor	G	PhD
Sharon**	Research	Lab manager	E	MD/PhD
William	Research	Lab manager	E	MSc
Pam	Research	PhD student	E	BSc
Ben	Clinician–scientist	Professor and physician	J	MD
Hoyt	Clinician–scientist	Professor and physician	E	MD
Virgil	Clinician–scientist	Professor and physician	E	MD/PhD
Andy	Clinician–scientist	Professor	G	PhD
Jason	Service to research	Professor and clinical centre director	B	MD
Terry	Service to research	Professor and clinical centre director	B	PhD
Crystal	Service to research	Professor and physician	B	MD
Rene*	Service to research	Database analyst	B	MD
Helo	Service to research	Professor and physician	C	MD/PhD
Sam**	Service to research	Research associate and clinical centre director	J	MD
Eric	Service	Professor and physician	A	MD
Saul	Service	Professor and physician	J	MD
Lafayette	Service	Health officer	D	MD

\* All names given as pseudonyms.

\*\* Not certified to practice medicine in Canada.

and one—Felix—had an MD/PhD. Gauis, Jessica, and Sookie had always worked in hospitals, even during their PhD training, and identified themselves as basic scientists who worked within hospitals. In addition to research, other expectations—such as teaching and administration—took up part of their time. Teaching took the form of course instruction at UBC and supervision of graduate students and post docs. Both lab managers—William and Sharon—and the PhD student—Pam—worked in research labs run by clinician–scientists who conducted research and had a clinical practice. In addition to research, both William and Sharon were involved in training PhD students who worked within their research labs; training medical students was not part of their work.

All research done by individuals in this group—with the exception of Tommy and Jessica—occurred in biomedical ‘wet’ labs. Tommy worked within the area of patient-focused public health research and Jessica worked as an epidemiologist analysing patient data combined with administrative health records. The research models used by all researchers included cell lines, animal models, patient samples, and administrative health data.

**Table 2**  
Job focus of participants by organisation.

Organisation	Job focus	# Participants
A	Service	1
B	Service to research	4
C	Service to research	1
D	Service	1
E	Clinician–scientist	2
	Research	4
F	Administration	1
G	Administration	1
	Clinician–scientist	1
	Research	3
H	Research	1
I	Administration	1
J	Clinician–scientist	1
	Service	1
	Service to research	1
<b>Total</b>		<b>24</b>

A theme that emerged from interviews with researchers was that they operated their research labs and ran their research programmes the same way research occurred within universities. The major difference between university researchers and hospital-based researchers was that the hospital-based researchers had access to patient samples because they were physically located within hospitals. Tommy was the exception, as he did not obtain patient samples from the hospital in which he was based. Researchers working within universities did not have this access. Sookie, for example, identified this as the main difference between her research and university-based research stating: “We have a tremendous opportunity here to have access to patient samples.” As argued by French and Miller (2012), these researchers’ physical presence within healthcare organisations placed them within an obligatory passage point that enabled them to gain access to boundary-spanning objects in the form of patient samples.

Individuals in this group identified research based on patient samples as translational research. Researchers believed that translational research involved taking basic scientific ideas and methods from cell or animal models and applying these concepts to patient samples. This enabled research to move closer to clinical application in a linear manner while still envisioning the translational process as beginning in a basic science lab. Translation, for this group, was defined according to the scientific institutional logic. Research based on patient samples made up the majority to less than 10% of the research conducted within these labs. The remainder—based on cell lines and animal models—was called basic research.

These researchers were not involved in care or medical training. The science institutional logic dominated their work. Researchers considered their university or research centre to be their ‘home’ as opposed to the hospital within which they worked. Many did not have official appointments or affiliations with the healthcare organisation within which they were physically located. Gauis, for example, underscored during his interview that although he physically worked within a hospital, the centre within which he worked was separate from care activities within the hospital and was considered a UBC Senate-approved research centre. He thus viewed his work as occurring within a university organisation.

UBC administered these individuals' salaries, either through dedicated budget lines, endowment funds, or grant money. For these researchers, interactions with the day-to-day work of the hospital were negligible. Hospital-based problems and questions minimally influenced research programmes. Goals focused on publishing and securing grants, key facets of the science institutional logic. Reinforcing the domination of the science institutional logic in the work of his research lab, William argued "That's our job, to publish papers, that's what we get paid to do."

Researchers did not need to negotiate tensions between science and care institutional logics within their day-to-day work because they worked within the science institutional logic. Domination of a single institutional logic—here science—was thus the strategy used by researchers to negotiate potential tensions between science and care institutional logics. In keeping with [Star and Griesemer's \(1989\)](#) conceptualisation of boundary-spanning objects, patient samples spanned care and science institutional logics without forcing researchers to adopt care institutional logics in order to gain access to the samples.

## 5.2. Clinician–scientist

The remaining 13 participants that I interviewed were all involved in both care and research with the majority also involved in training. All of these groups, therefore, needed to adopt strategies to deal with potential tensions between the care and science institutional logics. Within this group, a high degree of variation existed between types of work done; amount of time dedicated to care, research, and training; and the degree that integration between these three mandates was formally institutionalised. For example, research work ranged anywhere from 80% of participants' time to evenings and weekend activities. While some participants had the percent of their work dedicated to care and research formally written into their job contracts, for others this division was based on informal agreements and norms. Some had dedicated research resources while others did not. Many job positions appeared to have developed on an ad hoc basis rather than being part of larger organisational policies. Nine participants had MDs, two had MD/PhDs, and two had PhDs. While the majority—ten—had formal affiliations and titles at both their academic healthcare organisation and affiliated university, one participant lacked a clinical title and two participants lacked a university title. Participants fell along a fuzzy spectrum where science and care institutional logics influenced individuals' work in different ways.

While further categorisation within this group was challenging and somewhat porous, three broad subgroups emerged based largely on the amount of time dedicated to research and care in participants' day-to-day work and the relative influence that science and care institutional logics played in this work. The first group—made up of Ben, Hoyt, Virgil, and Andy—broadly fell into a role that is often called clinician–scientist. They spent approximately 25% of their time involved in care activities. Balance between care and research work was either formally stipulated in work contracts or fell in favour of research work. All four ran 'wet' research labs, although Hoyt and Andy were also involved in clinical trials and diagnostic test validation. Work in these research labs appeared broadly similar to the work in the researchers' labs described above and to the work in university-based research labs. Research models again included cell lines, animal models, and patient samples; research was viewed as either basic or translational. Like researchers, these participants viewed UBC or their research centre as their 'home.' With the exception of Andy—who held a salary award from a funding agency—participants drew part of their salaries from the health authorities and part from the university. The university administered these funds. Care work either took the form of a specialist hospital physician or—for

Andy—diagnostic work. All four participants supervised graduate students and post docs within their research labs; Ben, Hoyt, and Virgil were also involved in training medical residents and fellows within the hospital setting.

For these participants, the science institutional logic dominated their research work and graduate student training while the care institutional logic dominated their care work and medical resident and fellow training. Because they ran 'wet' biomedical research labs, adhering to the science institutional logic was viewed as necessary. They needed to publish papers and get the grants to keep their labs running:

[My goals are] getting grants so we can keep the lab open, writing papers so we can be successful in getting our grants... if you asked me the simplest equivalence of my goal for the next six months, then it's to secure a CIHR [Canadian Institutes of Health Research] grant and to review another grant. That's the goal. It's not to make sick kids healthy  
(Virgil)

Two additional participants who had worked in wet labs run by clinician–scientists reinforced the view that research within these labs was roughly equivalent to university-based lab research. One of the two—Sharon—had previously worked within a research lab on UBC campus run by a professor with a PhD and no MD. She did not believe that the work in her current lab—run by a clinician–scientist—differed greatly. Sharon underscored that the research and care work of her PI were relatively separate. Sharon identified two ways that her work within an academic healthcare organisation differed from her work on UBC campus. The first: her current PI had less time for research. The second: the physical location of her lab in an academic healthcare organisation enabled access to patient samples. I also interviewed two participants who had worked in two of the four research labs within this group. Both echoed Sharon's views that these clinician–scientists' research was roughly equivalent to university-based lab research.

While the science institutional logic dominated research work, the care institutional logic had some influence. Approximately 5% of the work within Virgil's lab was based on 'experiments of nature' where samples from patients with strange or undiagnosed disorders were further researched within the lab setting to try and improve the patient's treatment (bed-to-bench research). Andy emphasised that he tried to focus his research based on interactions with clinicians and clinician–scientists. For Ben and Hoyt, their work in the clinical sphere played a more a subtle role in shaping how they viewed research problems and prioritised questions even while the science institutional logic dominated their approach and work: "It [my clinical work] affects how I think about my research and the ideas that I have and what I think is interesting and important" (Ben).

Like the researchers located within hospitals, clinician–scientists' physical location within academic healthcare organisations gave clinician–scientists access to patients and their data for their research work; their work within healthcare organisations placed them within the obligatory passage point for access to patients and their data. Here, patients and their data often remained with the clinician–scientists, moving from their role as clinician to their role as scientist. This differed from researchers working within academic healthcare organisations who relied on clinicians and clinician–scientists who worked within the same organisation to give them access to patients and their data.

Clinician–scientists resolved tensions between science and care institutional logics predominately through two strategies: decoupling and combining. Decoupling appeared to be the most common strategy: the science institutional logic dominated their research work and graduate student training while the care institutional logic dominated their care work and medical resident and fellow

training. A strategy that was less used was combining. Here the care institutional logic influenced how clinician–scientists viewed research problems and questions or inspired a subset of research questions that the clinician–scientists explored.

### 5.3. Service to research

The second group—made up of Jason, Terry, Crystal, Rene, Helo, and Sam—spent the majority of their time focused on care. Work balance between care and science was not formally stipulated in work contracts. However, informal organisational norms encouraged participants to dedicate part of their work to research. Jason, Terry, Crystal, and Rene all worked in Organisation B where organisational culture, originating from the organisation's director, emphasised the importance of incorporating research and training into daily work without formally dedicating time within employees' contracts for these activities. Crystal explained the informal research culture within her organisation as follows: "There is pressure. . . Our peers do research and publish. Our leader has done a lot of research, has published a lot, and there's pressure from all of that – indirect from peers but direct from our leadership."

Both Sam and Jason were part of 'wet' research labs. Others lacked dedicated lab space; Crystal, Rene, and Helo worked in 'dry lab' settings where most research could be performed on a computer based on patient data. Software and time were the greatest expenses in their research work. With the exception of Helo, individuals in this group did not work as physicians. Instead, care roles were highly varied and ranged from administration to diagnostic lab work to disease surveillance. Helo, again, was the only participant involved in medical resident and fellow training. Instead, participants in this group taught courses, supervised graduate students, or were not involved in training. Thus the science institutional logic dominated the training work of three of these participants while the care institutional logic dominated the training work of one participant.

Overall, the care institutional logic dominated participants' work. Participants here viewed their university affiliation as secondary to their healthcare affiliation. Terry, for example, viewed his UBC affiliation as having little meaning, flippantly stating that UBC gives "me an email address, that's it. Sometimes they pay for parking, sometimes they don't." Others had trouble remembering their university title or did not have one. The health authorities paid these participants' salaries, which were administered through UBC.

Perhaps key was that research was seen as occurring in a different direction for these participants than for researchers and clinician–scientists. Most of the research conducted by these participants was based on 'experiments of nature' and began in the care setting not in the research lab. Research was based on problems encountered in care work and involved leveraging the expertise from this work and applying it to research. While many of these participants had limited time to conduct research, through this leveraging they attempted to incorporate their service work into their research, ensuring that the two spheres remained relevant to each other. Jason explains the process: "The critical thing is to use the problems of your service delivery and create those problems into a researchable question." Some participants within this group questioned whether the work they did was truly research, at least according to the science institutional logic. Crystal argued that much of what she considers her research work involves "sharing lessons learned from the service work" and might not be considered true 'research' by others. Because her research work was more applied, she viewed it as less prestigious and less 'scientific' than more basic research.

These participants may have been able to let the care institutional logic play a stronger role in research activities because the majority of participants do not apply for research grants: Jason

and Helo were the exception. While other participants have been listed on other people's grants they have not applied for any grants themselves, either lacking the proper job classification or believing that their work is too focused on care. Because most of this group does not need to fulfil criteria from national or international research funding agencies—criteria rooted in the science institutional logic—in order to maintain a research focus, they have more freedom to mix care and science institutional logics in their research work.

For these participants, it was not just patients and their data but also problems and questions that moved between science and care institutional logics. Participants resolved tensions between science and care institutional logics by combining the two logics within their day-to-day work. This was done by grounding research in service delivery problems, what Jason called "embedding research within service". Patients, their data, problems, and questions thus acted less as boundary-spanning objects and more as key components of a new hybrid logic. By combining the two institutional logics and related activities, individuals ideally were able to fulfil multiple goals of the two institutional logics simultaneously thereby "getting 150% out of people 100% of the time" (Jason). The creation of this new hybrid logic is by no means uniform. Participants recognised that it involved a cultural transformation in Organisation B as people began to explicitly combine care and science logics as they went about their day-to-day work; that combination may have been easier for some individuals than for others. Tensions can develop in the expectations, and support for, research and service at Organisation B. However, all four of the participants whom I interviewed in Organisation B believed that the combination of the science and care institutional logics, while sometimes making their work more challenging, also made it more fulfilling.

### 5.4. Service

The fourth group was made up of Eric, Saul, and Lafayette. Eric and Saul were both full-time hospital physicians who took part in research through stolen moments during the day, evenings, and weekends. Both stated that they were involved in research because of personal interest as opposed to organisational policy. Meghan described physicians in this group as conducting research "off the side of their desk and [they are] not even compensated for it." She believed that prestige played a big role in motivating these physicians to be involved in research; involvement in research distinguished certain physicians from their peers. Training took the form of medical resident and fellowship training. The majority of Eric's research was more applied and connected to the clinic. It involved participation in clinical trials where he oversaw local patient recruitment and trial implementation. Eric classified a subset of his research as more basic and related to outcomes. Saul was not involved in clinical trials, although he had been involved with firm-sponsored studies of the effectiveness of certain diagnostic tests. The majority of Saul's research work was more basic. For both Eric and Saul, basic research work was done with collaborators who had dedicated research time and resources. This was likely a necessity.

Eric and Saul were involved in specialised depositories of patient information and/or samples within their respective hospitals. These depositories were funded by charities, private donors, and industry as health authorities viewed the depositories as too research oriented to be funded while national granting bodies generally viewed the depositories as too applied. The basic research work of both Eric and Saul was closely linked to these depositories and involved both of them acting as an obligatory passage point between the information held in the depositories and more basic researchers. Patient information acted as boundary-spanning objects moving from the clinical world of Eric and Saul to a research

world with Eric and Saul negotiating its passage. Eric and Saul appeared able to 'trade' their access to these depositories with more basic researchers who had access to research equipment and expertise that these participants, in a more service oriented role lacked. Eric's involvement in clinical trials similarly involved him acting as an obligatory passage point enabling patients and their data to move from within the hospital to be incorporated into a larger clinical trial.

For Eric and Saul, the care institutional logic dominated. Eric, for example, identified himself according to the care institutional logic stating: "I'm a clinician, not a scientist." Their university affiliation was necessary for them to practice in their healthcare organisation and meant little other than an expectation that they be involved in medical residency and fellowship training:

If you want a university appointment, you have to do something for them. And in many medical centres not having an appointment is not an alternative. Your ability to work in a hospital is tied to having an appointment. So essentially you're held hostage of the university to do some teaching for them. (Saul)

Eric's salary was paid entirely by the health authorities as was ~90% of Saul's salary. It appeared as though the research component of their work was predominately shaped by their collaborators who acted as leads on these projects. It is unclear to what extent the science and care institutional logics influenced this research.

Lafayette worked under a slightly different model. An employee in the Ministry of Health, Lafayette's work involved developing best practice recommendations for the Ministry and his research work was focused on developing these recommendations mainly through literature reviews.

Understanding how participants in this role resolved institutional tensions was more challenging in part because the group was so small. Compromising appeared to play a role; Eric focused on more applied types of research where norms and standards may have been more closely related to the care institutional logic. In other cases Saul and Eric appeared to decouple their care and science work, letting other researchers, more solidly entrenched in the science institutional logic, lead the research in which they were involved.

## 6. Discussion and conclusion

Table 2 shows the distribution of participants across the organisations by job focus. Because participants are distributed across 10 different organisations, definitively connecting organisational policy to institutional tension negotiation is challenging. The exception is Organisation B where experiments of nature were used as an explicit strategy to combine and create a hybrid science/care institutional logic. Participants in other organisations (such as Virgil) based some of their work on experiments of nature. In experiments of nature, problems and questions—in addition to patients and their data—moved between the care and science institutional logics and helped facilitate hybridisation of institutional logics. The perceived directionality of translation also reversed; participants strongly influenced by the science institutional logic viewed translation as moving from bench to bedside while participants conducting experiments of nature viewed translation as moving from bedside to bench.

All health research has the potential to result in the long-term improvement of care; innovation may indirectly emerge from research. Policy makers often hope that academic healthcare organisations can increase the interface between research and application by acting as boundary-spanning organisations. My study found that there is less hybridisation of institutional logics than policy makers might hope. Participants responded to the science and care institutional logics in different ways. For participants

in research and service roles one institutional logic – either science (researchers) or care (service)—dominated their work, leading to nominal tensions between logics. These participants were involved in projects that spanned the two institutional logics; here patient samples acted as boundary-spanning objects without fundamentally changing the institutional logics followed by individuals in either group.

With the exception of Tommy, researchers strategically worked in academic healthcare organisations to gain access to patient samples and give themselves an edge over their university-based colleagues. Patient samples were separated from the hospital and care institutional logic where they originated and used by researchers to fulfil their goals within a scientific institutional logic. Service-based participants acted as obligatory passage points for their science-based collaborators to gain access to patients' data. The care institutional logic dominated the service-based participants' day-to-day work but did not appear to influence the research questions or design of the projects led by their science-based collaborators. Instead, individuals in service roles may affiliate themselves with research projects to increase their prestige, similar to [Reay and Hinings' \(2009\)](#) findings that individuals strategically affiliate with powerful logics to increase their own power.

For others, tensions between science and care institutional logics existed and were addressed through a variety of strategies. Clinician-scientists largely decoupled their research and service work so that they followed the science institutional logic in their research work and the care institutional logic in their service work; a small amount of their work combined institutional logics. Patient samples again acted as boundary-spanning objects, although now they spanned institutional logics used by one individual in different aspects of their day-to-day work. Individuals in service to research roles actively combined science and care institutional logics through experiments of nature. Tensions between the two institutional logics still existed within this hybridised institutional logic.

The finding that science and care institutional logics are poorly integrated is not altogether surprising. In their study of the non-spread of eight healthcare innovations, [Ferlie et al. \(2005\)](#) found that social and cognitive boundaries between research and clinical practice were relatively impermeable as both groups have well-developed professional roles, identities, and traditional work practices.

The majority of participants worked within academic healthcare organisations not to consciously combine institutional logics but to place themselves within an obligatory passage point—the academic healthcare organisation—to gain access to patients and their resources. [French and Miller \(2012\)](#) similarly identified academic healthcare organisations as obligatory passage points for access to patients and their data; others have identified patient samples as boundary-spanning objects between science and care institutional logics ([Lander and Atkinson-Grosjean, 2011](#); [Keating and Cambrosio, 2003](#); [Wainwright et al., 2006](#)) and argued that integration is not necessary for an object to span multiple institutional logics ([Star and Griesemer, 1989](#)).

Several limitations exist in my research. As an interview based study, participants are largely taken at their word. Because the infection and immunity research and care group in Vancouver is relatively small, I was able to employ some corroboration in the results when participants discussed what they thought of each other; but this was limited. I did not cross check participants' statements with documents such as work contracts or through audits of the actual research they were conducting.

Questions remain about the generalizability of my research to cities other than Vancouver and areas other than infection and immunity. Case studies enable researchers to explore processes in depth and lead to understandings that are often unachievable



through other methods (Stake, 2005). However, generalizability is a common challenge in choosing this methodology (Creswell, 2007). The complex, multi-organisational, networked academic health-care organisations studied in this case study have been observed in all of Canada's major cities (Brimacombe et al., 2010). Furthermore, in an international review of the literature related to academic healthcare organisations, French et al. (2014) argue that academic healthcare organisations are a key feature within the North American healthcare environment and are increasingly being developed internationally as vehicles for medical training and healthcare innovation.

As the academic healthcare organisation model gains traction internationally, policy makers focused on encouraging translational activities and administrators involved in administering academic healthcare organisations have an opportunity to apply insights from this paper to their own work. This will help to encourage the integration of the science and care institutional logics and facilitate translational science. One way of integrating the two institutional logics may be to encourage more user-defined research questions—here described as experiments of nature. The importance of user-defined research is well discussed in the innovation literature (see for example von Hippel, 1988). Encouraging this approach to research within academic healthcare organisations may be one way to help to integrate the two institutional logics.

As illustrated by the work of Robert Good in the 1950s to 1970s, experiments of nature have historically been a cornerstone in medical research and development. However, as Gittleman (current issue) argues, this bedside to bench approach, popular in the 1940s–1970s gave way to a theory driven bench to bedside approach in the 1980s to present day with the advent of the genetic revolution. As policy makers increasingly focus on encouraging translation in medicine, perhaps it is time for the pendulum to swing back towards user-driven research. There are some indications that—at least in Canada—this trend is beginning. One of the largest initiatives currently underway by CIHR is a Strategy for Patient-Oriented Research (SPOR).<sup>1</sup> Support units for this initiative are being developed in all of Canada's provinces to help provide the necessary expertise to pursue patient-oriented research and drive research to explicitly focus on local health care needs. It remains to be seen whether this strategy will result in fundamental change or whether it will be viewed as a new pot of money to be co-opted to support existing projects and ways of doing research. Atkinson-Grosjean (2006) has identified this co-option of funds as occurring in other major Canadian science policy initiatives.

Clinician–scientists are often perceived as bridges between science and care institutional logics and are targets of explicit policy initiatives focused on encouraging translation. If most of the research work done by clinician–scientists involves a decoupling from the care institutional logic then much of their bridging advantage is gone. Other groups—such as researchers working within academic healthcare organisations and service workers—can also facilitate access to patient samples for research purposes. Because clinician–scientists work within both science and care institutional logics, they should become a key focus for policy makers, not just to protect their existence or research time, but to encourage them to ground their research work in their clinical practice through experiments of nature.

Several areas of future research present themselves based on my findings. It is unclear whether the concept of experiments of nature works equally well across the translational spectrum. Service workers appeared more comfortable working in more applied research areas such as clinical trials and it may be here that experiments

of nature can be most easily implemented. Future research could explore whether fewer tensions exist between the care logic and more applied types of research and whether it is easier to integrate care and science institutional logics around experiments of nature in more applied research areas. Observations of the day-to-day work practices of staff within academic healthcare organisations could be used to better understand how these staff negotiate institutional tensions in specific activities and what the day-to-day outcomes of negotiating institutional tensions are on staff related to aspects such as work/life balance and quality of care given. Review of staff contracts and research activities could also be incorporated in future studies, enabling further triangulation of findings.

## Acknowledgements

This work was supported in part by the Canadian Institutes of Health Research and the Michael Smith Foundation for Health Research. Financial support for travel was provided by the Centre for Clinical Epidemiology and Evaluation, University of British Columbia. Steve Morgan, Janet Atkinson-Grosjean, David Tindall, and Adam Holbrook provided feedback on study design and initial analyses for this paper. Taran Thune, Magnus Gulbrandsen and others at a paper workshop on Health Innovation at the University of Oslo in December 2013 provided thoughtful comments on earlier drafts of this paper. Two anonymous reviewers provided further suggestions. All errors and omissions remain my own.

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<sup>1</sup> See <http://www.cihr-irsc.gc.ca/e/41204.html> for more information. Accessed December 19, 2014.

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