

Vital mobilities: circulating blood via fictionalized vignettes

cultural geographies

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DOI: 10.1177/1474474018792656

journals.sagepub.com/home/cgj**Stephanie Sodero**

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Abstract

How do we move things when it really matters? Drawn from research encounters, this article traces the journey of blood from donor to recipient through nine fictionalized vignettes interwoven throughout the article. This article makes two key contributions. First, by using blood as both exemplar and metaphor, this article experiments with fictionalized vignettes to illustrate the ‘non-visible . . . non-obvious . . . non-verbal’ vein-to-vein journey entailed in blood donation as a vital mobility. Blood supply chains rely upon and constitute complex and geographically expansive infrastructure circuits. Blood has a societal circulation and can be described as hemosocial. Second, it introduces and theorizes the concept of vital mobilities, extending Adey’s work on emergency mobilities. I distinguish vital mobilities in two ways: they are non-optional material and/or energetic movements that safeguard life, and they constitute ongoing circuits of care that can be ramped up in case of wide-spread crisis, and are also required in everyday contexts. Overall, this article contributes to cultural geography by demonstrating how non-traditional qualitative methods can effectively be used to represent and communicate dynamic temporalities, spatialities and rhythms of vital mobilities such as blood.

Keywords

blood, circulation, disruption, emergency mobilities, hemosocial, mobilities paradigm, vignettes, vital mobilities

How do we move things when it really matters? This article traces the journey of blood from donor to recipient through nine linked fictionalized vignettes, drawn directly from research encounters (a process detailed under ‘*Non-visible, non-obvious non-verbal: Fictionalized vignettes*’) and interwoven throughout the article. My goals are twofold: to theorize vital mobilities, using blood as an example, and to experiment with vignettes as a mode of ethnographic telling suited to often unobvious vital mobilities. First, imagine a drizzly February afternoon in Vancouver . . .

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Vignette 1: Donating

‘All done’, says the Canadian Blood Services (CBS) employee as she pulls the needle from my arm. I heave a sigh of relief and cautiously open one eye, then the other. I feel my body relax into the oversized chair. As I firmly hold two fingers on a cotton ball lodged in the crook of my arm, I watch the phlebotomist efficiently and discretely collect four test tubes and a translucent bag of penetratingly red blood. All told a little less than half a litre of blood is collected, with four and half litres left circulating in my body.¹ The test tubes and bag are fastidiously labeled and I feel a puff of pride as I read my blood type: O Negative. A universal donor, I have the one blood type that can be transfused to anyone else.² A Band-Aid is placed over the cotton and I am directed to a quiet common area where I contentedly munch on cookies and sip apple juice. After resting for a few minutes, I head out the door as rain turns to snow.

Vital mobilities

Using fictionalized vignettes, this article addresses a critical gap in knowledge about the complex and dynamic mobilities inherent in the socio-technical-ecological assemblages that constitute blood supply chains. By developing linked fictionalized vignettes of a Canadian blood donation, this article enables deeper understanding of the circulations and coagulations inherent in health care delivery. This understanding highlights areas of resilience, as well as areas of susceptibility to infrastructure breakdown.³

Blood is mobile within and beyond the body. It is a ‘liquid tissue pumped through the body by the heart through *thousands of kilometres* of blood vessels. It delivers oxygen, minerals, hormones, nutrients and other important material to the organs, and helps clear the body of waste’ (emphasis added).⁴ When describing atherosclerosis, a medical condition that obstructs arteries, Mol observes how the internal world of blood is translated through visual and aural data: ‘the colors on the screen represent the blood’s velocity. . . . The apparatus is also capable of making this information – velocity – audible. Pshew, Pshew. . . . And it can be represented on a graph’.⁵ Through the process of donation, blood can travel thousands more kilometres outside the body. Ravi observes, ‘Ensuring the safety and availability of blood products presents nations with considerable collection, screening, and distribution challenges that are often exacerbated by public health crises, particularly mass-casualty events’.⁶ Blood is moved via, and constitutes, an interscalar infrastructure network. It is the representation of blood’s significant external mobility – blood mobilities – starting with the act of giving blood (*Vignette 1: Donating*), on which I focus in this article.

This article makes two key contributions. The first is to introduce and theorize the concept of vital mobilities, using blood as both exemplar and metaphor. I detail the terms ‘vital’ and ‘mobilities’ and how, when combined, they extend Adey’s work on emergency mobilities.⁷ The concept suggests a line of enquiry within cultural geography, provoking questions such as the following: What needs to be moved to enable and sustain life? How are infrastructures and life enmeshed? How are vital mobilities prioritized politically and/or logistically? The second contribution is the experimental use of fictionalized vignettes as a non-representational method to illustrate the ‘non-visible . . . non-obvious . . . non-verbal’ vein-to-vein journey entailed in blood donation as a vital mobility.⁸ Overall, this article contributes to cultural geography by demonstrating how non-traditional qualitative methods can effectively be used to represent and communicate dynamic temporalities, spatialities and rhythms of vital mobilities.

I am interested in goods for which transport is imperative, that is, with implications for one’s life chances.⁹ Such a list might include (but is by no means limited to) blood, water, food, pharmaceuticals, shelter and fuel. It can also be extended to energy, such as electricity.¹⁰ Dematerialization is not, at this point an option, for these goods (in contrast, see Birthchnell and Hoyle on 3-D printing¹¹ and

Prassad and Prassad on medical transcription outsourcing).¹² What is deemed vital is context dependent. Otter, for example, examines government intervention in 19th century slaughterhouse operation as a means to ensure the circulation of meat as a vital commodity, and by extension ensure urban vitality.¹³ I concentrate scholarly attention on the movement of blood in critical care as a means to highlight the circulations and coagulations inherent in achieving cultural geographies of mobility. I use the term ‘circulation’ to indicate smooth flows and pliant mobility assemblages, while ‘coagulation’ refers to temporary or permanent disruptions in the functioning of such care assemblages.

Graham highlights that vulnerability and, by extension disruption, is intrinsic to the complex global social-technical-ecological assemblages that permit mobility.¹⁴ I explore this vulnerability in the context of blood as a vital material that requires external transport in order to enable internal bodily circulation. Transport systems and electricity grids are ageing and subject to failure, as well as struggling to cope with new pressures. Climate change, for example, exacerbates these challenges by posing risks to community health (e.g. heat waves) and health services infrastructure (e.g. flooding).¹⁵ Newer communication infrastructures are also vulnerable to disruption. A 2017 ransomware attack, for example, impacted the United Kingdom’s National Health Service, resulting in inaccessible patient records, diverted ambulances and cancelled procedures.¹⁶ There is a pressing need to understand the impacts of major disruptions on health care and emergency services. Furthermore, blood supply chains are continuously shifting. Dynamics include an ongoing push to centralize national blood services,¹⁷ international travel resulting in increased exposure to blood borne disease¹⁸ and the use of drones to transport blood products and tests.¹⁹

This approach engages with blood in a unique way within cultural geographies. To date, work has centred on blood in relation to race and the blurring of racial boundaries. Pile and Mawani, for example, both focus on racial ambiguity, the former in the context of African American communities and the latter in the context of Canadian aboriginal culture.^{20,21} In a different but not unrelated vein, I focus on blurring the physical boundary between internal bodily circulation and external supply chains.

This article bridges mobilities, materialism and infrastructure studies with logistics, disaster management and critical care, offering new understandings of the movements and materials upon which we rely. It has three parts. First, I theorize vital mobilities by defining each term and then discussing how they work in combination, particularly extending Adey’s work on emergency mobilities, as well introducing the concept of ‘hemosocial’ thinking. Second, I delve into the literature on fictionalized ethnography to reflect on what this method enables within cultural geography generally, and its suitability to unobvious vital mobilities specifically. Third, before concluding, I examine potential coagulations within Canada’s blood supply chain and how vignettes might be engaged with as a form of public cultural geography.

Vignette 2: Processing

The four test tubes containing my blood are placed in one box, the bag of blood in another. About 80 people will donate at this mobile clinic today, with approximately 400 donations collected on average per day in Vancouver. There is 30-minute limit between when blood is donated and when it must be cooled in order to ensure cell viability and limit bacterial growth.²² At the end of the day, the cooled test tubes and bags are transported 20 minutes by van to the regional Vancouver CBS office on Oak Street and unloaded at a humble docking bay that belies the importance of the work undertaken on site. The test tubes are taken to a lab where they are processed by technicians wearing white lab coats. The bags are stored in a spacious walk-in refrigerator. The atmosphere is as hushed as in a hospital or library.

Three of my test tubes are packaged for transport to a centralized screening facility and the fourth is stored on site. My test tube samples, along with those of the donors from all over British Columbia and the Yukon

(an area of 1.4 million km²) – 1,200 test tubes in total – are couriered in the middle of the night by van to the Vancouver International Airport. At 4am they are loaded onto an Air Canada flight and travel approximately 700 kilometres east to Calgary, Alberta, one of only two centralized blood-testing facilities in Canada. (The other is in Toronto, 3,400 kilometres east of Vancouver). Testing confirms blood group and identifies antibodies and infectious diseases.²³

Vital

I introduce the term vital mobilities as a means to think through the question of how we move things when it really matters. The ‘vital’ in vital mobilities operates in two distinct ways: vital systems and vital materialism. First, it refers to goods that are critical or essential in everyday life, as well as in emergency contexts. Vital systems security, as described by Collier and Lakoff, concentrates on fostering the ‘health and welfare of the population’.²⁴ During the Cold War, there was a growing consciousness in the United States of the ‘increasing dependence of collective life on interlinked systems such as transportation, electricity and water’, and the vulnerability of these systems to nuclear attack, disease outbreak and/or natural disaster.²⁵ Graham’s contemporary work on disruption underscores the ongoing vulnerability of tightly interlocking infrastructure systems.²⁶ ‘Governing vital flows’ emerged as an integrated field with the goal of preventing scarcity.²⁷ Examples of vital systems security practices include ‘stockpiling critical materials, decentralizing vital industrial facilities, building redundant infrastructures (such as communication networks), and creating standby production lines’.²⁸ Blood is a particularly challenging good as its products cannot be stockpiled and the current trend is towards centralized processing infrastructure.

Second, the term ‘vital’ leverages Bennett’s work on vital materiality or ‘vibrant matter’. Vital materiality highlights how things – stem cells, fish oil, metals – constitute a web of forces that actively shape human life.²⁹ Such theorization extends a materialist, more-than-human turn in cultural geography where Whatmore argues for recognition of the ‘vital nexus’ between earth and life.³⁰ Informed by Latour’s actor network theory, Bennett views agency as distributed and envisions a vital materiality that ‘runs alongside and inside humans’, blurring physical boundaries between body and environment, as well as conceptual boundaries between life and matter.³¹ Blood occupies a rich middle ground whereby, depending on the supply chain stage, it can be framed as human (inside the body) or not-quite human (outside the body). As a material, its framing is variable, blurring definitional boundaries. Such a shift is illustrated, for example, between *Vignette 1: Donating* and *Vignette 2: Processing*, where blood shifts spheres from human/personal to material/product. The particular materiality of blood as a vital mobility resonates with and exemplifies the concept of vital materiality, adding to Bennett’s repertoire of food that sustains life and stems cell which repair life.

These two uses of ‘vital’ converge on the issue of blood borne disease. AIDS highlighted the risk of blood borne disease, triggering vital systems security analyses.³² Irving recounts the liminal state experienced waiting for HIV test results: ‘the time between the *test* and getting the *results* was often a period of radical uncertainty whereby a person . . . often found themselves imagining two possible futures, one of life and one of death’.³³ In Canada, approximately 32,000 individuals were transfused with HIV- and hepatitis-infected blood within the Canadian health care system.³⁴ Following the 1993 Royal Commission of Inquiry on the Blood System in Canada (i.e. Krevier Inquiry), a hemovigilance paradigm was adopted in the newly formed Canadian Blood Services:

a national, not-for-profit charitable organization that manages the blood supply in all provinces and territories outside of Québec. We operate 41 permanent collection sites and more than 19,000 donor clinics annually to collect over 900,000 whole blood donations and deliver products to more than 700 hospital customers.³⁵

Hemovigilance is a form of biosecurity, and refers to intense surveillance of, and accountability for, the quality and care of blood components.³⁶ Traditionally, the goal was to ‘sort “good” from “bad” circulations’ often framing a pure interior as under threat by a contaminated exterior.³⁷ More nuanced perspectives entail ‘sensitivity to the cultural, biological and technological ways that infections move’.³⁸ Efforts to contain disease are reminders of Bennett’s vital materiality. Sheller, reflecting on a post-hurricane cholera outbreak in Haiti, observes that diseases ‘make use of vectors of mobility with no respect for the borders of states or islands, bodies or cells. We are all permeable’.³⁹ From the re-emergence of drug-resistant tuberculosis^{40,41} to efforts to contain avian influenza (H5N1),^{42,43} attempts to separate humans from webs of material forces are humbled.⁴⁴

Graham observes that just as human bodies are metabolic, cities with ‘dense water, sewerage, food and waste distribution systems continually link human bodies and their metabolisms to the broader metabolic processes through which attempts are made to maintain public health’.⁴⁵ This echoes a materialist emphasis on the tools and infrastructures that both enable and shape human activity. De Laet and Mol use the example of a Zimbabwean water pump to illustrate how the ‘fluidity’ or flexibility of its design renders it a particularly ‘appropriate’ technology.⁴⁶ Meehan advocates for moving beyond the perspective that tools are ‘handy implements used by humans to exercise dominion’, towards the idea that tools exert power.⁴⁷ Meehan illustrates how common household water tools – barrels, cisterns, buckets – intersect with state infrastructures. Such a ‘hydrosocial cycle’⁴⁸ raises the possibility for describing a ‘*hemosocial*’ supply chain, and ‘*hemosocial*’ thinking.

Blood travels thousands of kilometres within the human body. Upon entering the blood donation system it often travels thousands kilometres more as it is screened, manufactured and transported. Blood has a societal circulation; it is *hemosocial*. A single blood donation is manufactured into at least three different components that are distributed to three different locations and are eventually transfused into three different patients. Upon a closer look the blood system relies upon and constitutes a ‘vast and unimaginably complex’ material infrastructure circuit.⁴⁹ The local act of donating blood activates geographically expansive nodes. The relationship between not only bodies – but life – and infrastructures is enmeshed.⁵⁰ The intricacy is impressive and, as is often the case with functioning infrastructure systems, it is overlooked and taken-for-granted unless there is disruption (*coagulation*).

Vignette 3: Manufacturing

Meanwhile, at the Vancouver CBS facility, the bag containing my blood is placed in a centrifuge that looks like a large washing machine. In 20 minutes my blood is separated into four components. The components serve different functions, and once outside the cozy confines of my body, each requires storage at different temperatures with differing expiration dates. Each bag of blood components has a bar code and is tracked via computer system. The donations are held on site, in quarantine, until the test results from Calgary are available.⁵¹ Within 48 hours the Vancouver facility receives a report on the screening status of the test tubes. With a green light, the blood components enter into circulation. My red blood cells are couriered by van to Vancouver General Hospital (two kilometres north) as part of a standing order, my plasma is flown to Prince George (750 kilometres north) for an emergency delivery and my platelets remain in the blood bank for a couple of days until they are ferried to Victoria for a special order (110 kilometres west).

I am all over the place.

Mobilities

The mobilities paradigm examines the importance of mobility and immobility to contemporary society, exploring intersections of people, goods, infrastructure, information and communication. The mobilities paradigm lies at an interdisciplinary crossroads, incorporating social analysis of

power, geographical analysis of space and cultural analysis of discourse, in examining the phenomenon of movement and stasis.⁵² Sheller and Urry forwarded the mobilities paradigm to explore the interaction of social and spatial dynamics, animating a sedentary social science that tended to overlook mobility.⁵³

Sheller is careful to distinguish the mobilities paradigm from metaphors of flow, such as Bauman's discussion of liquid modernity where individuals experience continually shifting economic, geographic and personal circumstances.⁵⁴ This is in part to avoid totalizing narratives and, in part, to allow for the blockages that are viewed as an intrinsic and integral component of pervasive movement. The mobilities paradigm is 'concerned with frictions, turbulence, immobility, dwelling, pauses and stillness, as much as speed or flow, and examines how these textured rhythms are produced, practiced and represented'.⁵⁵ Urry elaborates on the interaction of flows and fixities, what he terms 'mobilities and moorings'.⁵⁶ For example, Canadian Blood Services (CBS) requires a fixed web of manufacturing centres, airports and road networks to allow the societal circulation of blood.

While Foucault does not address mobility specifically, he applies the concept of circulation to a variety of phenomena: 'circulation of ideas, of wills, and of orders, and also commercial circulation . . . fastening them together and mutually reinforcing them'.⁵⁷ Foucault's theorization of circulation moves beyond a mobility/immobility dichotomy. Rather circulations, as with pulsations of blood through veins, may be strong or weak.⁵⁸ Furthermore, external circulations of blood can be widely distributed geographically and may be stored multiple times in multiple sites before final use illustrating a spatially, temporally and rhythmically variable circulation (*Vignette 3: Manufacturing*).

By foregrounding the materiality of blood, rather than humans, I extend how cultural geography might engage with the mobilities paradigm. It is possible to imagine zooming in on the figure of, for example, the passenger. At one scale, Adey et al. reflect on the embodied passenger, including the social-technical assemblages they enact: 'how is the passenger represented, practiced and performed?'⁵⁹ At a different scale, Bissell examines the embodied experience of travellers on train and plane journeys.^{60,61} He argues that the perceived inactivity of the passive seated passenger in fact belies a shifting and nuanced internal landscape characterized by desirable states, such as relaxing and daydreaming, and uncomfortable states, such as lethargy and agitation.⁶² Bissell positions his work as a shift away from 'conscious, reflective and signifying practices of the body' towards more unconscious but palpable experiences within the body.⁶³ Taken one step further, a focus on the mobilities of blood between bodies, transported inconspicuously but critically by diverse modes from van to plane in bags and test tubes (described in *Vignettes 1–9*), offers an alternative entry point to understanding mobility in terms of scale and positionality.

Vignette 4: Blood 101

My knowledge of how blood functions within my own body, nonetheless how it is used once donated, is sorely lacking. Here are the basics. Straw-coloured plasma constitutes the bulk of blood volume (55 per cent). All plasma is frozen and remains frozen throughout the supply chain. Once thawed it must be used within five days. Plasma replaces proteins and is used in patients undergoing extensive surgery or suffering traumatic injuries. Red blood cells account for up to 45 per cent of volume and have a shelf life of 42 days when stored in cool conditions (1–6°C). Like plasma, red blood cells are used in emergencies and during surgery, as well as for cancer patients. Platelets make up less than one per cent of volume and have a shelf life of five days when stored at room temperature (20–24°C) and kept moving (*agitated*). Platelets are given to patients with bleeding disorders and undergoing cancer treatment. White blood cells account for less than one per cent of volume and are extracted as waste (*leukoreduction*), as these cells might trigger a negative reaction in recipients (*immuno-suppression*).⁶⁴ Some blood products are irradiated, washed or deglycerolized as determined by patient needs.⁶⁵ Once manufactured, some plasma may be sent to the

United States or Europe for further manufacturing into more specific blood products (*fractionation*), which are then returned to Canada, adding thousands of kilometres to the supply chain. At any given time, CBS aims to maintain a five-day supply in their blood bank.

Vignette 5: Road trip

There is snow and speed and the Red Hot Chili Peppers. He leans over the wheel: ‘*Can’t stop, addicted to the shindig/Chop Top, he says I’m gonna win big*’. Just a few short hours and he’ll be zipping down Whistler’s ski slopes with Sam. Smiling, he accelerates. Front left tire hits black ice. Sliding now spinning. There is a crashing halt at the base of a highway signpost. The hiss of escaping coolant is the only sound.

Vital + mobilities

The vital mobility of blood is constituted in combination with transport, information and electricity infrastructure, traversing multiple scales: bodily, street, urban, national and international.^{66,67} These infrastructures have their own specificities, each tailored to the particular needs of different blood products, from frozen plasma to cool red blood cells to warm and restless platelets (*Vignette 4: Blood 101*). Blood infrastructure is socio-material and includes institutions that (re)produce both blood donors and recipients, ensuring the availability of supplies in times of need (e.g. *Vignette 5: Road trip*). These dynamic infrastructures are inextricable from the production and maintenance of a national blood transfusion system.⁶⁸

By combining the terms ‘vital’ and ‘mobilities’, I want to contribute to theorization that centres on the question, ‘How do we move things when it really matters?’ How do we achieve priority mobility that may impact life chances in everyday contexts (e.g. heart attack), as well as during crisis (e.g. terrorist attack)? In their 2006 agenda-setting editorial, Hannam, Sheller and Urry acknowledge the applicability of the mobilities paradigm to emergency, including global warming, hurricanes and oil wars.⁶⁹ Mobilities scholars have since examined a range of emergencies: Birtchnell and Buscher’s special issue on the Icelandic ash cloud,⁷⁰ Cook and Butz’s study of flooding response in Pakistan⁷¹ and Sheller’s work on post-hurricane Haiti.⁷²

Ten years on, in 2016, Adey theorized the ‘inescapable pairs’ of emergency and mobility.⁷³ He describes emergency mobilities: ‘whether in flight or in response, emergencies demand highly intensive forms of movement that radically transform one’s life chances and quality of life’.⁷⁴ Such emergencies can range from events that fall within everyday governance to states of exception. ‘The emergency governance of mobility’, Adey writes, ‘seeks to organise a series of activities, practices, technologies and representation that work in concert to respond and plan so as to get things moving again’.⁷⁵ When a state of recovery is achieved, the emergency and its related mobilities are concluded.

It is on this foundation that I seek to introduce a theory of ‘vital mobilities’, that complements and extends Adey’s emergency mobilities. Where the latter focuses on context, emergency, the former focuses on what is being mobilized. What goods and services are necessitated and prioritized? Emergency mobilities and vital mobilities both focus on the techniques, ethics and politics of mobility.⁷⁶ However, emergency mobility foregrounds governance issues, while vital mobility emphasizes material (or energetic, as in the case of electricity) circulations – although governance and materiality are components of each.⁷⁷

Two characteristics of vital mobilities distinguish them from emergency mobilities. First, vital mobilities cannot be dematerialized; the feat of mobility must be accomplished to safeguard life (e.g. blood must get to the patient). The use of fictionalized vignettes in this article emphasizes this distinction by focusing attention on the circulations of blood supply chains,

rather than using an emergency as the dominant framing device. Second, while vital mobilities are critical, in that they must occur, they are not necessarily constitutive of an emergency. Rather they often constitute routinized circulations that can be scaled up as need demands. For example, as part of standard practice, hospitals require stocked blood banks. This circulation must occur regardless of whether there is the pressure of emergency (e.g. wide-spread crisis) or not. They are mobilities that ought to be prioritized in the face of coagulation, such as reliance on airlifts, requirements for fuel rationing and/or longer-term carbon constraint. Therefore, while emergency mobilities are time limited, vital mobilities are constant, continual circuits. Vital mobilities enable the enacting of emergency mobilities when needed; emergency mobilities are ‘often adaptations or improvisations . . . or intensifications’ of existing infrastructures.⁷⁸

Central to the vital mobilities enabled by CBS is the National Blood Inventory, whereby shortages in one area can be compensated for by other regions. Within British Columbia there is a robust redistribution network that maximizes use of donated blood products with a wastage rate of less than 1 per cent. There are six health care regions, each of which has at least one hub that (re)distributes blood to other regions. If stores of red blood cells, for example, remain on the shelf within 14 days of their expiry date they are redistributed to a higher demand facility such as Vancouver General Hospital. In a hemosocial process, diverse transport modes, organized by CBS as well as hospitals, are continuously circulating standing orders, special orders and emergency deliveries between sites to optimize distribution.

Cowen sheds light on the ‘radically undervalorized role of movement and circulation in everyday life’, examining how military practices influence other sectors.⁷⁹ The military is an incubator for innovations in both blood transfusion and supply chain logistics. During the Spanish Civil War, a Canadian surgeon, Dr Norman Bethune, made two innovations. The first was the organization of blood banks, that is, an infrastructure for donating, transporting and transfusing blood.⁸⁰ The second was ‘taking the blood to the wounded and not the wounded to the blood’, yielding more successful patient outcomes.⁸¹

Today, trends towards lean supply chains and just-in-time delivery mean that disruption often translates into shortages. Blood supply chains are lean in part because blood products expire and overstocking can result in wastage, and in part because of efforts to reduce costs through centralization. At the same time, enough blood needs to be maintained to ensure availability. Cowen describes how supply chains are invested with ‘biological imperatives to flow . . . as a means of sustaining not only human life but the system itself’.⁸² Supply chain circulation takes on the import of blood circulation; they are living processes.

Vignette 6: Inventory

At the Transfusion Medicine Laboratory at Vancouver General Hospital, a registered nurse reviews the hospital inventory. He fills out a CBS order form, identifying the type, number and urgency of blood products needed. The phone rings and he notes the order. Opening the fridge door, he retrieves two bags of O Negative red blood cells (one of them mine). He packs the bags in a small beige travel cooler, which is transported via ground ambulance to the Vancouver International Airport airbase. Though the CBS blood bank is closer to the airbase than the hospital, CBS is only permitted to supply blood to hospitals.

Vignette 7: Elevation

The air ambulance crew assembles: two pilots and two paramedics (so there is always back-up). As the site of the car crash is less than 100 kilometres away and on a highway with limited landing space, they take a helicopter rather than a fixed-wing plane. While the pilots calculate the necessary fuel (gauging distance,

weight, etc.), the paramedics await the arrival of blood by truck from Vancouver General Hospital (12 minutes away). When the blood arrives, the crew departs.

Non-visible, non-obvious non-verbal: fictionalized vignettes

The process of donating, collecting and transfusing blood is technically, socially and politically complex.⁸³ I focus on the mobilities, materialities and infrastructures activated between the point of donation and the point of care. How does one ‘bear witness to the vital materialities that flow through and around us?’⁸⁴ How might a researcher follow blood given that it is subject to quarantine and donor/patient privacy, as well as a complex, multi-faceted product that is transported via multiple modes across surprising distances?⁸⁵ How do we, to draw on Hulme’s work on capitalist commodity chains, follow things that ‘do not lend themselves to being followed?’⁸⁶ That is, at least by a researcher who is not privy to the systems that permit traceability. I spent the winter of 2017 in Vancouver where I interviewed diverse individuals whose work relates to blood transfusion. In addition, I toured facilities and reviewed CBS documents. My goal was to gain an understanding of how blood circulates.

Two key methodological issues arose. First, the distribution of blood components is incredibly dynamic. There are multiple potential paths that one donation might take. The infrastructure enacted in any given donation varies depending on geographic location; local conditions (e.g. weather, hazards); availability and accessibility of donors, patients, testing and treatment facilities; and transport infrastructure.⁸⁷ Furthermore, different blood types vary in terms of their mobility. The universal donor, O negative, is continually in high demand and widely circulated, while the demand for other blood types varies. Second, much of the blood journey is ‘non-visible . . . non-verbal . . . non-obvious’.⁸⁸ For example, a component may be tested and manufactured in restricted labs and transported long distances in the cargo hold of a van and/or airplane. However, such ‘neurodiverse, insensible, intuitive and untranslatable spaces should ethically not be ignored’.⁸⁹ Therefore, a non-representational ethnography that ‘emphasizes the fleeting, viscous, lively, embodied, material, more-than-human, precognitive and non-discursive dimensions of spatially and temporally complex life worlds’ presented itself as a worthwhile experiment for illustrating vital mobilities.^{90,91}

In order to report on the general, I opted to animate a story of the specific through linked fictionalized vignettes (i.e. short scenes). A specific example illustrates the complexity of blood donation more effectively than listing abstract possibilities.⁹² The result is a more ‘lively, moving, provocative and challenging’⁹³ experience for the reader that reflects that blood supply chains are ‘restless, rich with verve and brio, constantly on the move, forever becoming something else’.⁹⁴

There was a technical question of how to frame and compose a narrative of blood. The materiality of blood as a vital mobility called for moving beyond ‘generating talk and text’, towards more-than-human methodologies ‘with experimental practices that amplify other sensory, bodily and affective registers and extend the company and modality of what constitutes a research subject’.⁹⁵ Scanning academic and non-academic literature, two blood-related examples of creative methodology emerged. Harry Parker’s novel, *Anatomy of a Soldier*, tells the story of a British captain injured in Afghanistan.⁹⁶ Around 45 objects narrate the story. A bag of blood voices chapter 16, hanging over a critical surgery. The chapter concludes,

I was empty; my plastic walls had collapsed together and red showed only around my seals. The rest of the blood I’d carried since a young man donated it after a lecture, joking with a mate in the queue, was now in you.⁹⁷

I contemplated positioning blood as a first person narrator, but was quickly bogged down. What personality, preoccupations and tone might blood have? How might these characteristics shift as it

moved through a wide-ranging landscape, including, finally, residing in a different body? Straying from my focus on external blood supply chains was a risk.

Another example was Mol's ethnography of atherosclerosis. She develops two parallel narratives, one describing her fieldwork observing medical practice and a literal subtext engaging with medical ontology.⁹⁸ Two parallel narratives occupy each page and flow through the length of the text. For example, on the top of one page there is a description of how an ultrasound represents blood flow (e.g. 'Pshew, Pshew' reference under '*Vital mobilities*'), while on the bottom there is discussion of how diverse medical practices multiply reality.⁹⁹ This use of two narrative strands, one situated in the hospital and the other in academia, effectively captures dual processes of describing and analysing. As donated blood is separated into three components, the possibility of tripartite narrative was raised. However, again complexity soon emerges. Given my emphasis on blood supply chains, might the story of one blood component journey be sufficiently illustrative and more accessible for the reader than following three blood components? Such an approach remains a playful possibility.¹⁰⁰

Informed by these possibilities, I opted for a linear narrative approach centred on fictionalized vignettes, with the aspiration of experimenting with more varied and more-deeply ethnographic approaches in future. Through interviews, site observation and document analysis, I create nine linked, fictionalized vignettes that 'follow the material', tracing the vital mobilities of *one* component of *one* blood donation. The vignettes amalgamate my fieldwork, allowing me to narratively link diffuse spatialities, temporalities and rhythms, as well as circulations and coagulations – heuristics that I wanted to highlight.¹⁰¹ They are grounded in details, specificities and insights offered by research participants, documents analysis and site observation. I chose an idealized scenario with minimal supply chain disruption (such as in *Vignette 6: Inventory*, where complex material and communication procedures are disguised by a simple phone call). The complexity of the supply chain itself highlights the potential for coagulation (for example, in *Vignette 7: Elevation* where numerous protocols must be fulfilled before the air ambulance can take flight). They are grounded in evidence at all points. However, the specific unfolding of the scenario is imagined. I term this approach 'linked fictionalized vignettes'.

To this end, it is key that I transparently detail decisions I made in crafting the vignettes.¹⁰² As non-representational ethnographic research 'begins from the researcher's body . . . with bodily fluids enlivening all relations in which ethnographic relations are entangled', I positioned myself as a blood donor based on my memories of being a regular donor (I currently am unable to donate). Then, drawing on data from the field, I imagined possible trajectories for my donation. The everyday experiences of the individuals I interviewed (e.g. air medics, transfusion specialists) directly informed the trajectory. Given my interest in mobilities scholarship, I chose a sequence of events that activated diverse mobilities (e.g. walking, van, airplane, car, helicopter) to illustrate the potential for supply chain complexity. For example, the pre-hospital transport of blood products via air ambulance was a relatively new and rare practice informed by military evidence, and is currently on hold due to logistics. It is anticipated to restart in the future, potentially using whole blood. I opted to focus on an O Negative blood donation, as this is a universal donor type that can be received by all individuals. The crisis on which the vignettes pivot, a car crash, is unfortunately too common. In this case, choosing an actual incident felt too invasive.

The vignettes centre on Vancouver, British Columbia. Located on Canada's West Coast, issues of disaster preparedness are of increasing concern. A report issued by British Columbia's Auditor General states that the province is at 'significant risk' should an earthquake occur. This report lends energy to ongoing and new disaster preparedness efforts.¹⁰³ One such initiative is the Maritime Transport Disruption research project, which examines the resilience of health care supply chains in the face of disruptive emergencies.¹⁰⁴ The study focuses on coastal British

Columbia where many communities are served by ferries and float planes.¹⁰⁵ Blood was excluded from this study, to date, in part due to its complexity. Therefore, this article contributes to understanding blood supply chain resilience in Canada and other countries with national blood transfusion systems.

Vignette 8: Extraction

While extricating the driver using the jaws-of-life, paramedics reach through the windshield to establish IV access. The roar of the arriving helicopter is deafening. First responders call it ‘the sound of life’. The pilot briefly hovers only to find that Fire-Rescue are still establishing a secure landing zone on the busy highway. He veers away, tracing a large circle. When the landing stage is secured, the helicopter alights. An hour after the crash, the driver is pulled free but in hemorrhagic shock caused by extensive blood loss. In the air ambulance, the paramedics rapidly infuse O Negative red blood cells as the helicopter takes flight.

My blood is now his blood.

Vignette 9: Waking

He peels open one eye. White sheet. Tubes in arm. Red entering.

He is alive.

Coagulations

In describing a successful multimodal journey, the vignettes illustrate the complexity of the blood supply chain. Given such complexity, the risks for disruption, or, coagulation, are numerous. The possibility for disruption is merely hinted at when the lack of a secure staging area delays the arrival of the air ambulance crew (*Vignette 8: Extraction*). Perrow observes that tightly coupled systems, such as transport networks and blood donation networks, ‘predictably fail . . . in unpredictable ways’.¹⁰⁶ Cascading infrastructure failures can result.¹⁰⁷ Mobility infrastructure disruptions highlight how immobility is implicit in mobility; there is an entangled relationship between mobilities and moorings.¹⁰⁸

The CBS fleet is limited to surface transport (e.g. vans, trucks). It relies on commercial providers for all other modes (e.g. airliner, floatplane, air ambulance, surface ambulance, ferry, barge, courier). The focus is on facilitating the continuous and seamless societal circulation of blood (and the products needed in its manufacture).¹⁰⁹ Improvisations, guided by knowledge of and influence over ‘baroque material regimes’ are essential to navigating supply chain disruptions.¹¹⁰ Such spontaneous reconfigurations are not always possible. While delays are not uncommon, due to a plethora of factors from severe weather to construction closures, failure to deliver is rare.

One such incident occurred during my fieldwork. A winter storm caused the closure of all three highways connecting the city of Kelowna, in the province’s interior, to Vancouver. Blood being transported by truck from Kelowna to Vancouver (390 km) for manufacturing and then on to Calgary for screening, was stuck en route when snow and ice conditions led to road closures. While the blood was maintained at the correct temperature, it was unable to be manufactured within the permitted window. In total, 90 bags of blood were discarded. Blood bank shelves were depleted as a result. At an extreme, this could result in an adverse patient outcome (contrary to the promising outcome presented in *Vignette 9: Waking*), for example, if a winter storm precipitates or coincides with a mass-casualty event. One practitioner recalled that this was the first such experience she had

of no viable transport. However, with climate change, British Columbia is experiencing more intense precipitation events and such disruptions may be more common.¹¹¹

At a systemic level, due to cost considerations, Canadian blood screening was consolidated to two sites: Calgary and Toronto. Blood manufacturing was also consolidated. For example, rather than each Maritime province (Nova Scotia, New Brunswick and Prince Edward Island) having its own production facility, CBS experimented with one centralized facility in New Brunswick. Upon evaluating '700 bus shipments, 400 air shipments, and 500 courier deliveries' CBS opted for centralization.¹¹² It was concluded that winter weather will 'always impact the blood transport network. . . . [but with] careful inventory, contingency, and operational planning, these impacts can be minimized'.¹¹³ It is worth asking at what point centralization might compromise vital systems security.

Vital systems security is premised on responding to unknowable future events, emphasizing the 'limits to predictive knowledge and . . . the prevalence of the unexpected'.¹¹⁴ Adey highlights anticipation as one dimension of emergency mobilities,¹¹⁵ noting that in practice anticipation is less prescriptive and more like a 'tentative testing and feeling'.¹¹⁶ There are a variety of technologies of anticipation ranging from risk matrices to embodied simulation exercises.¹¹⁷ Adey suggests 'mobilities researchers may be well poised to explore the possibilities of experimental intervention into these forms of anticipatory practice'.¹¹⁸ To this end, can cultural geographers use vignettes to think through possibility and complexity (*Vignette 6 Alternative: Inventory*)?

Vignette 6 Alternative: Inventory

The nurse answers the phone. Another car crash. He opens the fridge door, visually confirming what he already knows. A brutal winter kept potential donors at home and wreaked havoc on the transport of blood products to and between hospitals. There is no O Negative.

How might coagulations be overcome? What might potential future circulations and coagulations look like? For example, how might drones shape blood mobilities?¹¹⁹ How might requirements for fuel rationing and/or global carbon constraint shape blood mobilities?¹²⁰ Beyond academia, such vignettes could ground discussions with practitioners and policy makers resulting in greater mutual understanding of practices, processes and issues at play. This could be in the context of a fieldwork interview, or it could scale up to an academic-practitioner working group as a form of public cultural geography charged with examining,¹²¹ to draw on Sheller's terminology, potential 'demobilizations, remobilizations and unique (im)mobilities'.¹²²

Conclusion: suturing

This article traces the journey of blood from donor to recipient through nine fictionalized vignettes, grounded in research encounters, interwoven throughout the article. This article makes two key contributions. First, I illustrate the potential for fictionalized vignettes to represent dynamic temporalities, spatialities and rhythms that are non-visible, non-obvious and non-verbal. This approach is flexible and conducive to describing and comparing blood mobilities within one region, such as how different blood products or blood types circulate within British Columbia. Or, it could be used to compare how blood mobilities differ between regions, such as the movement of red blood cells in Vancouver versus Paris or Kigali. Blood is just one of many vital mobilities that can be enlivened through the use of vignettes.

Second, I theorize the concept of *vital mobilities*, using blood as exemplar and metaphor. Attention to blood as a vital mobility – that is, a good that directly impacts one's life chances and

cannot be dematerialized – offers theoretical and methodological contributions to cultural geography. Blood, as a vital mobility, ranges from internal bodily circulations to geographically diffuse journeys: *I am all over the place*. Focusing on the specific highlights that blood supply chains are homosocial, enacting complex and geographically expansive assemblages of people, materials, equipment and infrastructure to accomplish blood donation. *My blood is now his blood*.

My choice of ‘vital’ invokes Collier and Lakoff’s work on vital systems security of critical infrastructure, as well as Bennett’s emphasis on a vital materiality that circulates around and through humans. Mobilities scholarship has always been attentive to crisis and disruption, with Adey theorizing emergency mobilities that emphasize practices and technologies of getting things ‘moving again’. Building on this foundation, I distinguish vital mobilities in two ways: they are non-optional material and/or energetic movements that safeguard life, and they constitute ongoing circuits of care that can be ramped up in case of wide-spread crisis, and are also required in everyday contexts. Vital mobilities, as used here, denote external circulations that enable internal bodily circulations. They directly impact life chances. Vital mobilities are applicable to myriad materials and energies beyond blood, such as vaccines, electricity and potable water. When faced with coagulations, such as infrastructure disruption, fuel scarcity and/or carbon constraint, vital mobilities justify prioritization.

The concept of vital mobilities assists geographers in describing imperative spatial relationships between humans, vital material and/or energies and the potential or fact of their spatial movement. The concept of vital mobilities can prompt geographers to ask what needs to be moved to enable and sustain life? What temporalities, spatialities and rhythms characterize vital mobilities? How are infrastructures and not only bodies, but life, enmeshed? How do vital mobilities enable or inhibit one another? How are (or are not) vital mobilities prioritized politically and/or logistically generally, as well as in the context of mobility scarcity? In the face of coagulation, how might vital mobilities change in either their materiality or supply chain configurations? In sum, vital mobilities offers insight into how we move things when it matters.

Acknowledgements

Thank you to project research participants who generously donated time and energy to share their important work, as well as reality-check the resulting vignettes. Thank you to four reviewers for sincere and constructive engagement, and to Dydia DeLeyser for thoughtful and insightful.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was possible due to the support of the University of British Columbia’s Killam Postdoctoral Fellowship (supervised by Philippe Le Billon) and a Social Science and Humanities Research Council of Canada Postdoctoral Fellowship.

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