

Negotiating humanity: An ethnography of cadaver-based simulation

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Author contributions

The study was conceived and designed by (AM, GK, PC). Research material were prepared by (AM, PC, MF). GK and LP led recruitment and scheduling observations. AM, PC, VL, MF, and OK participated in data collection; MF, PC, and VL coded the data and all team members participated in data analysis. AM wrote the first draft of the manuscript and all team members provided input on subsequent drafts. All authors read and approved the final manuscript.

Abstract

Human body donation (HBD) serves an essential function in many medical schools, particularly in institutions where people engage in cadaver-based simulation (CBS) as a pedagogical approach. The people who facilitate HBD and CBS have a highly specialized skill set, yet their expertise remains largely unacknowledged, and takes place out of sight from the broader medical school community. This manuscript, based on a two-year practice-based ethnography (Structured Observations n = 68 hours, Unstructured Observations n = 150+ hours; Interviews n = 24; and Document/Policy Analysis n = 14) illuminates the complex work of HBD. We identify three primary functions of HBD and CBS (1. Cadaver Intake & Administration, 2. Cadaver Preparation, and 3. Cadaver-Based Pedagogy). We describe how medical educators involved in CBS have developed a skillset specific to their role: negotiating humanity.

Keywords: human body donation, cadaver-based simulation, professional practices, invisible work, ethnography

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It's easy to underestimate the number of people working behind the scenes to ensure the design and delivery of high-quality medical education. Some of the work and workers of medical education are more apparent: a lecturer describing organ function, a simulated patient portraying a person with a chronic illness, a clinician teaching at the bedside during rounds. Some medical education work, however, happens behind the scenes and is largely invisible, even to deeply embedded members of a medical school community.

The complex work of a Human Body Donation (HBD) Program is one such example. The medical education literature has largely overlooked the complex work associated with HBD and preparing cadavers for educational purposes. While HBD programs serve an essential function in anatomy and clinical skills teaching—and include everything from the recruitment and management of donors to the interpretation of policy and the maintenance of records, to the actual preparation of bodies for educational purposes—the realities of this work happen very much out of sight.

The potential of cadaver-based pedagogy, and in particular, cadaver-based simulation (CBS) is striking, particularly with respect to educating clinicians to be prepared for High Acuity, Low Occurrence (HALO) events, like emergency intubations (Kovacs et al, 2018), as well as in the context of surgical skills training (Faizer et al., 2020; Kim et al., 2016; Lovasik et al., 2021) and even, in some cases, to support humanities endeavours (Böckers et al., 2010; Lempp, 2005; Ross et al., 2020). Much in the same way there is skill and strategy associated with other educational work (for example, developing reliable and valid assessment tools, or writing an effective problem-based learning case), there is a specific expertise associated with

preparing cadavers for CBS. Yet, this skill-set is not well-recognized, and has yet to be fulsomely documented in the medical education literature.

This is an important gap to address. The promise of CBS relates to the “ontological fidelity” (MacLeod et al., 2021) of the cadaver itself. In other words, the essential *humanness* of the cadaver, no matter how much we try, cannot be removed from CBS (MacLeod et al., 2021). This humanness influences, in a positive way, every educational interaction in the simulation, encouraging learners to engage in authentic, patient-centred education, while allowing them to practice invasive procedural skills. Negotiating the humanity of the cadaver as it is transformed into, and then used as, an educational tool, is important education work.

In this paper, we acknowledge, and make visible, the dedication and skill of those who work in the broad areas of HBD and CBS, and honour this ‘invisible’ work which is foundational to medical education. Based on a two-year, practice-based ethnography, we describe three primary functions of an HBD program: 1) Cadaver Intake and Program Administration; 2) Cadaver Preparation; and, 3) Cadaver-Based Pedagogy. Within each of these functions, we will describe a unique type of medical education work specific to the tasks of HBD, which we refer to as “negotiating humanity.”

Background

While there is a long history of working with cadavers in health professional education, their use has traditionally been restricted to the realm of anatomy teaching (McLachlan et al., 2004; McLachlan & Patten, 2006). As advances in naturalistic cadaver preservation emerge—notably the “Halifax Clinical Cadaver Preparation Technique”, a modified light-embalming technique allowing cadavers to be preserved in a manner that maintains tissue elasticity—the potential uses of clinical cadavers for education is growing (Kovacs et al., 2018).

The human cadaver is a unique educational tool. Neither a living patient, nor a physical model, the cadaver is “non-vital, morbid and mortal, variable, and three-dimensional,” offering “a low health hazard and high quality of haptic experience, restricted availability and relatively moderate costs per student. It cannot be harmed by the student and its use is ethically sound” (Brenner, 2014, p. 316).

There is a significant record of learning medicine with cadavers. In the context of formal medical education, the use of cadavers rose to prominence in the late 1700s, with cadavers primarily serving as a tool for dissection (Balta, 2015; Brenner, 2014; Dyer, 2000). Cadavers continue to have a role in more recent medical education and are still used to teach human anatomy in many programs (Lewis, 2012). However, the affordances of technologies have meant that cadavers as a tool for learning anatomy are now frequently replaced with manikins and dissection models (Stunt et al., 2014). Still, the question of fidelity remains for these manufactured substitutes for the human body.

Outside of their use in teaching anatomy, the scholarly work related to cadavers in health professional education has been primarily centred on ethics and psycho-emotional reactions (Arráez-Aybar et al., 2015; Boeckers et al., 2010; Druce & Johnson, 1994; Hancock et al., 2004; Houwink et al., 2004; Nnodim, 1996; Tseng & Lin, 2016; Weir & Carline, 1997), and to a lesser degree, with respect to issues of professionalism (Weeks et al., 1995).

The actual *work* involved with human body donation and cadaver-based education—tasks that must be accomplished, skills that must be held, decisions that must be made, and countless other such things—has been, to date, largely unconsidered. This may relate to the fact that society has become, to some degree, preoccupied with denying death (Becker, 1973; Charmaz, 1980; Sudnow, 1967); or, possibly due to the occupational stigma associated with dealing with

death (Thompson, 1991). Regardless of reason, this manuscript addresses the gap, shining a light on the intricate work of preparing cadavers for teaching and learning.

Methods

Research Context

From September 2018-December 2020, we conducted a practice-based (Nicolini 2012, 2017) ethnography of the Human Body Donation (HBD) Program and Cadaver Based Simulation (CBS) at Dalhousie University in Halifax, Nova Scotia, Canada. This program is internationally recognized for its state-of-the-art preservation technique, the Halifax Preparation Technique (Kovacs et al, 2018), and includes a variety of workers (see Table 1). Bodies preserved in this manner maintain many of the characteristics of an anaesthetized patient, including tissue elasticity. They are typically used to practice a range of procedures, from thoracotomies to lateral canthotomies. While some bodies donated are used for research purposes, our focus was specifically on those that would be used for educational purposes.

In the context of our study, the work of HBD and CBS takes place in a variety of physical locations and spaces. These included traditional academic offices (administrative work) and laboratory spaces (cadaver preparation) high above the ground in an office tower on campus. Some of the work of cadaver intake and preparation took place in a basement morgue, in the same office tower, and in hospital morgues. Most of the pedagogical work involving cadavers takes place in spaces which have been specifically designed to accommodate this type of teaching. These are renovated clinical spaces, which are surprisingly bright and clean, despite the fact that they are located either in basements or in ‘out of the way’ places that are removed from the general everyday ‘traffic’ of the hospital.

Theoretical Perspective: Practice Theory

Our ethnographic study was theoretically framed in Practice Theory, which centres *ordinary action* as its unit of study with the intent to “re-specify...and [re-present] social phenomena in terms of networks, assemblages and textures of mediated practices” (Nicolini, 2017, p. 19). Practices are composed of multiple layers of activity, constituted through a network of social and material elements as people and things came together to accomplish particular goals (Nicolini, 2012; Schatzki, 2001). Accordingly, the everyday *tasks* performed by administrators, technicians, and teachers involved in CBS (Nicolini, 2009, p. 12) are organized into conventional ways of doing (Nicolini, 2012) such that they came to define workers’ *roles* in the larger context of the *functions* of the HBD. Hence, the practices of HBD—composed of tasks, roles, and functions—served as rich fodder for ethnographic interpretation.

Methodology: Ethnography

Ethnography, through its layering of multiple methods, allowed us to focus on the everyday work and taken-for-granted activities of HBD, leading to thick description (Geertz, 1973). While our work was informed by traditional ethnography, which aims to understand social and cultural organization, our Practice Theory orientation required us to refine the focus of our inquiry. Our goal was to dig deeply into the specific, but often unexplored, practices of HBD and CBS. To build a depth of understanding, we collected data across the continuum of HBD: *before* cadavers were used for educational purposes (donor registration and consent, point of death, cadaver collection and preparation), *during* instruction (continuing professional development course, emergency medicine resident procedural skills sessions), and *after* their use (interment and memorial service for donors and loved ones).

Reflexivity

Olmos-Vegas and colleagues describe reflexivity as “a set of continuous, collaborative, and multifaceted practices through which researchers self-consciously critique, appraise, and evaluate how their subjectivity and context influence the research processes” (2022, p.2). We share this perspective and engaged in reflexive activities longitudinally, throughout our empirical and analytical work.

This was particularly important because our research team is diverse both in terms of educational and professional backgrounds and as well as in their contributions to the study. Collectively, we hold expertise in educational ethnography (AM, PC, VL, OK, MF, JT), practice theory (AM, PC, VL, OK, JT), medical education (AM, PC, VL, GK, LP, OK, JT), medicine (VL, GK, LP), and cadaver-based pedagogy (GK, LP). In terms of personal reflexivity, for some of us, working with cadavers was familiar; for others, the experience of being surrounded by bodies was new and even shocking. We met regularly to discuss the sensory and emotional experiences related to our data collection. The members of our team who were more experienced with CBS served as informal mentors, answering questions, relating our reactions to past experiences, and helping the others to make sense of the sights and sounds of CBS. We note that our various positionalities did, indeed, influence the elements we chose to participate in and observe, and helped us to identify potential interview participants.

Throughout our data collection phase, we engaged in deliberate, iterative reflexive exercises through which we informally appraised the data collected, reflected on what we were learning, and considered whether we required additional information. As an example of methodological reflexivity (Olmos-Vegas, 2022), we collaboratively discussed which learning events we wanted to observe and which of these ought to be formally ‘field-noted.’ We also worked together to determine whether there were gaps in our data that ought to be addressed by

adding more formal observations. Our invitations to be interviewed were also iteratively derived, and were based in team conversation about where we needed more information, and who we needed to interview in order to ascertain these data.

Those more experienced with CBS noted that deliberately taking time to reflect on taken-for-granted elements of CBS required them to think carefully about the sayings and doings of HBD and CBS. We consulted regularly with one team member (GK) who had significant longitudinal experience with HBD and CBS. Through this team member's expertise, we were able to connect with resources to help address areas where we needed more information. Those who were not experienced with CBS were able to leverage their perspectives as relative outsiders to identify specific practices that seemed noteworthy, bringing them forward for our team to specifically address.

In the context of an ethnographic study, fieldnotes constitute a significant source of data. Given the nature of the data we collected, and the sometimes-alarming sights, sounds, and smells we encountered through this project, contextual reflexivity (Olmos-Vegas et al. 2022) was a particular concern. Our research members were encouraged to write freely when they recorded fieldnotes (see Appendix A). Thus, our fieldnotes were not unfeeling documentations of observations, but rather attempts to process in real time the experience of CBS from a group of researchers who, for the most part, had not encountered such work before.

Relatedly, the results described in this ethnographic manuscript are presented along with some interpretation and emotion. This is consistent with state-of-the-art thinking with respect to reflexivity, which moves us away from clearly siloed 'reflexivity sections' and encourages researchers to write reflexively throughout the manuscript. As Olmos-Vegas and colleagues noted, "the researchers' voices and interpretations are intimately connected to the results and

discussion sections.... Thus, researchers can demonstrate reflexivity by clarifying where the data they present came from, how it was interpreted, and how it is being used” (2022, p.8).

Methods: Zooming in

Following Nicolini (2009) and consistent with our Practice-Based approach, we “zoomed in” to observe and explore, in detail, the specific practices of HBD and CBS. Zooming in was made possible through *informal* data collection captured through ethnographic immersion in the field, which was of central importance to this study. In other words, through the many hours we spent in the field and building relationships with the workers involved in HBD and CBS, we were able to identify key practices (which we refer to as types of work) to explore in detail, using formal data collection techniques. Our *formal*, structured data collection strategies included: 1) observations; 2) in-depth interviews; and, 3) document analysis.

Ethnographic Immersion. Collectively, our team spent hundreds of hours visiting the various facilities of the HBD and CBS, getting the lay of the land, and preparing to collect formal data. We had several tours of the morgue and cadaver preparation spaces, and countless informal, but informative, conversations with various workers. We also explored HBD artifacts including hand-written ledgers and a collection of photographs, and were able to view, and even handle, plastinated hearts, lungs, and other organs, displayed in the anatomy museum. We visited a variety of simulation suites in which cadaver-based simulation occurred and learned to navigate a complex network of underground tunnels connecting hospital buildings that we did not know existed before beginning this project.

As ethnographers, these visits and conversations were essential elements in our quest for rich understanding. We put a significant amount of effort into building trust, relationships, and mutual respect with our study participants, so that they would feel comfortable sharing insights

with us and allow us to observe them while at work. Because of this, during our encounters, we did not record, nor formally document field notes. Rather, we debriefed in pairs, or as a team, following these visits. We also wrote personal reflections on what we had experienced. These reflections are not considered part of the formal data; however, they were essential to building our understanding and helping us identify people to interview, situations to observe, and documents to review.

Formal Observations. We (AM, MF, OK, PC, VL) documented 68 hours of formal, structured observation. These included 1) the delivery and preparation of cadavers for a CPD course on airway management; 2) the teaching of the airway management skills for practicing clinicians; 3) the teaching of various procedural skills for Emergency Medicine Residents; 4) the Donor Interment Ceremony; and, 5) the Donor Memorial Service. We used a field note template to structure our observations (see Appendix A). In all cases, participants were informed of our presence and study purpose. Informed consent was provided where required (in individual and small group sessions).

In-Depth Interviews. We (PC, MF, VL, AM) conducted open-ended, in-depth interviews with 24 individuals associated with the Human Body Donation and Cadaver-Based Simulation programs (five physician learners, four resident physicians, four educators, six Human Body Donation program workers, five family members of donors). The interviews ranged in time from 32-63 minutes, with the average time being 47 minutes. We used a combination of purposive and snowball sampling to identify participants. Interviews were recorded and transcribed. Informed consent was received for all interviews.

In this paper, we focus specifically on data generated with people who are directly or indirectly working in the role of a medical educator (see Table 1). This means that they were

involved in either: curriculum development; the preparation of teaching resources (i.e. educational cadavers); and/or teaching using cadavers.

We used a protocol to guide our interviews; however, the interviews were largely open-ended and conversational. The tone varied significantly, from those that were more business like to those that were more personal in nature, reflective, and thought provoking. The interview questions were tailored for each participant group, and focused on exploring the nature of their roles and the types of tasks they took part in. For example, we asked HBD staff to explain how they obtain and prepare bodies for CBS; we asked teachers about their experiences facilitating CBS; and we asked students to describe what it is like to manipulate and practice on cadavers. Participants were offered the opportunity to review and approve their transcripts. Given the potentially sensitive nature of some of the things discussed in our interviews, we offered this opportunity to allow participants the chance to reflect upon their comments before they became formal data. Also, as ethnographers, we spent a considerable amount of time with some of the participants in the field and we wanted to ensure that we built a respectful relationship.

Critical Document Analysis. We (MF, PC, VL) critically analyzed 14 documents (see Table 2) which included legal and administrative forms, curriculum guidelines, program websites, and media coverage. We used a document review template (See Appendix B) based on MacLeod et al. (2019), specifically seeking to better understand the policies, processes, and procedures involved in obtaining, preparing, and using cadavers for CBS. These documents formed the basis for the inquiry that followed, helping our team to identify areas for us to discuss through interviews, or scenarios to observe.

Our study was planned for a two-year duration, and we collected data iteratively throughout our time frame. We stopped interviewing when we identified that we had sufficiently

considered relevant concepts and were not identifying new ideas to explore. We completed document analysis when we had reviewed the complete set of identified documents. However, our ethnographic immersion was truncated, and we were not able to complete one final round of formal observations (one additional CBS session and in person Memorial) due to the COVID-19 pandemic.

Analysis

Ethnographic research is focused on interpreting the processes and products of social and cultural behavior. Our analytical approach was therefore iterative, focusing on translating ideas that arose during active involvement “in the field” into a written account. We categorized our various sources of data to detect and interpret themes, while also highlighting inconsistencies and contradictions. Our practice-based approach guided us to document the social and cultural relations taking place in our various research sites, tracing the ways in which material (tools, spaces, bodies) and immaterial (discourse, language) elements came together to accomplish CBS.

Data were analyzed in accordance with Wolcott’s (1994) classic three-step approach to the analysis of ethnographic data: description, analysis, and interpretation.

Our goal was to produce an ethnographic aesthetic through description, analysis and interpretation. In other words, we attempted to reproduce, to some degree, a sense of ‘being there.’ To accomplish this, we structured our analysis to arrive at thick, rich description of the practices of CBS. Our presence in the field through ethnographic immersion was of central importance. Through immersion, and the relationships we built with people involved in CBS, we were able to identify important events to formally observe and fieldnote, key informants to interview in order to learn more about events or practices we had observed, and important

documents to analyze that either set the conditions under which CBS occurred (policies), or set the direction for the CBS activities taking place (curriculum).

The ethnographic tenet that what people *think* they do, what they *tell* you they do, and what they *actually* do are not always one and the same held true in this study. Consistent with practice theory, our observations were of central importance in helping us document and describe the everyday work of CBS. However, it was in bringing multiple data points together that we were able to understand its unalloyed complexities. Where there were moments of contradictions or divergence across data sources, we discussed these as a team and, when necessary, sought direction or further information from participants.

Practically speaking, a small group of researchers took primary responsibility for coding of the multiple data sets (MF, PC, VL), independently coding each source (observations, interviews, and documents). Coding was iterative, and ongoing throughout the study, in real time. Initial ideas identified through the coding of data were described in detail and brought forward to a larger group of core researchers (AM, MF, JT, OK, PC, VL) for analysis via discussion in detail, focusing initially on potential ways to organize codes into themes. In addition, these conversations also served to identify emerging areas requiring further attention and/or additional data.

Once this initial coding and preliminary analytical conversations took place, the full research team (AM, GK, JT, LP, MF, OK, PC, VL) engaged in interpretation via collaborative conversation, with an eye to identifying and interpreting the different ways in which the workers of HBD and CBS negotiated humanity in their various tasks. We regularly drew on the familiarity with HBD and CBS of our clinician team members (GK, LP), who helped us

strategize to address gaps in our data and identify learning occasions to observe or appropriate people to interview to address these gaps.

Our approach was iterative, and we engaged in this cycle of description, analysis, and interpretation at regular points throughout the study as new data were collected. We managed this process using qualitative data analysis software (ATLAS.ti).

Analytical Focus: Negotiating Humanity

As we engaged in analysis, our analytical focus was on the practices associated with HBD, which we believe are of central importance in medical education. This work relies on the expert contributions and highly specialized knowledge of a number of unsung heroes, including administrative staff, managers, inspectors, transportation staff, anatomy technicians, teachers, and teacher's assistants (See Table 1).

We coined the term “Negotiating Humanity” to identify a unique type of work specific to Human Body Donation, and we collectively attuned to this idea as we worked with our data. The HBD spans a continuum of work related to negotiating the boundaries of humanity of its donors. At one end, the workers are tasked with communicating with donors and families, which means recalling, respecting, and revering the humanness of the person who offered their body. However, workers are also tasked with the job of storing, transporting, and preparing educational cadavers, which requires a certain degree of detachment from the person who was.

Practice theory, in foregrounding the concepts of work, materiality, and processes, offered us “a new vista” on HBD and CBS (Nicolini, 2017). Across the various tasks associated with CBS, the humanity of cadavers is an unbreakable thread (MacLeod et al., 2021). Negotiating this thread of humanity is an essential, but largely invisible, practice for medical educators who work with cadavers. Our analytical focus, then, was on the everyday ways in

which workers would detach from humanity temporarily to do the things that needed to be done to transform a body into an educational cadaver; then refocus on humanity to celebrate the selfless gift of those who donated their bodies for educational purposes. And while workers involved with CBS must sometimes stretch the thread of humanity, or momentarily ignore it, it never breaks.

We identified Negotiating Humanity in the data when a participant described, or we observed them, navigating the line between revering humanness and obscuring humanness, managing expectations depending on the task at hand. We will describe this work in detail, in order to shine a light on these critically important, but largely invisible, practices and people of medical education.

Results

We identified three primary functions involved in the practice of CBS: 1) Cadaver Intake and Administration; 2) Cadaver Preparation; and, 3) Cadaver-Based Pedagogy. We describe each of these in more detail, and then discuss how workers negotiate humanity at each level.

We recognize that attempting to draw clean lines between the three functions of CBS is necessarily artificial. The different types of work, roles of those involved in CBS, and individual tasks that compose each of these functions are not discrete, and there are certainly areas of overlap. However, in the interest of clarity and presenting a coherent description, we have separated these roles and types of work wherever possible.

Negotiating Humanity during Cadaver Intake and Administration

The Intake and Administration of an HBD program was complex. It involved communicating with donors and families, both at the time of donation and at the time of death. It also involved deciding whether a body would be accepted to the HBD program (which depended

on a number of factors). This work also included the transportation of bodies from the point of death to the University morgue and managing cadaver storage issues. Underpinning all of this work was a series of relevant policies and legislations, which were interpreted and acted on by a variety of workers. One of the more important functions from a Program Administration perspective was the planning and delivery of the Annual Memorial Ceremony honoring donors.

Negotiating humanity was identified in the Administration function of the HBD Program when a participant told us about, or we observed them, grappling with humanizing versus dehumanizing individual cadavers. Maintaining an inventory was an important way to track humanity. People described it as being necessary to replace a name with a number in order to get on with their work. However, they also described the importance of the inventory in being able to bring pieces of a disassembled body back together.

A focus on returning a whole body to loved ones, and honoring the generosity of donors, permeated many of our conversations. Perhaps the ultimate representation of gratitude came in the form of the annual Interment and Memorial Service. This event brought together families and friends of donors with teachers, learners, and administrators. The two-part ceremony involved an interment service at a cemetery, and a memorial in a large church (which we were told is not a religious choice, but a logistical one based on reasonable rental fees and ample parking).

In both components of this service, workers from the HBD program played an important role, directing the day's events, and participating in reciting the names of the donors. This naming of the donors—an act of returning their humanity—was touching to observe.

Human Body staff read out a ledger with donors' names. Such an important marker of humanity—when we're someone, we have a name. The names seem to pull us back to who they used to be, maybe? Whatever the case, this part is a very solemn recitation. You

can recognize a subtle stir from the various groups when their person is called, if you look closely enough.

-Fieldnote

The Memorial Service was a point of pride and organized with the utmost care and thoughtfulness, even presenting each attendee a small packet of “Forget-Me-Not” seeds to sew in honour of the donors. The ceremony included a series of remarks from religious figures, high ranking university administrators, and a variety of learners. Across all these remarks, a message of gratefulness and generosity prevailed.

The tone of the ceremony was difficult to describe. For many, the death of their loved one was several years passed, and so this ceremony was solemn, but not somber in the way a funeral might be.

You’re sitting in a church with 500 other people that made that same choice you did. It’s more comforting to them, I think, than knowing that they were isolated in those decisions.

-Manager, p7

Negotiating Humanity during Cadaver Preparation

Preparing cadavers for educational purposes is a key function of the Human Body Donation program. This involves the physical transformation of a donor’s body into an educational tool, and the acts associated with its deidentification, embalming, and, in some cases, disassembly. We took note of workers negotiating humanity when we observed, or a participant told us about, the steps that they would take to disassociate humanness to accomplish the sometimes-gruesome realities of their work, while still striving to respect the human who made the donation of their body.

The most obvious way workers described managing humanity involved making a concerted effort to forget about the person who was. Assigning a number to the cadaver was a common strategy. Working to make the bodies unidentifiable—for example, by shaving their heads—was another.

And we shave their heads. So ... you wouldn't be able to tell if it was your loved one sitting on the table.

-Technician, p9

Professional role conflict occurred in the Cadaver Preparation function. The cadaver technicians who prepare cadavers for teaching are all Certified Funeral Directors, trained in embalming. The act of deidentifying a cadaver is in contradiction to what these participants would have done as Funeral Directors, where their job would have been to present to loved ones a body that looked familiar. The ability of participants to engage in de-personification related back to the coping mechanism described above: disconnecting from the humanity of the cadaver and focusing on the greater good and the educational mission.

So I find that I kind of disassociate myself from that. Once we put the number on them ... It's like, you know, the things that I do downstairs or that I need to do to produce these teaching tools, it's happening for the greater good. You know, these people want to be here. They want their bodies to be used for educational purposes. And this is just a means to get there.

-Technician, p9

Yet, while workers disassociated to engage in cadaver preparation, the focus of the work, and of our conversations, always seemed to return to respecting humanness. We also observed this commitment to humanity in the extremely clean conditions in which bodies were worked

upon, and in the careful ways in which they were presented to learners, as well as the clear pride the workers took in returning a complete body to a family.

Leveraging the humanness of cadavers, in order to produce a better educational experience, was a reoccurring theme. Refining embalming techniques to provide ‘lifelike’ cadavers was a universal source of pride across all of our conversations. Workers described their role with excitement.

So in order to enhance the cadaver’s ability to perform as a more life-like tissue, we’re usually warming them. We are ensuring that we’ve cleaned their airways... So you’re essentially preparing it so that, you know, when the learner comes in [it’s the best experience possible].

-Technician, p12

On several occasions, we observed cadavers being delivered to a teaching session. Transported by a professional service, with formally dressed people managing the delivery, all cadavers were strategically scheduled to arrive in advance of any learners. The goal is to create a learning environment that closely mirrors a real clinical setting; therefore, workers carefully unzipped the cadavers from silver bags and placed them on surgical tables, set the drapes, and did their best to ensure the cadavers looked like anesthetized patients. Covering the eyes and hiding toe tags helped to produce the illusion that this was a living patient.

Negotiating Humanity during Cadaver-Based Pedagogy

Ultimately, the cadavers prepared in the program we observed are used for educational purposes. The work associated with Cadaver-Based Pedagogy involved delivering curriculum using a cadaver as a high-fidelity simulator, either in supporting Emergency Medicine residents

to practice high acuity, low occurrence procedures; or, in supporting practicing clinicians to refine their airway management skills.

We identified educators negotiating humanity when we observed, or a participant told us about, the work they did to navigate the continuum of humanity during educational offerings: ranging from keeping the cadavers “presentable” to minimize negative reactions, to attempting to “keep their patient comfortable.”

We noted interesting uses of language, that mirrored the complexity of questions related to the cadaver’s humanness. Some workers described being task focused and concentrating on the maintenance of the physical body in front of them, using words like “specimen.” However, even though this sort of work became routine, traces of humanity always rose to the surface.

This is somebody. They have their story; they have their life. You know, this is the end of that. They’ve moved on to whatever it is they’re moving on to. So, there’s always a certain pause for emotion and then to understand that this is the end of somebody’s journey through it.

-Teaching assistant, p10

The specificity of individual cadavers—unique traits of each body—served to reorient even the most seasoned workers to humanness. Participants talked about what it is like to be in the midst of a job, only to be jarred by the uniqueness of the body before them.

Because you’ll see like identifying markers. You know, scars, if they’re male, female. If they’ve had previous surgical procedures. It’s the identifiable human experience factors that are there for the patient that we see. You know? It brings into full force that this was a person who donated their body.

-Teacher, p12

Maintaining not only the privacy, but also the integrity, of the cadaver was an important function during the learning activities. We observed certain workers involved in cadaver-based pedagogy who seemed to take on a “hovering” role, ready to spring into action at any point, to problem-solve, reposition bodies to facilitate procedures, and maintain draping if a body part became uncovered, or if eyes became exposed.

A focus on providing an excellent learning experience was also clear. Participants talked about how they would go “above and beyond” in order to offer an experience where cadavers performed similarly to anesthetized patients. Pride in these innovations permeated our observations, as technicians described leveraging their professional knowledge to attain an even more “lifelike” cadaver.

So [a clinical faculty member] would say, ‘this is what we do typically on a living person and we can’t recreate that.’ And then I would help them in terms of ‘ok this is why you’re not getting that reaction’ because of the embalming or because of the prep or the position or something. ... It’s working with those physicians to kind of create the ideal situations.

-Manager, p7

One of the most interesting examples of an educational innovation we observed is the chest window. This signature innovation allowed participants to see inside the chest of a cadaver, observing the inflation of the lungs so that they could observe the effectiveness of their efforts.

They’re prepared beforehand with a small window, a few ribs that are cut and a little sort of, windows, a little door is opened up into the upper wall of the chest so you can see the lungs. In order to demonstrate some of the effects of different interventions for airway things. So, a peek at inflation of the lungs and how effective ventilations are on the

patient. Which is a real eye-opening experience for people to actually...see the lungs inflate.

-Teaching assistant, p10

The visual effect of the chest window is striking and educationally important.

They all have a little square open, maybe 10cm x 10cm, to expose their lungs. It's shocking [to see lungs working]....[A teacher] is demonstrating what happens when you use a particular medical device, how the lungs inflate, and I can actually see it happening through the cut open piece. ... one of the doctors in the group says, "That is very visually powerful."

-Fieldnote

Watching people navigate the continuum of humanity—using a body to practice procedures, while also being careful, even delicate—was fascinating.

An older man doctor in the group to my right is absent-mindedly holding the face of the cadaver at this station. He's standing behind it (I think this one may have been a woman, but again, it's hard to know) and has his hands on either side of the face, holding the (her?) chin. He keeps glancing down at the face. There's something almost tender about it. He continues to hold it/her by the face for quite a while, maybe five minutes, but then, the last time I look back, he has his fingers in the [chest window] and is looking intensely at something, the/her lungs, I suppose. The juxtaposition of those two motions is so strange!

-Fieldnote

This interesting navigation of human/non-human characterized much of our data and, again, showed up in the complicated use of language to describe cadavers. Not only was

language complicated with respect to pronouns, as demonstrated in the fieldnote above, but also in how to generally refer to cadavers: are they specimens, or are they patients? Despite momentary slips, we noted that humanness was difficult to fully obscure, and participants often treated the cadavers as they would a patient.

You may even lay your hand on their shoulder or their head. And I find that those are things that people, including myself, may do throughout the day. You know, things that we do for our normal patients. And being as delicate or as intentional with procedures as you would be on a real patient.

-Teacher, p12

I'm trying to suppress my cough, because I'm worried about infecting the cadavers for some reason. It's like I think they're vulnerable patients.

-Fieldnote

While this navigation of humanity was complicated, for those involved with the program, it was not surprising.

There's a sense of empathy that is similar to a clinical experience with somebody who's very sick or has just died. And then to appreciate that this is not just somebody who died but the family and this person has gone out of their way ... to either seek out the opportunity to donate the body. ... This is just sort of an extra special thing

-Teacher, p24

The program existed because of the gift of a body, and, throughout all of our work, a pervasive sense of intense gratitude prevailed.

Discussion

Our practice-based ethnography of a clinical cadaver program allowed us to attune to the work, tools, and people of CBS: highlighting its everyday “sayings and doings.” We found that negotiating humanity was an integral part of each of the functions we identified: from Cadaver Intake and Administration, to Cadaver Preparation, and Cadaver-Based Pedagogy. The call to negotiate humanity at every level meant that, despite its sometimes (necessarily) gruesome practices, HBD and CBS were also characterized by pride, a commitment to educational innovation, and care.

The fact the practices of CBS occur largely behind the scenes (Goffman, 1959) is perhaps not surprising. A fundamental part of negotiating the humanity of cadavers is grappling with the concept of death itself: it is having conversations with grieving families about the donor’s wishes, preparing the body to make it more ‘lifelike’, and questioning whether to call the cadaver a ‘person’ or a ‘specimen.’ Death is a taboo subject, in medicine and in society, more broadly (Illich, 1974; Lakasing, 2014). Yet, avoiding death completely is impossible—which makes it a fundamental, and lifelong, human concern (Yalom, 2008). Relatedly, death anxiety, defined as “a negative emotional reaction provoked by the anticipation of a state in which the self does not exist” (Tomer & Eliason, 1996, p. 345), is also a fact of life.

Wolf and colleagues (2020) found that exposure to human donor remains serves as a “mortality cue” (p. 2), reinforcing not only death anxiety, but also, perhaps, serving to intensify the fear of death (Lehto & Stein, 2009). This is significant because amplified levels of death anxiety are known to negatively influence mental health (Conte et al., 1982; Furer & Walker, 2008; Kastenbaum, 2012), potentially leading to post-traumatic stress related symptoms (Martz, 2004). Attending to these potential anxieties across their various tasks—notably, through

negotiating humanity—is yet another example of the invisible work in which our participants engaged.

Our societal discomfort with death translates into how we perceive those who work in the area of death (Thompson, 1991). Some even characterize death work as “dirty work” (Jordan et al., 2019). Dirty work, originally described by Hughes (1958, 1962) is work that stigmatizes those who are involved in it. These workers must “get their hands dirty”—both symbolically, and in the case of the HBD and CBS workers, literally—in order to accomplish the task at hand. Hughes noted that those who engage in “dirty work” do things that society, in general, would rather not know about.

Researchers have identified four overlapping types of dirty work: physical, social, moral, and emotional (Ashforth and Kreiner, 1999; Hughes 1951, 1958, 1962; McMurray & Ward, 2014). Death work (Henry 2004), such as that accomplished by workers in HBD and CBS, encompasses all four of these dimensions. The workers we observed certainly engaged in physically challenging work associated with moving, draining, and sometimes even disassembling, cadavers. Participants told us stories of wrestling with the social, ethical, and educational challenges of their work. And certainly, the emotional complexity underpinning all of these tasks was a common thread.

This type of work lies in stark contrast with public facing images of medical schools, projecting images of hope, educating the healers of the future (Razack et al., 2020). Healthcare workers have been discursively constructed as heroes who work valiantly to save lives, feigning off death through research and clinical practice (Strauman & Goodier, 2011). This imagery is even more pronounced in the face of the COVID-19 pandemic (Cox, 2020), as health care heroes are universally described as fighting tirelessly against death. Yet, death is an inevitable part of

life, and certainly an important component of medicine and of medical education. In order to appropriately prepare student physicians, death work must take place; however, that work is very much invisible.

In zooming in on the practices of CBS, we find ourselves faced with a set of workers who were, in fact, proud of their contributions. And while the term “dirty work” certainly fits with the unpleasantness of some of the tasks in which they engage, it does not reflect the ways in which these workers skillfully—and proudly—navigated the educational contradictions and tensions of their work. It was the navigation of these contrasts—the macabre and the benevolent; the human and the non-human—that stimulated much of our analysis. This is where people engaged in negotiating humanity.

Negotiating humanity was a unique type of work, specific to HBD and CBS. We took note of the ways in which workers negotiated the humanness of cadavers, sometimes obscuring it, sometimes celebrating it. Our participants were constantly negotiating the complexity of the cadaver itself: dead, but still human. The ways in which they navigated this contradiction was characterized by an overarching discourse of “excellent education.” Participants took pride in helping to educate better doctors; and, noted that in doing this work, they were fulfilling a donor’s wish to contribute to medical education.

When we initially began this ethnographic work, we engaged in reflective conversations about how much information we should, or would be able to, share when it came time to write. Interestingly, as we became more immersed in our observations, and as we learned more about HBD and CBS, this became less of a concern. In some ways, our work has opened up a previously protected world, offering a glimpse into what Goffman (1959) called “the backstage” of CBS. Doing so may lead to increased attention, a more critical eye, and perhaps, increased

surveillance (Wagner, 1995). Yet, surveillance is nothing new in the world of HBD, which is governed by a set of policy, subject to regular inspection.

Certainly, our ethnographic account is not intended to “expose” the behind the scenes work of HBD. The reality of the work associated with preparing cadavers for education was sometimes necessarily grisly, yet still approached with care, true to an overarching theme of contradiction that characterized this investigation. While we acknowledge that there is power and freedom associated with operating “below the radar” (MacLeod et al., 2017), and that some degree of invisibility in the workplace can be helpful (Star & Strauss, 1999), we believe it is important to call attention to under-considered elements of medical education: HBD and CBS, and the highly specialized and emotionally complex work that must happen to transform a cadaver into an educational tool. We do this because, as Star and Strauss (1999) famously noted, “If the system does not account for the matrix of visible and invisible work and its questions of equity, those at the bottom will suffer” (p. 25).

Conclusion

Our ethnographic account is offered as a testament to the commitment of those involved in HBD and CBS. As we become more technologically capable, and high-fidelity models become increasingly sophisticated and more readily available (Saltarelli et al., 2014), HBD is, to some degree, at risk. This threat is even more pronounced as we find ourselves in the midst of the COVID-19 pandemic, engaging in educational innovations that allow for physical distancing (Iwanaga et al., 2021).

Having spent hundreds of hours observing and learning about HBD and CBS, what struck us as the unshakable element underscoring all of its practices is humanness. Across the three

primary functions associated with CBS (intake & administration, preparation, and pedagogy) was a shared humanity of all the bodies in the room—living and dead.

This communion of humanness showed itself in so many subtle, but striking, ways over the course of our work, affecting all of us—researchers and HBD workers alike. Whether it was a physician-learner absent-mindedly holding a hand of a cadaver while it was being worked on, a technician who went to great lengths to present a cadaver in a way that was least likely to upset a first-timer, or a medical school community collectively coming together to read the names of those who donated their bodies: we believe humanness, despite our best efforts, cannot be simulated, and cannot be replaced. And so, this manuscript is a purposeful effort to elucidate the skill and expertise of these ‘backstage’ medical educators, appreciating that their careful efforts to negotiate the humanness of cadavers has a meaningful impact on medical education.

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Disclosures and declarations

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Competing interests

We have no conflicts of interest to report in this study.

Ethics approval and consent

The study was approved by the Research Ethics Board of the regional health authority. We followed standard procedures as outlined by the Tri-Council Policy Statement (TCPS-2): Ethical Conduct for Research Involving Humans Course on Research Ethics (CORE). All participants provided their informed consent to take part in the study.

Appendix A: Observation Template



Cadaver as Practice: An Ethnography 2018-2020
Field Notes & Memo Template

Basics - please fill out with care	
Your Name	
Date of your observation	
Start Time	
End Time	
You are physically present @? Which room (number)?	
What program?	
What type of CBS session?	
Is this a stand-alone memo?	
Other notables?	

Research Questions
1) How do bodies, learners, tools and spaces come together in everyday practices of CBS? 2) How are these practices situated within wider processes and discourses of simulation learning in the health professions? 3) What is the potential role of CBS in a competency-based postgraduate program? 4) How do social and material dimensions of CBS shape teaching and learning in this context?

Observation Starting Points:
9 Dimensions - James Spradley (1980): 1. Space: the physical place or places 2. Actor: the people involved 3. Activity: a set of related acts people do 4. Object: the physical things that are present 5. Act: single actions that people do 6. Event: a set of related activities that people carry out 7. Time: the sequencing that takes place over time 8. Goal: the things people are trying to accomplish 9. Feeling: the emotions felt and expressed

Appendix B: Textual Analysis Template**Cadaver as Practice: An Ethnography
Textual Analysis Guide & Form****Textual/Video Analysis Pointers^{*}**

Key points to keep in mind as you're reviewing the text:

- Think about what the purpose of this Text/Video might be. What does it accomplish?
- Who (individually or collectively) is involved in producing this Text/Video?
- The Text/Video generates effects. Think about what the effects might be.
- Think about the less obvious (i.e. hidden) meanings communicated through this Text or Video.
- Who and what do these Texts/Videos render visible and/or invisible?
How?
- What is explicit? What is implicit?
- What is your 'gut' reaction to the Text/Video?

***Remember: There are no right or wrong ways to review a Text/Video. We're interested in your impressions.**

Text/Video Analysis Form (please complete)

Name of Text/Video Reviewed:

Date of Text/Video Review:

Your name:

General

What type of Text/Video are you reviewing (policy, governing document, information document, website, lecture slide, etc.)?

First Impression/Appearance

Comment on the appearance of the Text/Video (Is it professionally designed? Is it an internal document? Dalhousie brand? What is this text telling you about the institution it is associated with? Etc).

Analytical Questions

- What do you think the Text/Video is *meant* to do (purpose)?
- What do you think the Text/Video is *actually* doing (effects)?
- What was your reaction to the text and why?
- What stands out about the Text/Video and why?

type here

Analytical Questions - continue

How does your position in the world (personal i.e., mother, son, hiker and professional, i.e., student, academic, photographer, physician) influence how you read this text?

type here

Other Comments?

type here

Thank you for your participation. Please save and rename this document (something descriptive related to the document reviewed) and email to: caine.meyers@dal.ca

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Table 1*Key Workers of Human Body Donation*

Role	Tasks
Administrative Staff	Maintain records, develop program material, and ensure follow-up with donors and families
Inspectors	Government appointment responsible for receiving and recording every death in the province Inspect the program; ensure adherence to acts and policies
Managers	Closely communicate with donors and their families to ensure informed consent Oversee the day-to-day activities of the program
Teachers	Uniquely trained to develop curriculum and teach clinical skills with cadavers
Teachers Assistants	Support cadaver-based pedagogy on an ad hoc basis
Technicians	Trained to embalm the bodies and prepare them for cadaver-based pedagogy
Transportation staff	Independently hired to move cadavers between locations

Table 2*List of Analyzed Documents*

<p><u>Legal documents/acts (2)</u></p> <ul style="list-style-type: none"> • Anatomy Act • Human Tissue Donation Act
<p><u>Airway Intervention and Management In Emergencies (AIME) Course Materials (3)</u></p> <ul style="list-style-type: none"> • AIME course Website • AIME course resources (curriculum) • AIME course poster
<p><u>Body Donation Materials (4)</u></p> <ul style="list-style-type: none"> • Human Body Donation Program Website + materials. • Process for Human Body Donation at Time of Death (For health care providers) • Contract/Agreement for Body Donation and for Cremation (must be submitted together)
<p><u>Media Coverage (5)</u></p> <ul style="list-style-type: none"> • allnovascota.com: “New Simulation Bay Hones Surgical Skills” Nov 30, 2018. • CTV News at 5: News story on the QEII new simulation bay. • The Star Halifax: “Halifax Hospital First in Canada to Combine Cadaver Skills and Simulation onsite” Nov 30, 2018. • CBC: “Inside Sim Bay: The QEII site that uses cadavers, mannequins to train staff” Nov 30th, 2018.