'Just because something works doesn't mean it can't be improved': an ethnographic analysis of the health system in *Black Panther's* Wakanda

Jennifer Jackson [iD],[1] Carla Ferreira,[2] Melissa Scott,[3] Elke Jaibeeh Barah,[1] Zahra Upal,[1] Krista Phelps,[1,4] Carol Mei,[1] Haneul Woo [iD],[1] Megan Tung,[1] Farida Gadimova,[1] Alexandra Ewanyshyn,[5] Samantha Perry,[6] Twyla Ens,[1] Carla Ginn [iD][1]

ABSTRACT

The emergence of COVID-19 (SARS-CoV-2) has introduced significant global challenges for healthcare systems, healthcare professionals and patients. This current climate creates an opportunity to learn from equitable health systems and move toward making fundamental changes to healthcare systems. Our ethnographic analysis of Wakanda's healthcare system in *Black Panther*, from the *Marvel Cinematic Universe*, offers opportunities for system-level transformation across healthcare settings. We propose four healthcare system themes within the context of Wakandan identity: (1) technology as an instrument (blending bodies and technology, blending technology with tradition); (2) reimagining medication; (3) warfare and rehabilitation; and (4) preventative approaches to health (prioritising collective health, deprofessionalisation of healthcare services). The preceding themes represent core elements of Wakandan health systems that allow the people of Wakanda to thrive. Wakandans retain a strong identity and cultural traditions while embracing modern technologies. We found that effective upstream approaches to health for all are embedded in anti-colonial philosophies. Wakandans embrace innovation, embedding biomedical engineering and continuous improvement into care settings. For global health systems under strain, Wakanda's health system identifies equitable possibilities for system change, reminding us that culturally relevant prevention strategies can both decrease pressure on health services and allow all people to thrive.

INTRODUCTION

The transformation of health systems with the emergence of COVID-19 (SARS-CoV-2) has introduced significant global challenges. The COVID-19 pandemic has placed considerable strain on clinical services[1] and healthcare professionals.[2–6] There are many contemporary examples of where our health systems are failing, from the overcrowding of emergency departments[7] to the Western tendency to overtreat and overdiagnose.[8] The pandemic has offered an opportunity to reconsider how healthcare is delivered

SUMMARY BOX

⇒ Wakandans retain a strong identity and cultural traditions, while embracing modern technologies, such as embedding biomedical engineering and continuous improvement into care settings.

⇒ Upstream approaches to health mean that little professional health intervention is required. Prevention continues to be an important way to decrease pressure on health services.

⇒ Effective upstream approaches to health are embedded in anti-colonial philosophies. Culturally relevant prevention strategies can decrease pressure on health services and allow all people the opportunity to thrive.

in many countries, as the current systems have shown they are no longer fit for purpose.[1 5 8]

At present, it may be difficult to imagine what a significant re-visioning of healthcare delivery could look like, because of the current focus on the provision of urgent services and overwhelmed clinicians.[6 8] However, the current climate also creates an opportunity to learn from equitable health systems and change fundamental aspects of care delivery. We suggest looking beyond Western countries for examples of healthcare systems that could be aspirational for future system change. The *Marvel Cinematic Universe's* (MCU) Wakanda, as a fictional nation, was curated to depict alternative social systems. Here we present an analysis of Wakanda's healthcare system for consideration of new possibilities.

UNCOLONISED WAKANDA

Wakanda is a mythical African nation, which was first documented in Marvel comics in 1966, and had its first cinematic depiction in MCU's *Captain America: Civil War* in 2016.

Wakanda has not experienced colonisation and has created a thriving society, with extensive social and technological capital. This nation has inspired researchers to imagine academia as decolonised and anti-racist,[9] and has prompted reflections on gender,[10] faith[11] and colonisation.[12] Researchers have also studied Wakanda for its contributions to Afrofuturism,[13][14] including as means to engage black youth in the fields of science, technology, engineering and mathematics.[15][16]

To our knowledge, there has been no published scientific analysis of the healthcare system in Wakanda. The opportunity to consider health and healthcare in Wakanda, an African nation, although fictional, is important because racism contributes heavily to health outcomes,[17][18] and this paper allows us to reimagine a health system embedded with cultural safety and an absence of racism. The additional impact of colonisation (or lack thereof) in Wakanda is also significant, as colonialism is a social determinant of health[19] and the trauma of colonisation contributes negatively to health outcomes[20] across Indigenous communities. With the increased recognition of the role that racism plays for both patients and clinicians, we can use Wakanda as inspiration for a health system that is decolonised and anti-racist. We explore Wakanda's healthcare services in the MCU and identify opportunities for system-level transformation in real-world healthcare settings.

ETHNOGRAPHY AND VISUAL MEDIA
Ethnography is a methodology in which health researchers can understand a culture through observation.[21] While we had hoped to conduct on-site, participant observation in Wakanda, we were limited by both COVID-19 travel restrictions and the lack of Wakandan visas for non-citizens. As such, we have used all publicly available visual media (films and television programmes) officially sanctioned by the MCU. We engaged in non-participant observation of these visual media. The use of film in ethnography has been recognised as a means to enhance the representation of a culture,[22] as video provides a multisensory documentation of a culture.[23]

APPLICATION OF AN ANTI-COLONIAL LENS
Our team includes members of the African diaspora (EJB), people of colour (CF, ZU, CM, HW, MT), and Indigenous people (MS), mixed race (KP), and immigrants (CF, EJB, ZU, FG, MT). All authors identify as women. We come from various disciplinary lenses (nursing (JJ, CF, EJB, ZU, KP, CM, HW, MT, FG, TE, CG), psychology (AE), medicine and health (MS, SP)) and social locations, which influenced the way we viewed the film. Guided by an anti-colonial philosophy, we viewed the film and considered the global historical underpinnings of colonialism's ill effects.[24] We embrace this anti-colonial philosophy in our analysis with the hope of addressing colonisation's impacts and rebuilding where damage has been inflicted.[24][25] We viewed all available

Table 1 Depictions of Wakanda in the *Marvel Cinematic Universe* as of February 2023

Included	Film/TV programme	Time*
	Captain America: Civil War	1 min, 25 s
	Black Panther†	2 hours, 18 min, 19 s
	Avengers: Infinity War	26 min, 49 s
	The Falcon and the Winter Soldier: The Whole World is Watching	2 min, 5 s
	Black Panther: Wakanda Forever†	2 hours, 43 min, 24 s
	Total	**5 hours, 31 min, 42 s**
Excluded	Film/TV programme	Reason
	Iron Man 2	Photo only
	Avengers: Age of Ultron	Mentioned only
	Spider-Man: Far From Home	Mentioned only
	The Falcon and the Winter Soldier: ► New World Order ► The Star-Spangled Man ► Power Broker	Mentioned only
	Avengers: Endgame	Only seen through Dr Strange's Interdimensional Portals
	WandaVision	Flashbacks of Avengers: Infinity War, excluded as a duplicate
	Black Widow	Mentioned only
	Spider Man: Far from Home	Mentioned only
	Moon Knight	Mentioned only
	Ms Marvel	Mentioned only
	She Hulk: Attorney at Law	Mentioned only
	What if…? Series	Alternate universe depictions of Wakanda outside of central Black Panther narrative

*Time accurate to within 3 s per programme for the viewing time relevant to Wakanda.
†The entirety of the Black Panther films was included.

Marvel productions at time of writing (February 2023). We considered all depictions of Wakanda for inclusion, as illustrated in table 1.

PROCESSES OF ETHNOGRAPHIC ANALYSIS
The entirety of the *Black Panther* films were considered. In other programmes, the inclusion of material was

restricted to scenes that feature Wakanda. We excluded scenes where Wakandan characters are observed, but outside Wakanda (such as scenes at the United Nations in *Captain America: Civil War*). The authors have extensive engagement with the MCU, enhancing their knowledge of context and characters' social positioning. We watched *Black Panther, Black Panther: Wakanda Forever* and other depictions of Wakanda as a group. Our collaboration started with an introduction by African diaspora and Indigenous coauthors, to sensitise our research team to an anti-colonial lens. When viewing the films, each participant wrote field notes, and we paused the films periodically to discuss what was observed. The field notes included examples of healthcare systems and technology, the cultural significance of health in Wakanda, and reflections on how Wakandan health contrasted with real-life healthcare settings in Europe and North America.

Initially, we wrote individual field notes and discussed our findings as a group. All field notes were imported into NVivo V.12 Plus. The first author coded the collective field notes and presented initial themes for discussion. Themes were added as needed through an iterative process of discussion, reviewing the field notes and watching the films. The analysis was revised to incorporate everyone's feedback until we reached a consensus about the themes. We enhanced the trustworthiness[26] of this analysis by triangulating the investigators,[27] using peer debriefing[28] and through repeated engagement with our sample of programmes.[23]

Wakandan identity

We created several inductive themes through our ethnographic analysis, to characterise health services in Wakanda. These themes are illustrated in figure 1. Wakanda relies on plants for its primary medicines, so we have imagined the themes as a plant, 'watered' by the context of Wakandan identity.

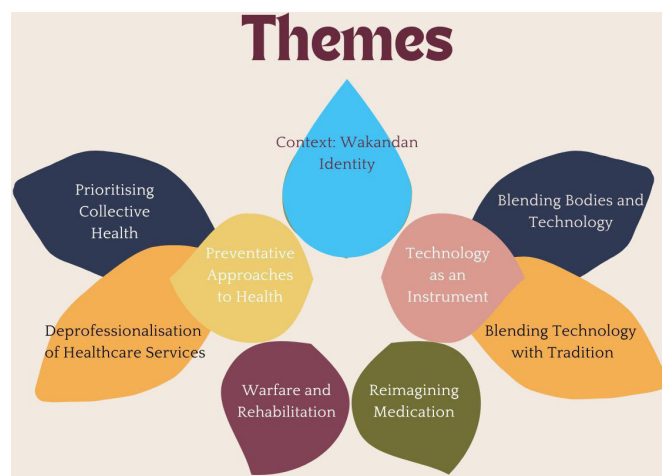There were several key informants in our ethnographic analysis, listed for reference in table 2.

Figure 1 Ethnographic themes on health and health services in Wakanda.

Traditional practices from Wakanda have endured for generations, supporting Wakandans' national pride and sense of belonging. This sense of national identity coexists with tribal affiliations, particularly showcased during the ceremonial fight for the title of Black Panther. The following themes are considered through the lens of Wakandan identity. Health decisions are informed by Wakanda's values of shared prosperity and fidelity to their cultural traditions, despite different tribal allegiances.

Technology as an instrument

The element vibranium is an invaluable natural resource found in Wakanda, with applications across multiple sectors. Vibranium is deeply embedded in Wakandan culture and identity, so much so that a luminescent inner lower lip tattoo made from vibranium-powered technology is used to identify Wakandans. Vibranium powers all technology and development in Wakanda and connects with the subthemes of blending bodies with technology, and tradition and technology.

Blending bodies and technology

Wakandans incorporate biomedical engineering and enhancement of bodies directly into the provision of healthcare. In Wakanda, vibranium has allowed for advanced forms of corporal technology that synchronise with bodily systems. For example, King T'Challa's Black Panther suit responds to silent neurological commands. The suit aligns more closely to King T'Challa's natural build than other examples in the MCU, like Iron Man's mechanised suit of armour. These examples illustrate how Wakandans use technology while retaining and honouring the physicality of the human body.

Blending technology with tradition

Advances in Wakanda's healthcare are supported by the physical spaces for Wakandan healthcare. Shuri's laboratory contains both spaces for patient care and research innovation. By embedding the laboratory into a space for care, Shuri reinforces a cycle of continuous improvement for health services. Shuri is cognisant that innovations have the potential for further development and claims in *Black Panther* that 'just because something works doesn't mean it can't be improved'. However, not everyone in Wakanda values these efforts. M'Baku accuses Shuri of 'scoffing' tradition with her role in developing technology for Wakanda. M'Baku's attitudes demonstrate how innovation can create conflict with those who value maintaining historical customs and approaches.

The heart-shaped herb plays an important role in Wakandan society and healthcare. This herb was first introduced to a warrior shaman by the panther goddess Bast through a vision, which led the shaman to its location. Ingesting this herb gave the shaman 'superhuman strength, speed and instincts'. This led to him becoming the first Black Panther, as well as the king of Wakanda, and continues to be ingested by Wakandan royalty and persons deemed worthy to receive it. The heart-shaped

Table 2 Key Wakandan informants

Person	Role
King T'Challa/Black Panther	King T'Challa is the main superhero and protagonist of the movie, referred to as the powerful warrior, Black Panther. He is responsible for protecting and leading the political and economic affairs of the African nation of Wakanda.
Shuri	Shuri is princess of Wakanda and King T'Challa's younger sister. Shuri is known for her genius-level intellect and biomedical engineering skills and leads the Wakandan Design Group lab that produces technology based on vibranium.
M'Baku	M'Baku is the leader of the Jabari Tribe, a Wakandan tribe isolated from mainstream society. Initially, he is seen challenging King T'Challa for the throne, then later supports King T'Challa in defending Wakanda against Erik Killmonger.
Vision	Vision is a non-Wakandan robotic superhero who makes an appearance in Wakanda during the movie *Avengers: Infinity War*. Vision is rescued by his comrades and seeks refuge in Wakanda to receive neurological surgery in Shuri's lab.
N'Jadaka/Erik Stevens/Killmonger	Erik Killmonger is the main antagonist to Black Panther, referred as N'Jadaka of Wakandan origin. He seeks to overthrow King T'Challa and accomplish his father's plan: to seize control of Wakanda's vibranium technology in order to stop the oppression of people of African descent globally.
Bucky Barnes/Winter Soldier	Bucky Barnes is a non-Wakandan superhero who is introduced to Wakanda for deradicalisation and for receiving a prosthetic arm. He was a villain known as Winter Soldier prior to the *Black Panther* movie.
Agent Everett Ross	Agent Ross is a Central Intelligence Agency (CIA) operative who is brought into Wakanda by King T'Challa when he suffers a life-threatening injury that can only be treated with Wakandan technology.
Nakia	Nakia is a member of the War Dogs, a central intelligence service in Wakanda. She attempts to persuade King T'Challa to expand Wakanda's support after witnessing the hardship and suffering of many people during undercover missions.
Okoye	Okoye is the General of the Dora Milaje, an elite group of female warriors who serve as the Black Panther's personal bodyguards.
Namor/Tenoch Huerta Mejia	Namor is the leader of the underwater kingdom of Talokan. He is a mutant with wings on his ankles that allow him to fly. Unlike other inhabitants of Talokan, he can breathe above water. Namor is the anti-hero of *Black Panther: Wakanda Forever*.
Riri/Ironheart	Riri is a 15-year-old engineering prodigy who is enrolled at the Massachusetts Institute of Technology. She designs the vibranium detector used by the CIA in *Black Panther: Wakanda Forever*. Using resources acquired without permission, Riri designs her own Iron Man-type suit.

herb remains part of the rituals around the Black Panther, including its ability to enhance a person's physicality. Shuri preserves the tradition of the heart-shaped herb by using a three-dimensional printer to recreate it, which is required for the one ingesting it to become the Black Panther. Without the use of this technology combined with Shuri's innovation, the tradition of the Black Panther could have been lost forever after Killmonger's destruction of the garden where the herb is grown. The interplay between tradition and modernity is a relatable one in the process of healthcare innovation.

Reimagining medication

Within Wakanda, another application of vibranium is a kimoyo bead; a small, versatile piece of technology. The beads connect to one another, are a communication device, and are used in medical emergencies. When Agent Everett Ross was shot in the spine—resulting in a life-threatening injury—a kimoyo bead was placed into the wound, stabilising him until he could receive additional treatment. Using a minimally invasive kimoyo bead for complete physiological stabilisation represents a new

vision of prehospital care and utilisation of medical technologies.

Wakandans also use oral medications with advanced properties. For example, King T'Challa drinks from the heart-shaped herb to remove and restore the powers of the Black Panther for ritual combat. The herb is seen in King T'Challa's vascular system within moments, having immense bioavailability. There also does not seem to be a first pass effect with the oral ingestion of the herb, and the powers of the Black Panther are durable after a single dose is ingested. The potential impact of fast-acting oral medications shows significant benefit for both medication administration and cost-effectiveness.

The heart-shaped herb is also used by the Talokan people. While the Wakandan heart-shaped herb is used to enhance the physical abilities of the Black Panther, the Talokani heart-shaped herb is used to cure illness, such as when the Talokans drink the vibranium-infused herb to cure smallpox. After ingesting this herb, the Talokans are transformed physically to be able to survive underwater. The healing properties of these ancient herbs highlight

that the treatment of modern conditions may be found in traditional medicine.

Warfare and rehabilitation

Wakanda focuses on the prevention of violent injuries during warfare, and thus, Wakandans require minimal rehabilitation after battle. Traditional guns and bullets are not used in Wakanda, which change the injuries that are experienced by Wakandans in combat. In *Black Panther,* Okoye remarks: "Guns. So primitive." While Shuri does use a gun-like mechanism of vibranium gauntlets with sonic blasts, the injuries produced are different than a typical gunshot. Wakandan injuries include cuts from the spears of the Dora Milaje and blasts that throw combatants backwards. These injuries appear to be immobilising, but less destructive than the internal puncture injuries created by bullets. To prevent injuries like gunshot wounds, Shuri improves King T'Challa's existing armour by making it bulletproof, compact and activated through his claw necklace. The outcome is that King T'Challa can withstand force that would certainly be fatal in another context.

It is inferred that Wakanda has robust systems of post-injury rehabilitation, as no characters are seen with lingering consequences from violent injuries, like altered gait or amputations. It may be that the absence of puncture injuries from vibranium weapons leads to decreased internal injuries, such as those caused by bullets. Shuri heals Everett Ross's spinal cord injury by using reconstructive surgery through a hologram, powered by vibranium. It is minimally invasive and depicted to have no potential adverse effects post-surgery. Additional rehabilitation treatments in Wakanda include treatments like the heart-shaped herb and the use of natural red earth to cover someone who has been injured. Visitations with ancestors on the Ancestral Plain also offer King T'Challa a measure of psychological treatment during periods of uncertainty and distress. These efforts contribute to minimal acquired disability among Wakandans.

Rehabilitation in Wakanda extends beyond physical injuries to include psychological care. Bucky Barnes/ Winter Soldier's successful rehabilitation includes both physical and psychological elements, using Wakandan technology and community-based mental health treatment. Bucky Barnes is seen in a residential area in Wakanda and is visited by Shuri. Her presence indicates the formal approach to rehabilitation, as she is Wakanda's lead supervisor for healthcare. The Wakandan natural environment and Bucky's soft clothing present a strong contrast to his armour and backdrop in settings where he was controlled by Hydra. Later, a member of the Dora Milaje recites Bucky's code words, and he does not become violent, indicating that he is no longer brainwashed and his rehabilitation is complete. This example demonstrates that Wakandans include psychological healing as part of rehabilitation and have infrastructure in place to support community-based treatment.

Preventative approaches to health

Wakanda's healthcare system focuses primarily on preventative care, rather than treating illness. In Wakanda, public health, including health promotion and prevention, is being practised optimally and to its fullest extent. Thus, the entire population has equitable access to healthcare technology, and in only rare circumstances do people need advanced healthcare. The following sections discuss how Wakanda's prioritising of collective health results in a deprofessionalisation of healthcare.

Prioritising collective health

In Wakanda, there is an emphasis on prioritising the collective well-being and population-level health, rather than an individualistic approach to health. Collective health is visible in the market, where Wakandans can be seen sharing resources such as food, using wrist holographic projection devices and using public transportation that is powered by magnetic levitation, called the Wakandan Maglev Train. The benefits of vibranium are used to improve the health of everyone and are reflected in Wakandan well-being and quality of life. It can be inferred that health issues are limited because of the substantial investment in the Wakandan community.

Wakandans must reckon with racism and health inequity when they begin to engage with people outside their country. The experience of health inequity was depicted by the differences between King T'Challa and his cousin, N'Jadaka (also known as Erik Killmonger), which can be attributed to their physical, social and cultural environment. In Wakanda, the absence of colonisation and efforts to maintain an insular society have preserved Wakandan identity and mitigated the impact of racism on health and well-being. N'Jadaka, growing up in Oakland, experienced a life without the same protective factors as King T'Challa, after his father died. In a scene between King T'Challa and Nakia, the king acknowledged that N'Jadaka was left 'behind with nothing'—no ties to their culture and the presence of Wakandan family structure. While death is celebrated as an occasion to be with one's ancestors in Wakanda, we heard a young N'Jadaka commenting that 'people die every day. That's just part of life around here'—highlighting his experiences in Oakland. Later in *Black Panther,* King T'Challa aims for structural change for youth living in Oakland by building the Wakandan International Outreach Centre. In this scene, Shuri engaged with youth in hopes of enticing them to learn more about Wakandan technology. We also learned of Nakia being in charge of social outreach, to address inequality. These structural changes could potentially improve the health of youth in Oakland, offering them opportunities like the youth of Wakanda, such as advanced science education. In *Black Panther: Wakanda Forever,* Okoye refers to the Massachusetts Institute of Technology as the equivalent of a Wakanda village school, implying that Wakanda could offer subjects like advanced science and mathematics education for youth in Oakland, including those from Killmonger's childhood home.

Deprofessionalisation of healthcare services

The deprofessionalisation of healthcare in Wakanda refers to the lack of visible healthcare professionals and the lay individual's ability to provide emergency care. For example, healthcare appears to be provided almost entirely by Shuri, the younger sister of King T'Challa, who provides healthcare in a specialised combination of a clinical area and biomedical research laboratory. There are other people dressed in white laboratory coats in the laboratory space in both *Captain America: Civil War* and *Black Panther*, but we do not see them provide direct patient care in Wakanda. Shuri assumes responsibility for most visible patient care. For example, Shuri is seen realigning neuronal synapses for Vision in *Avengers: Endgame* without sterile procedures or additional professional support. The lack of observable professionalised healthcare staff could indicate that Wakanda has advanced beyond the need for nurses, physicians, pharmacists and allied healthcare professionals. Members of the public may use the advanced technology of kimoyo beads to eliminate the need for professionalised health interventions. The emphasis on promoting collective health and the availability of advanced technology could mean that the need for medical intervention is limited to rare circumstances in Wakanda.

UPSTREAM APPROACHES TO HEALTH SYSTEMS

We present evidence of the benefits of preventative healthcare in Wakanda, with upstream approaches[29] to population health, to prevent illness and promote health and well-being. An upstream approach focuses on addressing the root causes of health issues by implementing systemic policies and removing structural barriers to improve population health outcomes.[30] Wakandans also extend preventative efforts to their combat, resulting in the deaths of fewer characters than programmes like Game of Thrones.[31] Wakanda provides an example of how we can reduce strain on emergency and inpatient services by investing in upstream interventions. With health systems under considerable strain internationally,[1] upstream approaches could provide relief for healthcare professionals.

The example of Wakanda demonstrates that a society— or community—can retain its identity and traditions while embracing modern technology and its benefits. Cultural safety is an effort to reclaim health by Indigenous peoples, which aims to create community-led health services.[32] Even as a fictional nation, Wakanda provides inspiration that change in systems can bring forth significant benefits by embedding innovation in clinical spaces, such as having bioengineering alongside patient care. Examples of biotechnology in films are often negative.[33] Positive examples like *Black Panther* may change this perception, as incorporating biomedical engineering is important in medical procedures for developing a timely diagnosis, supporting decision-making and planning of a suitable treatment regimen.[32] As in Wakanda, centring

identity and culture in health supports, services, and systems can enhance patient outcomes through cultural safety,[32] alongside a commitment to innovation. The wide adoption of public health measures means that Wakandans rarely need advanced healthcare services. Wakanda's example affirms the benefits of a collective and upstream approach to health that also includes the integration of technology to promote health equity and access for all. While Wakanda is fictional, it comes from the minds of humans, and so we have to ask: why can't we produce real-life anti-colonial, equitable health systems using the same human imaginations?

On a cautionary note, our observations were largely restricted to the Wakandan ruling class and armed forces, and it is not clear how these findings may apply to other citizens. In most healthcare systems, the quality of care is higher in urban areas, due to the increased availability of services. It is unknown how health may differ in other areas of the country, or in the Wakandan diaspora. In addition, it may be helpful to study other healthcare systems in the MCU, such as Asgard or Ta Lo. Studying Asgard represents a logistical challenge, as the planet was destroyed during *Thor: Ragnarök/Avengers: Infinity War*. However, an Asgardian diaspora was established. It is suggested in Marvel films that Asgardians experience mental health and addiction challenges following the destruction of their home, which could be explored further. Another healthcare system in the MCU warranting investigation is *Shang-Chi*'s Ta Lo. Ta Lo appears to be a society with few physical health concerns and extensive community martial arts expertise. The threat from the local dragon and possible invasion by outsiders may have provided a source of chronic stress, which could have long-term health consequences.

Our ethnographic analysis of Wakanda's health system is anchored by cultural identity. Decisions around health and technology reflected affordances that privileged a collectivist and preventative approach to their healthcare system. There is emphasis on reserving traditional, natural remedies for healing while embracing new technological advancements. Effective upstream approaches to health are embedded in anti-colonial philosophies. Culturally relevant prevention strategies can decrease pressure on health services and allow people to thrive. We suggest that healthcare professionals working in colonial and inequitable health systems could be inspired to create changes in healthcare services, drawing on Wakanda's example.

Author affiliations
[1]Faculty of Nursing, University of Calgary, Calgary, Alberta Barah, Phelps, Mei, Woo, Tung, Gadimova, Ens, and Ginn, Canada
[2]School of Nursing, The University of British Columbia Faculty of Applied Science, Vancouver, British Columbia, Canada
[3]Department of Family Medicine, Cumming School of Medicine, University of Calgary, Calgary, Alberta, Canada
[4]Nursing, University of Calgary, Calgary, Alberta, Canada
[5]Faculty of Arts, University of Calgary, Calgary, Alberta, Canada
[6]Alberta Health Services, Edmonton, Alberta, Canada

ORCID iDs
Jennifer Jackson http://orcid.org/0000-0001-9401-761X
Haneul Woo http://orcid.org/0000-0003-4049-6293
Carla Ginn http://orcid.org/0000-0002-8343-1388

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