



Beach day or deadly heatwave? Content analysis of media images from the 2021 Heat Dome in Canada

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Abstract

During extreme heat events (EHEs) the public often learns about health protective actions through the media. Visual news coverage can act as a powerful tool to help convey complex health protective actions to the public. Despite the importance of images in helping the public understand the risk, there has been no systematic analysis to assess what images have been used by media outlets in Canada during EHEs. This paper helps to fill that gap by analyzing how the Canadian media visually communicated the risks of extreme heat to the public during the unprecedented 2021 Heat Dome. A review of thousands of online news media articles published about the 2021 Heat Dome in Canada was conducted on five subscription news databases. Overall, 845 images were coded to identify denotative, connotative, and ideological content. Only 16% of these published images implied that heat was dangerous, of which only 40% depicted people, and 46% implied human suffering. Our findings demonstrate that the majority of images used in Canadian news coverage on the 2021 Heat Dome are incompatible with, and frequently contradict, evidence-based heat protective actions. Governments, public health agencies, and other stakeholders engaged in distributing heat preparedness messaging (e.g., journalists) should prioritize improving the images of extreme heat in news coverage to align with evidence-based public health messages. With rising global temperatures due to climate change and the associated increases in the frequency and intensity of extreme heat events, prioritizing these actions is critically important to offset the threat posed to public health.

Keywords Health messaging · Extreme heat · Heat health risk · Global warming · Digital media · Visual communication

1 Introduction

Visual news coverage plays a critical role in shaping public perspectives as images can give salience to the framing of news events through their selection and omission, depiction, symbolism, and lexical context (caption and headline/title) (Parry 2010). Therefore, during extreme heat events (EHEs) (or heatwaves), when the public turns to the media for informa-

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tion about health protective actions (Sheridan 2007; Strauss et al. 2022), images and graphics can have a powerful influence (Carvalho and Burgess 2005; Culloty et al. 2019). Unlike words and numbers, which require relational processing, images allow for quicker information processing using the experiential processing system (Epstein 1994). This ‘cognitive short-cut’ (Culloty et al. 2019) means that the inclusion of imagery can influence attention, engage readers more deeply (Domke et al. 2002), assist them in remembering information (Graber 1990), and help them interpret potential health risks more effectively (Leiserowitz 2006). This is due in part to the ‘picture superiority effect’ which promotes that learning accompanied by viewing images leads to a greater degree of recall than concepts learned only through written text (Whitehouse et al. 2006). Images are also critical for people with basic literacy who rely more on visuals than text (Houts et al. 2006; Peregrin 2010).

The news media has become the most widely used source of information on climate change-related weather events (Amdt 2020; Health Canada 2022). Specifically, online sites of major news organizations are the second most popular platform after television for accessing climate change-related information (Amdt 2020). Thus, news media is central to how individuals, organizations, and societies understand, evaluate, and act on climate change-related issues (Metag et al. 2017), and imagery is a vital component of this communication (Harold et al. 2016; van der Linden et al. 2014). Several studies have examined visual news coverage embedded in climate change-related articles in the mass media (O’Neill 2013, 2020; O’Neill et al. 2022; O’Neill and Smith 2014; Rebich-Hespanha et al. 2015; Wozniak et al. 2015, 2017). These studies have aimed to define and classify the body of images referencing climate change, identify the implications for public understanding and engagement, and offered recommendations regarding the efficacy of certain types of images for different audiences (Wozniak et al. 2017). However, the current literature has been focused on climate change in general and primarily centralized in Europe. Therefore, gaps remain regarding the visual portrayal of specific natural hazards that climate change may influence, like EHEs, as well as other geographic regions like Canada.

Visuals are typically used to tell the complex reality of news events, especially for audiences with no direct experience of the event(s) in question (Carnevale et al. 2015). Visuals also have been found to be more concrete in people’s minds when compared to words (Carnevale et al. 2015). However, images are considered indexical, meaning people view them uncritically and consider them to directly represent reality rather than as a particular representation of reality (Messaris and Abraham 2001). Further, as visuals rely on the reader to make sense of implicit meaning (i.e., images lack explicit propositional syntax), they can contain subtle references or clues which can promote certain views or undertones (Coleman 2010). For example, the denotative content (characteristics) of visual images, and the connotative content, such as the level of abstraction (e.g., symbolic images, decontextualization, portrayal of distance), may be associated with news outlets’ ideological leanings and can lead to the socio-political manipulation of an issue (Duan et al. 2017). Therefore, the process of visual framing is highly ideological (Hall 1973), where images do not portray an objective reality (Urry 1992) but instead are created, edited and/or selected to communicate a particular way of understanding (O’Neill 2013). The repetition and normalization of these images, or in contrast, the absence of images, represent an influence on empowering voices and promoting particular ways of conceptualizing a concept, while disempowering and marginalizing others (O’Neill 2013). Thus, the availability and selection of ‘compelling’ images by journalists and editors is a powerful tool for influencing a reader’s understanding and

perception of a topic, potentially affecting their decision-making during an emergency like an EHE.

The assessment of visual news coverage can provide valuable information on the subjective and objective nature in which information may impact how individuals and community officials perceive and respond to the threat of EHEs on health (O'Neill 2020). Visual content analysis is an empirical (observational) and objective procedure for quantifying visual representation using reliable, explicitly defined categories (*values* on independent *variables*) (Bell 2001). Although the application of visual content analysis has grown considerably for media analysis in general and for studies specific to climate change communication (Culloty et al. 2019; Duan et al. 2017; O'Neill 2020; Parry et al. 2022; Rebich-Hespanha et al. 2015), its application to specific natural hazards that climate change may influence, like EHEs, remains more limited (O'Neill et al. 2022; Painter et al. 2021; Pearce et al. 2020). For example, O'Neill et al. (2022) examined visual news coverage of the 2019 heatwaves in France, Germany, the Netherlands, and the UK, using content and visual critical discourse analyses. The authors found that many visuals framed the heatwaves as '*fun in the sun*' and concluded that the visual news coverage displaced concerns of vulnerability and excluded opportunities for envisioning a more resilient future (O'Neill et al. 2022). The positive visual images clash with the reality of EHEs, which are a significant public health risk and can be deadly. The reliance on positive images may affect the population's perceived risk (Leiserowitz 2006). With a projected rise in global temperatures and the frequency of EHEs (IPCC 2022) like the 2021 Heat Dome in Canada, more research is needed on the visual news coverage and framing of EHEs in digital media.

1.1 Case study: The 2021 Heat Dome

Western North America experienced an unprecedented EHE from June 24th to July 4th, 2021, which claimed the lives of at least 619 adults in British Columbia (B.C.), Canada, many of which were among populations known to be at greater risk to extreme heat, such as older adults (B.C. Coroners Service 2022). Deaths likely also occurred in neighboring jurisdictions, including an estimated 66 deaths in Alberta (City of Calgary 2022) and 100 in Washington State (Washington State Department of Health 2021). Declared one of the deadliest recorded weather events in Canadian history, this climate change-attributed EHE (termed the '2021 Heat Dome') resulted in unseasonably high day- and night-time temperatures, setting daily maximums and all-time records in multiple municipalities (Environment and Climate Change Canada 2022). Beyond the devastating health impacts of the EHE, there were also mass mortality of marine life, reduced crop and fruit yields, river flooding from rapid snow and glacier melt, and a substantial increase in devastating wildfires across the region (White et al. 2023). Based on a rapid attribution analysis of the EHE, it was determined that the event's likelihood and intensity was virtually impossible without human-caused climate change, as the observed temperatures were so extreme that they were outside of the range of historical averages (Philip et al., 2022). The authors further concluded that this EHE represented a once in 1000-year event under current climate conditions (Philip et al., 2022). Similarly, Zhang et al.'s (2023) analysis of the 2021 Heat Dome found that the probability of heat extremes similar to the 2021 Heat Dome are likely to increase due to background warming, which will further expose the population to future EHEs.

In Canada, thousands of digital news media articles about the 2021 Heat Dome were published before, during, and after the EHE. These articles included warnings and alert bulletins broadcasted by Environment and Climate Change Canada (ECCC) in the days preceding the EHE; promoted emergency response measures from regional public health agencies and municipalities, shared updates, and impact stories during the EHE; and assessed the scope and impact of the extreme heat post-event (Tetzlaff et al. (2024)). However, like most media scans on climate communication (O'Neill 2020; O'Neill and Smith 2014), the Tetzlaff et al. (2024) study was limited to the analysis of text-only content and did not examine the role of imagery. To help fill this gap, we explored the imagery in articles about the 2021 Heat Dome specifically published in Canada from when the ECCC alerts were first broadcast, throughout the EHE, to eight months following the EHE. The objectives of this study were to: (i) understand which imagery and visual frames were prominent (or were minimized) in digital news media articles published about the 2021 Heat Dome in Canada (denotation); and (ii) explore potential meaning conveyed through the visual news coverage of the EHE (connotation and ideological). Given the influence of media representations on the public's awareness of many topics, including climate change (Carvalho 2007; Painter 2013), advancing our understanding of which images are selected to visualize EHE is critical. Further, this study presents how the visual news coverage portrayed the nature and risk of the EHE, and it also presents an exploration of heat mitigation behaviors portrayed in images. Consequently, this study will help inform evidence-based guidance on how public health authorities and the media can visually communicate the risks of extreme heat to the public.

2 Materials and methods

2.1 Article selection & dataset

This article is part of a broader study analyzing how online news media articles portrayed the impacts and communication of health risks during the 2021 Heat Dome in Canada (see supplemental file 1 for search strategy) (Tetzlaff et al., 2024). The broader study conducted a systematized review of online news media content (e.g., newspaper articles, blogs, radio broadcast and television transcripts) using five subscription news databases (ProQuest Canadian Major Dailies, Business Source Elite, NewsDesk, Factiva, and Eureka). In addition to the database searches, a list of targeted public and non-profit organization websites was created for each of Canada's thirteen provinces and territories, along with a list of national websites, to ensure a comprehensive grey-literature search of traditional (e.g., electronic newspapers) and non-traditional media sources (e.g., health agency authored news articles). The search strategy was developed in consultation with a Research Librarian, and the final search underwent review by a secondary Librarian before database extraction. Articles published between June 1st, 2021 and February 26th, 2022 (date of search) were eligible for inclusion. The search strategy therefore aimed to capture all press published online after the forecasted extreme weather alert, during the heat event, and post-event. Further, although the 2021 Heat Dome impacted the entire Pacific Northwest region of Canada and the United States, this analysis only included articles published by Canadian news outlets. Additionally, this analysis did not include social media posts. This resulted in the identification of 2,909 articles.

2.2 Image selection criteria & dataset

During full-text coding for the primary project (Tetzlaff et al., 2024), the coding authors (N.G. and E.J.T.) identified 636 articles that included an image(s) (e.g., photographs, infographics, maps, social media screenshots, charts and figures, and video thumbnails) or image caption. Within the 636 articles, 845 images were captured. For each of these images, a line entry was made within an Excel spreadsheet, including the article title, news source, date of publication, article type (e.g., newspaper, community bulletin, blog post) image caption, image ownership, and an indication of copyright. The image file was then assigned a four-digit code and saved to a shared drive. For articles where the image was missing but an image caption was present (e.g., articles downloaded from the Factiva database remove all graphics) a co-author (N.Y.) searched for the original articles and located the images.

2.3 Codebook development

A pilot codebook of concepts, positive indicators of a given code, and visual examples of the dataset was developed. This codebook was circulated to all authors for review and agreement, and modifications were made to collapse and expand visual codes as needed. For instance, removal of redundant codes were applied to facilitate the coding process (e.g., the code *single image* was removed because all images not coded under *collaged image* could be considered as a single image). Additionally, discussions were had among the authors (N.Y., N.G., and E.J.T.) to clarify certain visual elements, such as what constitutes *light-coloured clothing* or *light-weight clothing*. A trial coding of *denotative content* (meaning the literal components of images) and *connotative content* (the implied meaning) was then completed by two independent coders (N.Y. and N.G.) on a subset of the data ($n=110$) to ensure consistency (reliability) and validity of the pre-determined definitions. Intercoder reliability was determined by a region-based coding comparison in NVivo (Release 1.6.2., QSR International), and results were transferred into an Excel template for calculating the percentage of agreement for all codes. We achieved a 96.8% of agreement; this was determined by calculating the percent of image content which the two coders agreed should be attributed to a specific code or not. We selected to assess intercoder reliability using percentage of agreement for this analysis to allow for assessment based on a standard unit of measurement appropriate for images - region selection by pixels. Although alternative methods were considered to help correct for chance agreement (e.g., Cohen's kappa, Krippendorff's alpha), they are computationally and conceptually challenging (MacPhail et al. 2016) for application on visual content analysis. Moreover, as this analysis reflects a mixed-methods approach that combines quantitative content analysis and qualitative interpretive analysis we felt this determination was suitable.

2.4 Image analysis

All images ($n=845$) were coded and analyzed using the methodology developed by O'Neill (2013) for the visual analysis of images in newspaper articles about climate change. This methodology also aligns with Barthes' (1977) description of the theory of visual meaning which distinguishes between what is *depicted* in an image (denotation), what the image *means* in a specific context (connotation), and what the image *implies* or *normalizes* (ideo-

logical). The approach also supports Culloty et al.'s (2019) argument for the separation of *descriptive* and *interpretative* frames to allow for a distinction between image content and the meaning of that content as an element of communication.

First, denotative (or *literal*) categories were coded to provide a background or map of a domain of visual representation (Bell 2001). The denotative content included: the currency of the image (used to determine if a pre-existing image was used in place of a real-time photo); image presentation (single image or a collage); location (indoor or outdoor); use of landscape (rural, urban, wilderness); presence of animals (wildlife, aquatic animals, livestock, pets); inclusion of heat mitigation behaviors (water access, clothing, shade, cooling center, hydration, cooling system); and indication of infrastructure and services (emergency response, public areas, roadways, and transportation). In addition, demographic details were coded based on investigator observation (Flanagin et al. 2021) for age (children, adults, older adults), perceived gender (male, female, unknown), and population group (white, racial and ethnic minority). These demographic details were included to identify whether the selected online news media portrays groups that have greater physiological vulnerability to heat (e.g., older adults are more heat vulnerable) (D'Souza et al. 2020; Meade et al. 2020) or if there is contrast between the image and text (e.g., primarily images of middle-aged adults). Further, these demographic details were included to explore whether social vulnerability factors known to pose a greater risk for heat-related impacts were portrayed, such as those of historical, structural marginalization (Berberian et al. 2022). Lastly, due to the timing of the 2021 Heat Dome coinciding with the COVID-19 pandemic and the ongoing opioid overdose crisis, additional denotative codes were added to capture the portrayal of these parallel public health crises (e.g., COVID-19: face masks, physical distancing signage; opioid: safe consumption sites, needle exchange programming). Further, images of other cascading weather events (e.g., wildfires, an atmospheric river) that were published in articles that co-referenced the 2021 Heat Dome were also coded. This approach to coding images enabled the author team to analyze the full set of images related to the 2021 Heat Dome and identify what image content was given prominence or, conversely, was excluded or missing (O'Neill 2013, 2019).

Next, to position the images within a broader socio-political context, they were analyzed for connotative content and ideological content. *Connotative* content coding was first used to identify how the denotative objects together create structures of meaning which elucidate other, additional, and implied meanings (O'Neill 2019). For example, images in the online news media of people playing on the beach during the EHE may have the implied meaning of a lack of risk, whereas images of ambulances may convey a heat-health risk. The connotative codes included the following prompts developed by the research team: (i) is heat portrayed? If yes, is it implied that heat is dangerous? (e.g., an image of a thermometer depicting high heat); (ii) is human suffering implied? (e.g., an image of a person receiving emergency medical care); (iii) is animal suffering implied? (e.g., an image of a dog panting); (iv) are environmental impacts implied? (e.g., an image of wilted foliage); and (v) are infrastructure or service impacts implied? (e.g., an image of a melted park bench).

Lastly, the images were analyzed for *ideological* content, which refers to the portrayal of ideas, beliefs, understandings, and attitudes (Culloty et al. 2019). For example, we explored whether the demographic details of individuals in the image (e.g., age) related to the portrayal of specific heat mitigation measures or risks. This was conducted by investigating the main themes, patterns and concepts portrayed in the visual news coverage via crosstab que-

ries of all codes against each other in NVivo. It also drew on the context provided by article titles and image captions as they helped to place the viewer in relationship with the image (Hall 1973; O'Neill 2013, 2019). As online news media images may have a contradictory relationship with the articles they accompany because image selection and article writing are often two separate processes within a newsroom (Anne DiFrancesco and Young 2011), the coders also recorded alignment of the caption with interpretation of the image.

3 Results

3.1 Publication details

Overall, the total dataset included 11 (1%) photos published before the 2021 Heat Dome which accompanied articles warning of the upcoming EHE (1 June 2021–23 June 2021; defined by the first date the 2021 Heat Dome was covered in the online news media), 283 (34% of total) images published during the 2021 Heat Dome (24 June 2021–7 July 2021) and 551 (65% of total) images published after the EHE (8 July 2021–26 February 2022). The images were circulated via 280 different sources (see supplemental file 1 for full list) including local, regional, and national news agencies ($n=695$; 82% of total), blogs ($n=34$; 4% of total), government releases ($n=60$; 7% of total), radio producers ($n=22$; 3% of total), and community associations ($n=34$; 4% of total) (Table 1). Professional ($n=466$; 55% of total), stock ($n=81$; 10% of total) and reader submitted images ($n=57$; 7% of total) were included, with 1% of all images including copyright information. Most images were presented as a single photo ($n=831$; 98% of total), in comparison to collages ($n=14$; 2% of total). Lastly, only 49% ($n=410$) of all images were identified as being current, meaning half of the images used in the articles depicted a past event or a file image, in contrast to images representative of the present EHE ($n=435$; 51% of total).

3.2 Image content (denotative)

The majority of the images depicted outdoor environments ($n=758$; 90% of total) versus indoor settings (e.g., private residences, malls, restaurants) ($n=87$; 10% of total) (Fig. 1). Within outdoor environments, the setting of the images depicted various spaces, including urban ($n=352$; 47% of subcategory), wilderness ($n=123$; 16% of subcategory), water bodies ($n=121$; 16% of subcategory), rural landscapes ($n=99$; 13% of subcategory), and the open-air (e.g., sky, sun) ($n=57$; 8% of subcategory). Numerous photos also included animals ($n=79$; 9% of total), such as sea life and aquatic animals ($n=30$; 4% of total), livestock ($n=17$; 2% of total), pets ($n=13$; 2% of total), and wildlife ($n=8$; 1% of total). Various infrastructure elements were also present in the images ($n=79$; 9% of total), including water supply ($n=79$; 9% of total), housing ($n=50$; 6% of total), health care facilities ($n=8$; 1% of total), schools ($n=8$; 1% of total), energy supply ($n=7$; 1% of total), and roadways and sidewalks ($n=6$; 1% of total) (Table 2). When depicting only indoor environments ($n=87$; 10% of total), the images typically showed private residences ($n=58$; 72% of subcategory) or public spaces ($n=23$; 28% of subcategory). Both indoor and outdoor images also included the depiction of various activities and services, including emergency services ($n=66$; 8% of total), workplaces ($n=53$; 6% of total), community outreach and events (e.g.,

Table 1 Publication details of the images circulated in relation to the 2021 Heat Dome

Publication Details	Count (n=)	Percentage (%)
Date of Publication		
<i>Pre-Heat Dome (1 June 2021–23 June 2021)</i>	11	1.3%
<i>During Heat Dome (24 June 2021–7 July 2021)</i>	283	33.5%
<i>Post-Heat Dome (8 July 2021–17 February 2022)</i>	551	65.2%
Current Representation		
<i>Current</i>	410	48.5%
<i>Dated</i>	34	4.0%
<i>Unknown</i>	401	47.5%
News Type		
<i>Newspaper/Bulletin (e.g., local, regional, national news)</i>	695	82.1%
<i>Blog</i>	34	4.0%
<i>Government Source</i>	60	7.1%
<i>TV/Radio Transcript</i>	22	2.6%
<i>Association/Organization</i>	34	4.0%
Image Presentation		
<i>Single Image</i>	831	98.3%
<i>Collaged Image</i>	14	1.7%
Image Caption		
<i>Included</i>	626	74.1%
<i>Not Included</i>	219	25.9%
Image Ownership		
<i>Professional</i>	466	55.1%
<i>Stock</i>	81	9.6%
<i>Reader Submission</i>	57	6.7%
<i>Unknown</i>	241	28.5%
Copyright Indicated		
	9	1.1%

homelessness network) ($n=19$; 2% of total), business operations ($n=15$; 2% of total), medical care ($n=2$; 0% of total), and public transit ($n=2$; 0% of total). Lastly, a few of the images depicted visual components (objects) that portrayed existing public health crises related to the COVID-19 pandemic ($n=62$; 7% of total) and with the opioid overdose crisis ($n=2$; 0% of total) (Table 2).

Many of the images included one or more people ($n=418$; 50% of total), with the majority depicting adults (approximate age 18–59 years) ($n=336$; 40% of total), followed by children (approximate age ≤ 17 years) ($n=86$; 10% of total) and/or older adults (approximate age ≥ 60 years) ($n=32$; 4% of total). Of the images with people in them ($n=418$; 50% of total), most depicted white individuals ($n=307$; 73% of subcategory), opposed to racial and ethnic minority individuals ($n=59$; 14% of subcategory), whereas the portrayal of gender was slightly higher for males ($n=277$; 66% of subcategory) compared to females ($n=220$; 53% of subcategory). It was also noteworthy that 6% ($n=24$) of the images that included a person, pictured a political representative (e.g., Prime Minister, Member of Parliament, Minister) (Table 3).

Overall, 309 (37% of total) images depicted some aspect of a heat mitigation strategy. Within these images, six different types of behaviors and strategies were represented, including accessing water (e.g., lake, river, splash pads, misting stations) ($n=114$; 37%

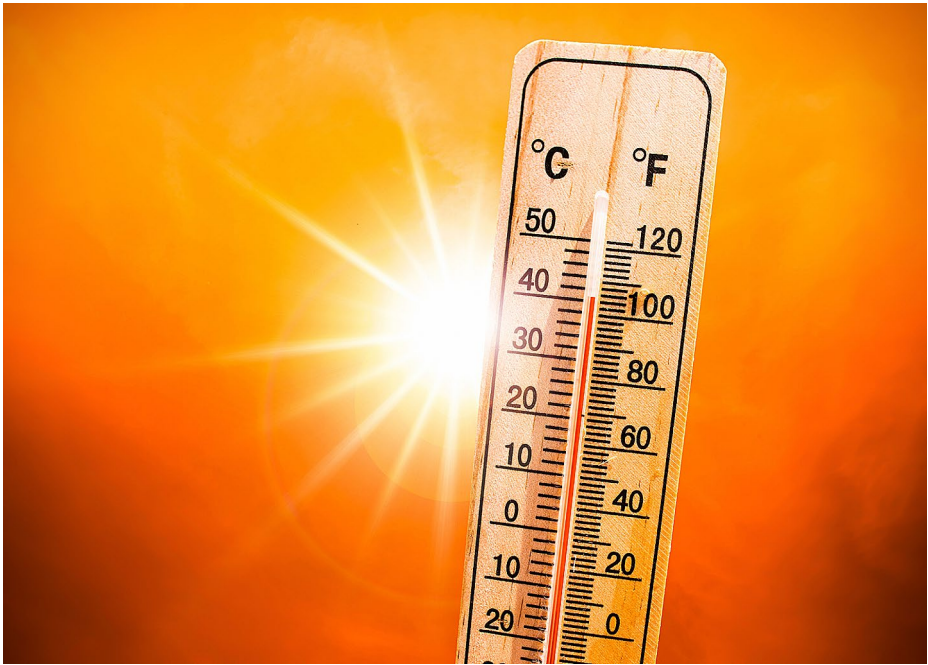


Fig. 1 Image showing a sun and thermometer to depict outdoor heat. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©Foto-Ruhrgebiet from Getty Images via [Canva.com](https://www.canva.com)]

of subcategory) (Fig. 2), clothing selection (e.g., minimal or light-weight/light-colored) ($n=248$; 80% of subcategory), shade seeking (e.g., tree canopy) or shade creating (e.g., tents, umbrellas) ($n=58$; 19% of subcategory) (Fig. 3), accessing cool spaces (e.g., malls, cooling centers) ($n=19$; 6% of subcategory), and using cooling systems (e.g., air conditioning, fans, windows) ($n=12$; 4% of subcategory) (Fig. 4). Additionally, 17% ($n=52$) of the images portraying a heat mitigation strategy depicted or implied fluid or frozen food ingestion, most commonly showing water (e.g., bottled, water fountain) ($n=37$; 12% of subcategory) or other non-hydrating beverages (e.g., alcohol, coffee, energy drinks) ($n=15$; 5% of subcategory). The majority of images portraying heat mitigation strategies also depicted people ($n=286$; 93% of subcategory) (Table 4).

When looking for trends in the images over the duration of the publication time period sampled, we found that the frequency of images representative of the present EHE did not differ significantly between the active duration of the 2021 Heat Dome ($n=155$; 54% of subcategory) and post-event ($n=271$; 50% of subcategory). A greater percentage of images depicting heat adaptive behaviors were observed in images captured during the 2021 Heat Dome ($n=141$; 49% of subcategory) and before the 2021 Heat Dome ($n=7$; 70% of subcategory) which accompanied articles warning of the upcoming EHE. Additionally, the portrayal of extreme weather increased from before ($n=1$; 10% of subcategory) to during ($n=49$; 17% of subcategory) to after ($n=144$; 26% of subcategory) the 2021 Heat Dome, and this was mostly attributed to depictions of wildfires. Concurrently, images implying environmental impacts (e.g., damaged crops, dry soil) were more frequent after the 2021 Heat

Table 2 Components of image content (denotative elements) circulated on the 2021 Heat Dome

Component Category	Image Elements* (Positive Indicator for Image Coding)	Count (n=)	Subcategory Percentage (%)	Total Percentage of Images (%)
Outdoor Environment		758	-	90%
Water Body	<i>Water; Sand; Shore; Pebbles; Swimmers; Sunbathers; Boaters; Seashells; Aquatic Species</i>	121	16%	14%
Rural	<i>Fields; Farmland; Livestock; Crops; Rural communities</i>	99	13%	12%
Sky	<i>Blue sky; Sun; Clouds; Night sky</i>	57	8%	7%
Urban	<i>Streets; Pavement; Sidewalks; Buildings; Skylines; Backyards; Public parks; Traffic; People; Utility plants; School bus; Ports</i>	352	47%	42%
Wilderness	<i>Forests; Vegetation; Glaciers; Wildlife (land)</i>	123	16%	15%
Animals		79	-	9%
Aquatic Animals	<i>Starfish; Oysters; Clams; Fish; Waterfowls; Whales; Coral reefs</i>	30	38%	4%
Insects	<i>Caterpillars; Mosquitos; Moths; Butterflies; Bees; Wasps; Dragonflies</i>	11	14%	1%
Livestock	<i>Cows; Pigs; Chickens; Sheep</i>	17	22%	2%
Pets	<i>Dogs; Cats</i>	13	16%	2%
Wildlife (Land)	<i>Birds; Coyotes; Deer; Leopards</i>	8	10%	1%
Extreme Weather		195	-	23%
Drought	<i>Dry soil; Damaged crops</i>	38	19%	4%
Flooding	<i>Floods; Washed-out roads</i>	45	23%	5%
Rainfall	<i>Clouds; Precipitation</i>	2	1%	0%
Wildfires	<i>Fires; Smoke; Burned grounds</i>	110	56%	13%
Indoor Environment		87	-	10%
Private Spaces	<i>Residential Homes; Private workplaces; Hotel rooms; Vehicle interiors</i>	58	72%	7%
Public Spaces	<i>Schools; Vaccination clinics; Restaurants; Grocery stores; Public halls; Hospitals</i>	23	28%	3%
Infrastructure		79	-	9%
Energy Supply	<i>Utility plants; Power lines</i>	7	9%	1%
Health Care Facilities	<i>Hospitals; Ambulances</i>	8	10%	1%
Housing	<i>Single family homes; Apartment buildings</i>	50	63%	6%
Streetscapes	<i>Roadways; Sidewalks</i>	6	8%	1%
Schools	<i>School buses; Classrooms</i>	8	10%	1%
Water Supply	<i>Wells</i>	79	38%	9%
Activities and Services		153	-	18%
Businesses	<i>Restaurants; Hotels; Stores; Lemonade stands; Ports; Farmer's market; Ice cream truck; Fisheries</i>	15	10%	2%
Community Outreach & Events	<i>Fireworks; Protests; Volunteer groups</i>	19	12%	2%
Emergency Services	<i>Paramedics; Ambulances; Police; Wildfire services; Emergency rooms; Dispatchers; Firefighters; Lifeguards; Firetrucks; Search and rescue crews</i>	66	43%	8%

Table 2 (continued)

Component Category	Image Elements* (Positive Indicator for Image Coding)	Count (n=)	Subcategory Percentage (%)	Total Percentage of Images (%)
Workplaces	<i>Farmers; Tractors; Farmland; Livestock; Air-conditioner repairs; Construction workers; Waste collector</i>	53	35%	6%
Medical Care	<i>Vaccinations; Medical attention</i>	2	1%	0%
Public Transit	<i>Buses</i>	2	1%	0%
Crossover with Other Crisis		64	-	8%
COVID-19 Pandemic	<i>Masks; Face shields; Symptom checklists; Physical distancing signage</i>	62	97%	7%
Opioid Crisis	<i>Naloxone kits; Safe consumption sites</i>	2	3%	0%

*Note: Positive indicators for image coding represent the actual elements an image was composed of that directed its inclusion in a specific component category

Table 3 Denotative content for images circulated, before, during, and after the 2021 Heat Dome

Component Category	Image Elements* (Positive Indicator for Image Coding)	Count (n=)	Subcategory Percentage (%)	Total Percentage of Images (%)
People Present		418	-	50%
One person	<i>A single person was present in the image</i>	224	53%	27%
Multiple people	<i>Multiple people were present in the image</i>	195	47%	23%
Age Group		-	-	-
Children	<i>Approximate age: ≤17 years</i>	86	21%	10%
Adults	<i>Approximate age: 18–59 years</i>	336	82%	40%
Older Adults	<i>Approximate age: ≥60 years</i>	32	8%	4%
Perceived Gender		-	-	-
Male	<i>At least one male person was present in the image</i>	277	66%	33%
Female	<i>At least one female person was present in the image</i>	220	53%	26%
Unidentifiable	<i>The gender of the person in the image was unidentifiable</i>	5	1%	1%
Population Group		-	-	-
Racial and Ethnic Minority Individuals	<i>At least one person belonging to an ethnic minority was present in the image</i>	52	13%	6%
White Individual	<i>At least one Caucasian person was present in the image</i>	307	73%	36%
Unidentifiable	<i>The ethnicity of the person in the image was unidentifiable</i>	59	14%	7%
Political Representative	<i>Mayor, Member of Provincial Parliament, Minister, Primer Minister</i>	24	6%	3%

*Note: Positive indicators for image coding represent the actual elements an image was composed of that directed its inclusion in a specific component category



Fig. 2 Heat mitigation via accessing water community splash pad. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©FatCamera from Getty Images via [Canva.com](https://www.canva.com)]

Dome ($n=188$; 34% of subcategory) compared to during ($n=43$; 15% of subcategory) and before ($n=1$; 10% of subcategory).

3.3 Interpretative content (connotative and ideological)

Overall, 74% of all images were accompanied by a caption ($n=626$), with 92% ($n=576$) of the captions including descriptive text that helps readers understand the image. For example, some headshots of individuals that died during the 2021 Heat Dome were included; such images on their own would not imply relation to the 2021 Heat Dome but accompanied by a caption indicating that the person was a decedent of the EHE provides context for interpretation. When interpreting the images within the context of the 2021 Heat Dome and their broader implied meaning, it was identified that 65% of all images portrayed (or implied) heat being present ($n=551$). To portray the presence of heat, 90% of all images depicted the outdoor environment ($n=758$), and more specifically urban, outdoor settings ($n=352$; 42% of total) (Fig. 5). Many of these images also used indicators of other extreme weather ($n=195$; 23% of total) to imply heat, including wildfires ($n=110$; 56% of subcategory) and drought ($n=38$; 19% of subcategory) (Fig. 6). Further, roughly half of the images that implied heat also depicted people ($n=283$, 51% of subcategory) and engagement in heat mitigation behaviors ($n=276$; 50% of subcategory) (Fig. 7). Most often, the heat mitigation behaviors depicted adults ($n=220$; 69% of subcategory) and/or children ($n=76$; 24% of subcategory), with only a few showing older adults ($n=18$; 6% of subcategory).



Fig. 3 Creating shade using an umbrella. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©Elmar Gubisch via [Canva.com](https://www.canva.com)]

Overall, only 16% of all images implied heat was dangerous ($n=133$), of which 40% depicted people present ($n=53$) or implied human suffering ($n=61$; 46% of subcategory) (Fig. 8). Further, 44% of the images portraying heat as dangerous also implied environmental implications ($n=58$), 13% showed infrastructure impacts ($n=17$), 25% portrayed service disruptions ($n=33$), and 2% depicted animal suffering ($n=3$). Images portraying heat as being dangerous were also predominantly of outdoor ($n=128$; 96% of subcategory), urban environments ($n=67$; 50% of subcategory), and often relied on the inclusion of other extreme weather events ($n=66$; 50% of subcategory) to portray danger or risk (Fig. 9). Interestingly, only 38% ($n=51$) of the images communicating the danger of heat were images taken during the 2021 Heat Dome.

In the images portraying human suffering ($n=87$; 10% of total), the majority were associated with extreme heat being implied ($n=74$; 85% of subcategory), and it being perceived as dangerous ($n=61$; 70% of subcategory). Many of the images portraying human suffering depicted white ($n=41$; 47% of subcategory), male ($n=35$; 40% of subcategory) adults ($n=41$; 59% of subcategory) in an outdoor ($n=79$; 91% of subcategory), and urban environment ($n=62$; 71% of subcategory) (Fig. 10). A slight majority demonstrated people engaged in heat adaptive behaviors ($n=46$; 53% of subcategory), while also demonstrating service implications ($n=41$; 47% of subcategory) (e.g., cancellation of vaccine clinics, disruptions to waste collection) and infrastructure impacts ($n=46$; 53% of subcategory) (e.g., buckled sidewalks, melted power lines). Similar to human suffering, animal suffering was evident in relation to the implied heat ($n=23$; 85% of subcategory), and frequently overlapped with the portrayal of environmental impacts ($n=8$; 30% of subcategory). Typically, the images



Fig. 4 Using fans for heat mitigation. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©PRImageFactory from Getty Images via [Canva.com](https://www.canva.com)]

portraying animal suffering depicted outdoor environments ($n=26$; 96% of subcategory), such as the beach ($n=14$; 52% of subcategory) and portrayed the negative impacts of heat on aquatic animals ($n=16$; 59% of subcategory) (Fig. 11). The images with perceived environmental impacts ($n=165$; 20% of total) commonly related to implied heat ($n=148$; 90% of subcategory) and displayed various settings, including wilderness ($n=54$; 33% of subcategory) and urban spaces ($n=46$; 28% of subcategory), and typically also depicted other extreme weather events ($n=143$; 87% of subcategory); wildfires in particular ($n=95$; 58% of subcategory). Lastly, of the images that were coded for infrastructure impacts (e.g., buckled sidewalks and melted park benches) ($n=64$; 8% of subcategory), the majority were related to heat being implied ($n=48$; 75% of subcategory), dangerous ($n=26$; 41% of subcategory), and were often associated with broader environmental impacts ($n=33$; 52% of subcategory).

4 Discussion

This study examined visual news coverage of the 2021 Heat Dome in Canada, using visual content analysis methods. This exploration allowed us to identify which visual frames (denotation) were prominent or understated in the news coverage, and explore the potential meanings conveyed through this visual discourse (connotation and ideological). Based on the image analysis, we observed the majority of images did not align with evidence-based

Table 4 Inclusion of heat adaptive behaviors and strategies in images circulated with media articles on the 2021 Heat Dome

Publication Details	Image Elements* (Positive Indicator for Image Coding)	Count (n=)	Subcategory Percentage (%)	Total Percentage of Images (%)
Water Access		114	25%	13%
Splash Pad	<i>Splash Pad; Spray Park; Water Park; Fountains</i>	29	25%	3%
Misting Station	<i>Misting Station; Misters; Mist</i>	12	11%	1%
Public Pool	<i>Swimming Pool; Public Wading Pool; Lane Swimming</i>	6	5%	1%
Lake or River	<i>Creek; Lakes; Rivers; Oceans; Spring; Pond</i>	49	43%	6%
Private Pool	<i>Inground Pool; Above Ground Pool; Inflatable Pool</i>	4	4%	0%
Hose or Sprinkler	<i>Garden Sprinklers; Garden Hoses; Fire Hose; Fire Hydrant</i>	12	11%	1%
Spray Bottle	<i>Spray Bottle; Spritz Bottle</i>	2	2%	0%
Clothing		248	80%	29%
Light-Weight Clothing	<i>Summer dresses; Shorts; Tank Tops; Short-Sleeved Shirts</i>	149	60%	18%
Light-Colored Clothing	<i>Pale Colors (e.g., white, cream, tan)</i>	72	29%	9%
Minimal/No Clothing	<i>Bathing Suits; Shirtless</i>	67	27%	8%
Hat	<i>Panama Hats, Baseball Caps; Vizors; Cloche Hats</i>	105	42%	12%
Shade		58	19%	7%
Umbrella	<i>Foldable Umbrellas; Parasols</i>	2	3%	0%
Tree(s)	<i>Trees; Shaded Greenspace</i>	14	23%	2%
Tent or Tarp	<i>Pop-up Tents; Tunnel Tents; Canopy Tents; Canvas Tarps; Pergolas</i>	37	62%	4%
Window Shades	<i>Blinds; Curtains; Shutters; Drapery</i>	10	17%	1%
Cool Spaces		19	6%	2%
Public Health Cooling Center	<i>Cooling Center Signs</i>	2	11%	0%
Private Air-Conditioned Space	<i>Homes; Hotels</i>	6	32%	1%
Other Air-Conditioned Space	<i>Restaurants; Emergency Medical Services Vehicle</i>	11	58%	1%
Beverages & Frozen Food		50	16%	6%
Public Water Fountain	<i>Sidewalk Fountains</i>	2	4%	0%
Water Bottle	<i>Plastic Water Bottles; Reusable Bottles; Water Jugs; Water Pitchers</i>	35	70%	4%
Freezies & Ice Cream	<i>Popsicles; Freezies; Ice Cream Trucks</i>	3	6%	0%
Other Beverage	<i>Pop can; Lemonade; Coffee; Iced coffee; Wine; Beer</i>	15	30%	2%
Cooling Systems		12	4%	1%
Air Conditioning	<i>Air Conditioning Unit; Climate Control Dial; Thermostat; Ductless Air Conditioners; Heat Pumps</i>	6	50%	1%

Table 4 (continued)

Publication Details	Image Elements* (Positive Indicator for Image Coding)	Count (n=)	Subcat- egory Percentage (%)	Total Per- centage of Images (%)
Fan	<i>Electric Fan, Handheld Fan</i>	8	67%	1%
Window(s)	<i>Window; Balcony Doors</i>	1	8%	0%

*Note: Positive indicators for image coding represent the actual elements an image was composed of that directed its inclusion in a specific component category



Fig. 5 Portraying the presence of heat in the outdoor, urban environment. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©Xurzon from Getty Images via [Canva.com](https://www.canva.com)]

heat-protective messaging (Health Canada 2011). Observations include: (i) the minimal portrayal of heat as a deadly health hazard, (ii) the lack of representation of the most heat-vulnerable populations in visuals; (iii) minimal inclusion of image components that could cue heat-protective behaviors, and (iv) the misalignment of images with text-based heat-health messaging.

4.1 Portrayal of risk

Despite extreme heat being among the most dangerous natural hazards globally that poses a significant threat to human health (World Health Organization 2020), less than a fifth of the images published in articles during one of the deadliest heat events in Canadian history



Fig. 6 Image portraying the presence of heat in the outdoor environment by showing drought. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©Drbouz from Getty Images Signature via [Canva.com](https://www.canva.com)]

implied that heat is dangerous to peoples' health. This finding aligns with a recent analysis of the 2019 European heatwaves that found most online news media images had a positive valence (portrayed *goodness*; people having fun, relaxing and enjoying the heat in holiday-like, settings), framing EHEs as 'fun in the sun' rather than a threat (O'Neill et al. 2022). It was also noteworthy that less than half of the images in our study portrayed the risk of extreme heat to humans, and instead used images of the environment, landscapes, thermometers, or other weather events to visually cue the negative aspects of extreme heat. Similarly, online news media on the European heatwaves also found that people were largely absent from images when depicting the danger of heat extremes (O'Neill et al. 2022). Unlike other weather events (e.g., tornados), extreme heat is often referred to as a 'silent killer', which poses an additional challenge when selecting representative images (McKenzie 2022). This idea of 'distancing' in visual framing is commonly seen in the analysis of climate change in online news media (O'Neill 2020; Wang et al. 2019). In the context of climate change, many images selected by editors geographically and psychologically distances individuals from the direct impacts (O'Neill 2013). For example, the use of polar bears or polar landscapes are often selected as visual symbols of climate change which allow a reader to distance or remove themselves from the impacts. Our findings portray a similar framing technique to O'Neill (2013) which may have implications to public risk perception and engagement in heat adaptive behaviors. Of further concern, 90% of the images in the news coverage depicted outdoor environments. With 98% of heat-related deaths occurring indoors in B.C., Canada during the 2021 Heat Dome (B.C. Coroners Service 2022), the lack of images rep-



Fig. 7 Using heat mitigating strategies to help manage the heat. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©Tommaso79 from Getty Images via [Canva.com](https://www.canva.com)]

representative of indoor environments is a critical finding. Thus, the image selection portraying that heat is outdoors skewed the positioning of risk and may have been seen to imply that indoor environments were safer.

4.2 Lack of representation of heat-vulnerable populations

We found that those people most vulnerable to the health impacts from exposure to extreme heat – for example, older adults, infants, and children, and the chronically ill – were under-represented in the images. Of the images that included humans, the majority depicted adults (18–59 years) followed by children (≤ 17 years). However, the images did not represent the demographic profiles of the population most at risk. For example, based on the B.C. Coroner's Report (2022), 67% of decedents during the 2021 Heat Dome (July 2021) were 70 years of age or older, and 90% were over age 60, and there were no deaths among infants, children, or persons younger than age 30. This lack of representation of heat vulnerable groups may have not clearly communicated which populations are most at risk to the public. Various studies have shown that populations such as older adults and those with co-morbidities may not self-identify as vulnerable and therefore may not alter their behaviors in a protective manner in response to an EHE (Abrahamson et al. 2008). Therefore, the inclusion of broader visual representation of heat-vulnerable populations may support readers in accepting risk and adapting behaviors accordingly during future heat events. Although there are various opportunities for improving image selection, it is important to acknowledge



Fig. 8 Imply heat and human suffering. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©AntonioGuillem from Getty Images via [Canva.com](https://www.canva.com)]

that there are various contextual and organizational challenges (e.g., timing, availability of experts) that can influence coverage of extreme weather events in the online news media. For example, a recent survey of journalists in four European countries identified several factors influencing news coverage of extreme heat events, including: editorial policies, media time and resource constraints, and journalistic barriers to accessing expert sources (Strauss et al. 2022). It is likely that many of these same factors – as well as others such as access to staff photographers, receiving reader submitted images, access, or requirement to use stock images, and avoidance of visual discourses of fear (O’Neill and Nicholson-Cole 2009) influence the selection and inclusion of images in articles about EHE.

4.3 Minimal inclusion of image components to cue heat-protective behaviors

Assessing visual news coverage published in online news media articles provides valuable information on how individuals and community officials may perceive and respond to the health threat of EHEs (O’Neill 2020). However, we found that many images published in online news media articles do not accurately portray the risk extreme heat poses to the public. For example, less than half of images portrayed heat alleviating behaviors (e.g., personal cooling strategies). Further, of these images, only a small number of heat-health protective actions were shown (e.g., drinking water), while other effective actions (e.g., seeking air-conditioned spaces) were omitted. ECCC issues in its heat alerts various ‘call-to-action statements’ to help educate the public (Health Canada 2011). Based on an analysis



Fig. 9 Using other extreme weather to imply heat. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©Michael Underwood from Getty Images via [Canva.com](https://www.canva.com)]

of the dataset of images collected, we found the majority of ECCC’s action statements were not represented visually. Examples of actions not depicted in the image collection include health-checks for family, friends and neighbors, visual cues for the signs and symptoms of heat illness or visual guidance on responding to a heat-related medical emergency. Similar findings were seen in the study of images from the 2019 European heatwaves, with adaptation strategies not viable for many at-risk population groups prioritized over evidence-proven actions (O’Neill et al. 2022).

4.4 Misalignment of images with text-based heat-health messaging

While the majority of images we collected were accompanied by a caption, only a few of the image-text combinations provided clear context and relevance to the heat-health messaging during the EHE (e.g., an image of a man struggling with the heat outside accompanied by the caption “homeless people are vulnerable during extreme heat”). In contrast, many image-caption combinations largely contrasted the narrative of the text (analysis presented separately – see Tetzlaff et al., 2024). For example, we found captions such as “people enjoying the heatwave across Vancouver Island” paired with pictures of a packed beach, or “fun in the fountains” with an image of a children’s splash park. It was also noted that some of the captions were vague and left room for misinterpretation to the reader/viewer. For example, a caption stating “*health officials advise people to drink plenty of liquids*” may have been perceived to be implying that all beverages are equally hydrating versus more



Fig. 10 Image portraying human suffering depicting a white male adult in an outdoor environment. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©Africa Images via [Canva.com](https://www.canva.com)]

accurately stating that people should be consuming water. O'Neill et al. (2022) similarly found that a dissonance existed between the text within the article on the 2019 European heatwaves and the corresponding images. The authors gave the example of an article title reading “*Heatwave: What do the four levels of the national plan provide?*” accompanied by a picture of children and young people playing in a city splash park. In the literature, this is referred to as the ‘image-text fit effect’ (Li and Xie 2020). When images are not aligned with the text, or worse conflict with it, it can create difficulty for readers to comprehend the main message (Li and Xie 2020). This raises a significant concern in the context of extreme heat as contradictory messaging may result in unsafe behaviors (e.g., staying inside despite indoor temperatures exceeding safe threshold limits) and ultimately could have fatal consequences.

4.5 Limitations and future studies

This study employed a mixed-methods approach that combines quantitative content analysis and qualitative interpretive analysis. The purpose of this approach is to provide a comprehensive understanding of how EHEs are visually communicated in Canadian news media. The quantitative content analysis allowed us to identify and categorize specific visual elements present in news media coverage of EHEs. This method enabled us to analyze a large sample of images and identify patterns and trends in their representation. However, we recognize that quantitative methods have limitations, such as the potential for subjectiv-



Fig. 11 Image of the negative impacts of heat on sea life. Note: This image is not from the dataset, but is a Creative Commons licensed image used to illustrate the themes discussed [©Chimmy from Getty Images via [Canva.com](https://www.canva.com)]

ity and bias in the selection and coding of categories. To address this limitation, we also incorporated interpretive analysis to provide a more nuanced understanding of the visual communication of EHEs. This qualitative approach allowed us to examine the meanings and contexts of the visual elements identified in the quantitative content analysis. By combining both methods, we were able to provide a comprehensive analysis of how extreme heat events are visually communicated in Canadian news media. However, despite efforts made to reduce bias by using a mixed-method approach and through rigorous development of our codebook as well as diligence in testing intercoder reliability, there could be some bias introduced during the connotative and ideological coding of the images. As the coders are familiar with the literature on the health risks posed by extreme heat, there is potential that their interpretation of the images may have overestimated the portrayal of heat, danger, and suffering. As members of the public viewing these same article images may have less knowledge or awareness of the risks, they may be less likely to attribute the visual as portraying a threat. Thus, these findings may overemphasize the interpretation of risk and should be considered accordingly.

We also recognize that while this study is the largest investigation to date to systematically review and analyze the images published within online news media articles on an EHE, it focuses solely on articles from mass-media outlets, associations, and agency press specifically within Canada. Thus, international, or social media-based sources were not explored. Therefore, although these findings are novel, for the first time present visual data from a Canadian EHE, the findings must be considered within the limits of the media types (tradi-

tional media versus social media) we analyzed. This is especially important based on previous work which has demonstrated differences between countries (O'Neill et al. 2022) and between media types, such as between traditional media sources and social media. Future work should continue to evolve our global understanding in this field and facilitate cross-country comparisons. Further, the EHE selected for this analysis is now recognized as the deadliest heatwave in Canadian history (Environment and Climate Change Canada 2022) and therefore was accompanied by more prominent media coverage, and subsequently more images than other EHEs. Therefore, the findings may overemphasize certain components that would not be as prominent in less historic heat events. For example, during the 2021 Heat Dome, Lytton, B.C. recorded the highest temperature ever recorded in Canada and subsequently was incinerated during a wildfire, which resulted in the inclusion of numerous images of the town's buildings being burnt that may not be a feature of a typical EHE.

Additionally, within the denotative content coding, only three demographic factors were considered (gender, age and population group), and therefore our analysis did not include other important components of heat vulnerability (e.g., living alone, housing type, health status, mobility). Future work should consider extending coding and relational analysis to capture additional features of heat vulnerability to further investigate the level of inclusivity of image selection related to heat protection. Similarly, as this analysis more broadly sought to characterize the imagery used as a whole, we did not conduct any relational analysis to interpret the findings based on factors like the context of the publishing agency (e.g., political orientation) or based on geography (e.g., news outlets from areas more strongly impacted by the EHE). Future investigations may consider incorporating these factors to determine what influence this may have on image selection.

Lastly, in our analysis we added a code to distinguish image source (e.g., staged stock images versus professional photos authentically depicting an event). Although we were able to descriptively report on the related findings, the study design did not extend to explicitly address the role of image sourcing on reader interpretation, and as such we were not able to speculate on this finding further. This highlights an important component for future consideration, especially in light of the challenges facing journalists (e.g., access to staff photographers) (O'Neill and Nicholson-Cole 2009), and evidence indicating that the use of image banks is becoming a more common source for the news media (Aiello et al. 2023). Future studies may consider exploring whether stock images that are crafted to demonstrate positive heat-mitigating strategies or adverse effects of heat are as influential as photographs of real people engaging in heat-mitigating behaviours or demonstrating human suffering.

5 Conclusion

O'Neill et al. (2022) recently asked “*Is ‘fun in the sun’ a visual trope used globally or is it limited to the global North?*” Our findings demonstrate that in addition to its dominance in Europe, the use of images that do not align with heat-protective messaging is largely present in Canadian news coverage. By analyzing the literal and implied contents of images published in digital news coverage of the 2021 Heat Dome, the deadliest heat event in Canadian history, this study not only provides support for existing work conducted globally but extends our understanding further by providing for the first-time insight into visual heat-communication in Canada. The findings demonstrate that there are potential opportunities to

improve the images selected for publication by the online news media during future EHEs. Consideration could be given for the timing and content of images to support heat-protective behavior, the use of captions to provide clarity for heat-mitigating actions, and the inclusion of heat-vulnerable people within the images selected. Recognizing that the independence of the media in a democratic society is a foundational premise, public health practitioners could collaborate with the media to help prepare evidence-based guidance on image selection. Thus, all stakeholders engaged in distributing heat preparedness messaging could modify the images of extreme heat in news coverage to align with evidence-based public health messages with the goal of strengthening public resilience and readiness to respond to heat.

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Declarations

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