A Proposal: Protecting Military Working Dogs from Lasting Effects of War-Induced Trauma and Internalized Stress

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Abstract: This article proposes that certain deleterious physical conditions Military Working Dogs develop while serving militaries are a result of the relationship between the stressful nature of their work, and their bodies' response to that stress, through their experienced trauma, internalized stress (high cortisol levels), and anxiety. Subsequently, this article proposes methods to ameliorate those deleterious physical conditions by improving Military Working Dogs' welfare during their military service.

Keywords: Military Working Dogs (MWDs); trauma; trauma-informed; gastropexy; Gastric Dilatation and Volvulus (GDV); military.

1 Introduction

> "The capability they (military working dogs) bring to the fight cannot be replicated by man or machine. By all measures of performance their yield outperforms any asset we have in our inventory. Our Army (and military) would be remiss if we failed to invest more in this incredibly valuable resource."
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> — General David H. Petraeus (United States)[1]

Military working dogs (MWDs) are an integral part of militaries' successes in war theaters. They execute missions that militaries deem too dangerous for humans, and they do so without vocalized complaint or rebellion. As a result, MWDs operate in environments that expose them to extensive trauma, which leads to their development of internalized stress and mental illness. Despite their following commands, MWDs are frequently afflicted with physical internal injuries throughout their military tenure.

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[1] ANDREW L. MCGRAW & TODD M. THOMAS, MILITARY WORKING DOGS: AN OVERVIEW OF VETERINARY CARE OF THESE FORMIDABLE ASSETS, *in* WORKING DOGS: AN UPDATE FOR VETERINARIANS 933 (Maureen McMichael & Melissa Singletary eds., 2021).

Militaries, particularly United States (US) militaries, have implemented some practices to decrease the rate of MWDs' experienced injuries and deleterious conditions, to improve MWDs' general welfare. However, the military life still leads to premature deaths and early retirement for MWDs. Despite militaries' appreciation for MWDs, militaries often perceive them as tools or resources they can use for human benefit. If militaries continue using MWDs, current care toward, and perspectives of, MWDs must change. MWDs' longevity requires militaries to work with animal behaviorists and scientists to develop innovative solutions that promote MWDs' health and welfare, and that protect them from psychological and physical injuries.

This article will review one particularly devasting injury for MWDs: Gastric dilatation and volvulus (GDV). When not immediately addressed, GDV leads to intense suffering, pain, and frequently, death. GDV is an internal condition that afflicts MWDs as well as dogs whom humans use in other stressful environments. Sadly, it is a condition for which veterinary and medical experts have not determined a definitive cause. This article will argue that GDV may be a physical manifestation of MWDs' internalized stress and anxiety that results from the trauma they experience in war theaters, but from which they do not have the ability or necessary resources to effectively cope and mentally recover. This article will address this discussion in four sections. Part II of this article will review MWDs' background; their development of GDV; the lack of viable replacements for MWDs that could protect them from welfare concerns military service pose; and precautionary strategies militaries incorporate into MWDs' lives to protect them from GDV. Part III will interrogate potential, underlying causes of GDV, specifically connecting trauma, internalized stress, and anxiety to the condition. Part IV will propose alternative solutions to militaries' current precautionary measures, to prevent GDV development. It will include research ideas that could improve MWDs' welfare and lived experiences while serving countries that may also prevent GDV. And, Part V will provide concluding thoughts and potential applications for this discussion.

Militaries from countries throughout the world use MWDs, but not all countries openly publish data on the subject. Additionally, many studies focus on GDV, gastropexy, and MWDs' causes of death, but these studies come from a variety of countries and eras. This article, therefore, strives to create a comprehensive picture of MWDs and their relationship to GDV that is based on available studies whose research foci overlap, but whose foci and sources are not always the same. This article will primarily present data and statistics from sources that studied US MWDs because the US has one of the largest militaries in the world (third in active military personnel at 1,390,000[2] and the highest military spending as of 2021[3]), and because most of the studies that were available used US military data. Some animal advocates who are concerned about the welfare of MWDs request data through public records requests to their respective countries, in an attempt to disclose information about MWDs.[4] Thus far, provided data is vague or incomplete.[5] However, as MWDs' welfare increases in priority, perhaps more complete data will become publicly available, and animal

[2] Statists Research Department, *Largest armies in the world by active military personnel 2022*, STATISTA (Jan. 12, 2023), https://www.statista.com/statistics/264443/the-worlds-largest-armies-based-on-active-force-level/#:~:text=In%202022%2C%20China%20had%20the,the%20top%20five%20largest%20armies.

[3] Niccolo Conte, *Ranked: Top 10 Countries by Military Spending*, VISUAL CAPITALIST (Aug. 18, 2022), https://www.visualcapitalist.com/ranked-top-10-countries-by-military-spending/.

[4] *See, e.g.*, Alex Noronha, public records requests for Brazil's military sects and law enforcements' use of MWD. On file with author.

[5] *Id.*

behaviorists, scientists, and advocates throughout the world will be able to shed light on issues regarding MWDs and propose innovative solutions to improve MWDs' well-being.

2 Background

2.1 General Information Regarding Military Working Dogs (MWDs)

Purpose. Military working dogs have several crucial responsibilities that protect their human compatriots. Indeed, militaries train MWDs to execute and operate in "some of the most stressful situations while in war and combat."[6] For instance, the US military's special forces train MWDs to become 'multi-purpose canines' (MPCs), to find explosives, identify and chase human targets, identify hidden threats, rappel from helicopters, parachute from airplanes, perform nautical operations, execute search and rescue missions, patrol protected areas, and assist in dangerous raids.[7] Through their work, militaries expose MWDs to extreme levels of heat and gunfire, and train MWDs to be aggressive on command.[8] This training and conditioning arguably desensitize MWDs to humans and dangerous situations. Since desensitization to dangerous situations and violence has shown to increase violent behavior and perpetuate emotional numbing in humans,[9] MWDs are likely experiencing the same negative emotional effects through their military training and fieldwork. Because of MWDs' "extraordinary sensory capabilities," they complete tasks humans cannot, which inclines some experts to anticipate militaries will increase their use of MWDs in coming years.[10]

Though MWDs' responsibilities are heroic, these tasks expose MWDs to intense levels of physical, mental, and emotional stress, which MWDs often respond to by developing trauma, and then developing Post-Traumatic Stress Disorder (PTSD).[11] For instance, one anecdote regarding the MWD Oreo, shows that Oreo likely developed PTSD as a result of his role in locating bombs and identifying explosive devises in Iraq.[12] Military (human) personnel frequently develop PTSD from their war experiences—the percentages of PTSD in military personnel vary by year, but were as high as twenty-nine percent at some point in a veteran's life from Operations Iraqi Freedom and Enduring Freedom[13]—which manifests as physical, emotional, and

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[6] Sarah Ohlms *This is why Navy SEALS and Delta Force take dogs on capture-kill missions against terrorist leaders*, INSIDER (Oct. 31, 2019), https://www.insider.com/how-us-military-trains-dogs-navy-seal-delta-force-missions-2019-10.

[7] *Id.*

[8] *Id.*

[9] Noni K. Gaylord-Harden et al., *Examining the Effects of Emotional and Cognitive Desensitization to Community Violence Exposure in Male Adolescents of Color*, 87 AM. J. ORTHOPSYCHIATRY 463, 466 (2017) (citing J. Garbarino et al., *What children can tell us about living in danger*, 46 AM. PSYCHOLOGIST 376-383 (1991)).

[10] Laura Miller et al., *Causes of Death in Military Working Dogs During Operation Iraqi Freedom and Operation Enduring Freedom, 2001-2013*,183 MIL. MED. e467, e467 (2018).

[11] Ohlms, *supra* note 7.

[12] Kyle Stock, *The Dogs of War Are in High Demand*, Aug. 28, 2017), https://www.bloomberg.com/news/features/2017-08-28/military-dogs-are-becoming-an-increasingly-precious-weapon.

[13] PTSD: National Center for PTSD, *How Common is PTSD in Veterans?*, U.S. DEP'T VETERAN AFF. (last updated Feb. 3, 2023), https://www.ptsd.va.gov/understand/common/common_veterans.asp#:~:text=At%20some%20point%20in%20their,of%20100%2C%20or%206%25).

psychological symptoms.[14] So too, do MWDs display symptoms of PTSD, which veterinarians, dog trainers, and dog specialists at Lackland Airforce Base (the US military training headquarters for MWDs) have confirmed.[15] These symptoms include MWDs becoming fearful of loud noises, increasing aggression, forgetting ways to complete tasks, and choosing—or not being able—to work and complete missions.[16]

Breeds and favored qualities. Countries use a variety of dog breeds as MWDs, however, they most commonly use German Shepherds, Belgian Malinois, Labradors, Terriers, and mixed breeds.[17] Militaries source puppies from MWD suppliers, and select candidates because of their physical abilities.[18] Once candidate dogs complete military training, militaries choose graduates who have excelled in their ability to execute targeted aggression, their speed and agility, and their ability to survive extreme heat.[19] Dogs' inherent traits enable them to fulfill these demanding expectations and to handle the physical, mental, and emotional rigors of military work. However, such vigorous requirements seem to be factors that would instigate mental, physical, and emotional stress within any dog over time, regardless of their natural capabilities. As seen with athletes and military personnel, sentient beings physically, mentally, and emotionally degenerate when they endure long periods of exposure to stress and exert high levels of physical performance.[20]

Countries that use MWDs. Countries that use MWDs include the US, Britain, the People's Republic of China (China), Russia, Ukraine, New Zealand, Iran, Israel, India, France, and Australia.[21] MWD data is not available for every country. Though some countries' data can provide insight into MWDs' presence in militaries. For instance, the US maintains approximately 1,500 to 2,500 MWDs in active service at any given time,[22] seven hundreds of whom the US military deploys to overseas missions.[23] For China, one source states the country employs ten thousand MWDs at any given time, in five thousand army divisions.[24] Lastly, public records requests to

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[14] *PTSD*, U.S. DEP'T VETERAN AFF. (last visited Mar. 20, 2023), https://www.maketheconnection.net/conditions/ptsd/; *Understanding and Dealing With Combat Stress and PTSD*, MIL. ONSOURCE (Mar. 4, 2022), https://www.militaryonesource.mil/military-basics/wounded-ill-injured-and-caregivers/understanding-and-dealing-with-combat-stress-and-ptsd/.

[15] Ohlms, *supra* note 7.

[16] *Id.*

[17] Rebecca Frankel, *War Dogs of the World*, FOREIGN POL'Y (Apr. 27, 2012), https://foreignpolicy.com/slideshow/war-dogs-of-the-world/ (depicting MWDs who work for various countries' militaries).

[18] Ohlms, *supra* note 7.

[19] *Id.*

[20] *See, e.g.*, Agorastos Agorastos et al., *Developmental Trajectories of Early Life Stress and Trauma: A Narrative Review on Neurobiological Aspects Beyond Stress System Dysregulation*, 10 FRONTIERS PSYCHIATRY 1, 2 (2019); KELLEY J. SLACK ET AL., CHAPTER 1: RISK OF BEHAVIORAL AND PSYCHIATRIC CONDITIONS, *in* HUMAN HEALTH AND PERFORMANCE RISKS OF SPACE EXPLORATION MISSIONS 11 (Jancy C. Mcphee & John B. Charles eds., 2009); *generally* Elissa S. Epel et al., *More than a feeling: A unified view of stress measurement for population science*, 49 FRONTIERS IN NEUROENDOCRINOLOGY 146-169 (2018) (all listed literature describing the detrimental effects of psychological and physical stress can have on humans, in various situations).

[21] Frankel, *supra* note 18.

[22] Kristin Houser, *Military dogs may soon sport AR goggles in enemy territory*, FREETHINK (Oct. 10, 2020), https://www.freethink.com/technology/military-dogs; Michael Lagutchik et al., *Trauma Management of Military Working Dogs*, 183 MIL. MED. 180, 180 (2018). These numbers may vary depending on the cited source and year.

[23] Lagutchik et al., *supra* note 23, at 180.

[24] *More than 10,000 Military Working Dogs Serve in Chinese Army*, CHINA TODAY—EXPLAINING CHINA TO THE WORLD (last visited Mar. 22, 2023), http://www.chinatoday.com.cn/ctenglish/se/txt/2011-12/30/content_417647.htm.

the Brazilian government indicate that the country's army, navy, and air force used 918 MWDs in one year, as of November 2022.[25] Those numbers likely flux, but may be representative of similarly positioned countries. Countries use MWDs in other branches of government besides war-focused militaries, including local and regional law enforcement, military police, and special operations units.[26] The private use of MWDs and non-military working dogs is also becoming more prevalent; some individuals are purchasing working dogs who receive near-MWD training for home security, and for private corporations.[27]

Cost and training. Expense data is not available for all countries, but the US spends between $40,000 to $283,000 to purchase and train one MWD.[28] Other countries' expenditures on MWDs' procurement and training may be similar. Dogs entering the US military spend approximately 120 days in training to become MWDs.[29] The US and other militaries may require additional training for specialized roles.

MWDs' career statistics. Militaries hope each MWD's tenure lasts eight to ten years, during which time they will complete dozens of missions and multiple deployments.[30] On average, militaries prematurely retire their MWDs when they reach 6.5 years because of physical injuries (i.e., excessive wound bleeding, collapsed lungs, and amputations) and developed illnesses.[31] Many MWDs do not reach militaries' planned retirement age because they die prematurely in the field.[32] However, some studies indicate MWDs *can* live to an average age of eight to ten years,[33] but they usually have developed an illness or serious injury. For instance, one New Zealand study found that forty percent of its MWDs reached the planned retirement age of eight years, but that GDV was a "significant cause of death".[34] Another study on US MWDs' deaths from 1993 to 1996 indicated that 76.3 percent of deaths or imposed euthanasia on these animals occurred because of "appendicular degenerative joint disease [(osteoarthritis, 19.2 percent)], neoplasia [(abnormal tissue growths that may likely be cancerous in cases that led to death[35], 18.3 percent)], spinal cord disease [(15.6 percent]), nonspecific geriatric decline [(old age, 14.1 percent)], gastric dilation-volvulus [(GDV, 9.1 percent, also the focus of this article])," and cardiac disease (3.7 percent).[36]

To compare military career ages at early retirement or death to ages of dogs in general populations, the average life spans for dog breeds militaries most frequently

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[25] Alex Noronha, public records request. On file with author.
[26] Lagutchik et al., *supra* note 23, at 180.
[27] Andrea Chang, *A $150,000 'executive protection dog'? Rich L.A. homeowners are snapping them up*, L.A. TIMES (Mar. 1, 2023), https://www.latimes.com/business/story/2023-03-01/protection-dogs-security.
[28] Ohlms, *supra* note 7; Stock, *supra* note 13.
[29] Stock, *supra* note 13.
[30] Ohlms, *supra* note 7; AJ Worth et al., *Causes of loss or retirement from active duty for New Zealand police German shepherd dogs*, 22 ANIMAL WELFARE 167, 167 (2013); Lagutchik et al., *supra* note 23, at 180.
[31] Ohlms, *supra* note 7; Worth et al., *supra* note 31, at 170.
[32] Worth et al., *supra* note 31, at 170; Stock, *supra* note 13.
[33] Miller et al., *supra* note 11, at e471 (citing George E Moore et al., *Causes of death or reasons for euthanasia in military working dogs: 927 cases (1993-1996)*, 219 J. AM. VETERINARY MED. ASS'N, 209-14 (2001)).
[34] Worth et al., *supra* note 31, at 172.
[35] *Neoplasm*, NAT'L CANCER INST. (last visited Mar. 20, 2023), https://www.cancer.gov/publications/dictionaries/cancer-terms/def/neoplasm.
[36] Moore et al., *supra* note 33, at 209-11.

use are: German Shepherd—nine to thirteen years[37]; Belgian Malinois—ten to fourteen years[38]; Labradors—ten to twelve years[39]; and Terriers (depending on the sub-breed)—eight to fifteen years[40].

Legal status. At least within the US, the country's federal government used to classify MWDs as 'equipment' with the same status as military weapons and transport vehicles.[41] A member of the US House of Representatives introduced a bill in 2012 that recognized MWDs as "canine members of the Armed Forces" and no longer classified MWDs as equipment.[42] This enacted legislation enables the US military to transport MWDs back to the US after deployment (rather than being euthanized[43] or abandoned in their country of deployment[44]); enables the US military to work with nonprofits to adopt retired MWDs to forever homes; provides retired MWDs with necessary veterinary care; and formally recognizes MWDs who died in action.[45] This legislative recognition of MWDs' sentience and welfare during retired life is noble, but it responds to MWDs' needs *after* their military service. The legislation does not respond to MWDs' welfare needs while they are enlisted. Therefore, legal status-wise, US militaries still effectively treat MWDs as inanimate equipment during service.

In the same vein, some animal advocates and academics have argued for international governing entities to change the legal status of animals used in war—such as MWDs—to anything more than their current legal status, which is one that does not exist.[46] Proposed "international legal and global norms" exist regarding MWDs' welfare because of their participation in international conflicts.[47] However,

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[37] *German Shepherd Lifespan: How Long Do German Shepherds Live?*, ANYTHING GERMAN SHEPHERD (last visited Mar. 22, 2023), https://www.anythinggermanshepherd.com/how-long-do-german-shepherds-live-and-ways-to-make-the-most-of-it/.

[38] Brittany Grenus, *Belgian Malinois*, PET MD (Nov. 7, 2022), https://www.petmd.com/dog/breeds/belgian-malinois.

[39] Vicki Adams et al., *Exceptional longevity and potential determinants of successful ageing in a cohort of 39 Labrador retrievers: results of a prospective longitudinal study*, 58 ACTA VETERINARIA SCANDINAVICA 1, 1 (2016) (showing in some studies Labradors can live as old as sixteen or seventeen years).

[40] Jamie Lovejoy, *How Long Do Dogs Live?*, PET MD (Jan. 3, 2023), https://www.petmd.com/dog/care/how-long-do-dogs-live (though some sources indicate terriers can live to be as old as eighteen or twenty-three years).

[41] Sarah D. Cruse, *Military Working Dogs: Classification and Treatment in the U.S. Armed Forces*, 21 ANIMAL L. REV. 249, 251 (2015) (citing 10 U.S.C. §§ 101-18506 (2012) *and* 10 U.S.C §§ 2576, 2583 (2012)).

[42] *H.R.4103 – Canine Members of the Armed Forces Act*, CONGRESS.GOV (last visited Mar. 20, 2023), https://www.congress.gov/bill/112th-congress/house-bill/4103?r=1 [hereinafter H.R.4103].

[43] Larisa Epatko, *Military Working Dogs: What Happens After They Serve?*, PBS (May 28, 2012), https://www.pbs.org/newshour/nation/military-working-dogs#:~:text=To%20find%20out%2C%20we%20spoke,dogs%20were%20euthanized%2C%20she%20said.

[44] Angelo Fichera, *What We Know About the Claims of Military Dogs Left in Kabul*, FACTCHECK.ORG (Sept. 21, 2021), https://www.factcheck.org/2021/09/what-we-know-about-the-claims-of-military-dogs-left-in-kabul/.

[45] *Canine Members of the Armed Forces Act*, ANIMAL WELFARE INST. (last visited Mar. 20, 2021), https://awionline.org/content/canine-members-armed-forces-act; H.R.4103, *supra* note 43. The Canine Members of the Armed Forces Act is now enacted in 10 U.S.C. § 2410r, 10 USC § 2583, and 10 U.S.C. § 994.

[46] Karsten Nowrot, *Animals at War: The Status of "Animal Soldiers" under International Humanitarian Law*, 40 HIST. SOC. RES. 128, 128 (2015).

[47] AM. BAR. ASS'N, REPORT TO THE HOUSE OF DELEGATES 104B 6 (2020), https://www.animallawconference.org/wp-content/uploads/2021/10/2020-ABA-MWD-104B.pdf. *See also* H. Golledge, *The welfare of dogs and cats involved in commercial practices: a review of legislation across EU countries*, 24 ANIMAL WELFARE 360, 360 (2023) (explaining that the European Union does have legislation that regulates the welfare of animals used in commercial practices, but has

international bodies of law have not yet officially provided MWDs with a legal status, let alone a legal status that recognizes MWDs' sentience.[48] Indeed, at the time of this article's writing, animals, generally, who work in military theaters have not received international legal recognition, despite collective societies' acknowledgement of their critical importance to countries' military efforts.[49] For these reasons, most—if not all—militaries are not legally required to improve the lives and welfare of MWDs. Rather, improvements for MWDs seem to come from evolving cultural perspectives that MWDs deserve better treatment and welfare standards than those they receive thus far.

MWDs' welfare and militaries' environmental effects on them. 'Animal welfare' is commonly considered a measure of the quality of an animal's lived experience that depends on an animal's well-being. However, some scientists who have researched animal welfare as it applies to MWDs understand the concept as an animal's "lived experience": As the "quality of life or how the animal is feeling," which is "informed by positive or negative experiences" that derive from their "nutrition, environment, physical health, [and] behavioral interactions."[50] Animal welfare scientists compare these variables with animals' mental states to determine the influence the variables have on animals' experiences.[51] Animal welfare needs are species-specific. However, all species exhibit behaviors that are beneficial or detrimental to their well-being when they are thriving or in deleterious situations, respectively. For instance, dogs who experience positive animal welfare, and who exhibit beneficial behavior (i.e., exhibiting contentedness and being calm), have the ability to play and interact with other dogs, rest when they desire, eat when they desire, and receive mental and social stimulation.[52]

Dogs who do not have exposure to appropriate amounts of animal welfare-measured variables exhibit deleterious, stereotypic behaviors—"a repetitive, invariant behavior pattern with no obvious goal or function"[53]—including "circling, pacing, whirling, jumping, wall bouncing, repetitive grooming or self-biting, polydipsia [(excessive drinking)] or polyphagia [(excessive eating)], compulsive staring" and excessive barking.[54] Stereotypic behaviors increase animals' propensity to become injured or to become prone to disease.[55] A day in the life of MWDs demonstrates a much more restrictive life—with limitations on important animal welfare variables—than the type of life many dogs who serve as companion animals experience. These

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enacted less legislation regulating the welfare of dogs as companion animals, because disparities would arise between EU member states if such legislation was enforced. Concern for similar disparities may arise with the EU enacting a legal status for dogs, even MWDs.).

[48] Marco Roscini, *Animals and the Law of Armed Conflict*, 47 ISR. Y.B. 35, 38 (2017). Because international governing bodies have not drafted or enacted legislation regarding MWDs, citable legislation does not exist to prove this argument. Rather, academic articles discussing this issue are the most available citable source.

[49] Frankel, *supra* note 18.

[50] Mia L. Cobb et al., *The Animal Welfare Science of Working Dogs: Current Perspectives on Recent Advances and Future Directions*, 8 FRONTIERS VETERINARY SCI. 1, 2 (2021).

[51] *Id.*

[52] *Welfare of dogs: normal behavior patterns*, NIDIRECT:GOV'T SERVS. (last visited Mar. 20, 2023), https://www.nidirect.gov.uk/articles/welfare-dogs-normal-behaviour-patterns.

[53] Nora Philbin, *Towards an Understanding of Stereotypic Behaviour in Laboratory Macaques*, ANIMAL WELFARE INST. (last visited Mar. 20, 2023), https://awionline.org/content/towards-understanding-stereotypic-behaviour-laboratory-macaques#:~:text=What%20is%20stereotypic%20behaviour%3F,no%20obvious%20goal%20or%20function.

[54] Mark J. Prescott et al., *Refining dog husbandry and care*, 38 LABORATORY ANIMALS 1, 25 (2004).

[55] *Id.* at 25.

restrictions may decrease MWDs' general welfare. For instance, military personnel muzzle MWDs whenever personnel handle them.[56] Police dogs in New Zealand only receive food once a day for "logistical reasons," and do not have guaranteed rest periods because they are on call for emergencies.[57]

In 2014, to improve MWDs' welfare, the US military implemented the use of kennels that are temperature-controlled and that provide dogs space to go outside and to exercise.[58] However, depending on combat and deployment conditions, such kennels are not always available.[59] Instead, militaries use Vari Kennels, which are portable, open-air kennels, that have limited space and are kept within troops' barracks to protect dogs from extreme temperatures.[60] These kennels prevent dogs' free range of movement, keep them isolated from each other, and prevent them from executing species-specific behaviors, creating environments that are deleterious to dogs' behavioral and mental cognition since they are pack animals who require social interactions.[61] Through forced isolation and confinement in small areas, MWDs may develop stereotypic behaviors, which increase internalized stress and anxiety in dogs, and arguably, may exacerbate reactions to experienced trauma that promote dogs' development of mental illnesses. To compare, examples of external factors that cause stereotypic behaviors in laboratory animals include limited space in a contained area, stressful environments, isolated housing, and the absence of environmental stimulation.[62] The conditions in which laboratory animals and kenneled MWDs live seem very similar.

When MWDs are on missions, they have virtually no control over the tasks that are asked of them, nor do they have the ability to consent or refuse to perform, which can induce emotional and physical discomfort, and instigate unhealthy levels of internalized stress.[63] In other words, the environments within which MWDs work cause several mental and physical injuries which often lead to the development of degenerative disorders, preemptive surgeries, hospitalizations that involve rehabilitation and/or surgery (i.e., appendage amputations), early retirement, or premature death.[64] These environments and welfare conditions, compounded with the stress and traumatic experiences MWDs endure on missions, create a perfect formula for MWDs to develop trauma-related mental illnesses, including anxiety and PTSD.[65]

From military personnels' perspectives, militaries treat MWDs "like gold."[66] However, anecdotal evidence suggests that like gold, militaries consider MWDs to be highly beneficial tools, equipment, or expendable resources—"assets" that need to "last" the military "at least eight or nine years."[67] These references toward MWDs may indicate respect for the advantages MWDs provide militaries. But, such references do not indicate a recognition and appreciation for MWDs' existence as sentient creatures

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[56] Lagutchik et al., *supra* note 23, at 180.
[57] Worth et al., *supra* note 31, at 172.
[58] Audra Calloway, *New deployable kennels for military working dogs mitigate temperature extremes*, JOINT BASE LANGLEY-EUSTIS (Apr. 21, 2014), https://www.jble.af.mil/News/Article-Display/Article/844147/new-deployable-kennels-for-military-working-dogs-mitigate-temperature-extremes/.
[59] *Id.*
[60] *Id.*
[61] Prescott et al., *supra* note 55, at 25-26.
[62] Philbin, *supra* note 54; Prescott et al., *supra* note 55, at 25-26.
[63] Cobb et al., *supra* note 51, at 3.
[64] Ohlms, *supra* note 7.
[65] *Id.*
[66] Stock, *supra* note 13.
[67] *Id.*

who require cognitive, emotional, and physical well-being to survive their missions, let alone thrive. Furthermore, though nonprofits started by former military personnel work to rehabilitate retired MWDs so they can find homes after their service,[68] these rehabilitation efforts occur after MWDs have undergone military-induced trauma, internalized stress, and injury. The key for promoting MWDs' well-being is for militaries to facilitate environments for MWDs that improve their welfare *during* their tenure, which could help them execute their missions while simultaneously experiencing mental, emotional, and physical stability.

2.2 Robot Dogs as an Alternative to Avoid Issues Surrounding MWD Welfare, but Fail to Fulfill MWDs' Roles and Abilities

MWDs are invaluable to militaries: They complete jobs militaries do not assign or cannot assign to humans. The prospect of militaries choosing to stop using MWDs in the near future seems unlikely. Though some MWD welfare advocates with whom this article's author has spoken to have expressed hope that robot dogs could replace MWDs because of the welfare issues that surround MWDs' experiences in the military theatre, robot dogs are not the solution that will fulfill that desire.

The 'Vision 60' by Ghost Robotics, which militaries commonly refer to as 'robot dogs,' are machines Ghost Robotics designed to execute "remote inspection, [i]ntelligence, [s]urveillance, [r]econnaissance (ISR) missions, mapping, distribute[] communications, and [ensure] continual security."[69] However, robot dogs do not currently have the ability to replace MWDs and pose ethical concerns. Robot dogs have the capacity to patrol territories and scout new areas (i.e., battlefields and bodies of water) to protect military and law enforcement personnel from unknown dangers (i.e., landmines or disasters); to investigate objects of interest; and to carry sensors.[70] Militaries use robot dogs to "patrol areas that 'aren't desirable for human beings and vehicles,"'[71] which "free people up to handle other tasks that robots can't do."[72] US militaries use these robots frequently, yet, information regarding their available technologies is not widely publicized, given their classified role.[73]

These machines may mimic dogs' skeletal structure, but they do not function like MWDs, though Ghost Robotics has stated such aspirations. Robot dogs exist "strictly for bomb disposal, scoping out perimeters, and identifying threats."[74] They are not meant to fill the same roles that MWDs do. Indeed, their developers consider them "quadruped unmanned ground vehicle[s]" and even avoid referring to them as

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[68] *Id.*

[69] Tom Fish, *US Air Force: 'Unstoppable' Army trials AI robot dogs to defend bases –'Next-gen warfare'*, EXPRESS (Sept. 10, 2020, updated 7:14 AM), https://www.express.co.uk/news/science/1333295/us-air-force-robot-dogs-army-defend-military-bases; Joseph Trevithick, *Military 'Robot Dogs' Can Now Be Equipped To Swim (Updated)*, WARZONE (Jun 13, 2022, 5:42 PM), https://www.thedrive.com/the-war-zone/robot-dogs-can-swim-now.

[70] Fish, *supra* note 70; Trevithick, *supra* note 70; Gino Spocchia, *Company behind robot-dogs headed to US-Mexico border insists they cannot malfunction*, INDEPENDENT (Feb. 21, 2022, 4:44 PM), https://www.independent.co.uk/news/world/americas/robot-dogs-us-mexico-border-b2019706.html.

[71] Brett Tingley, *Here is What the Air Force's New Robot Dogs Are Actually Capable Of*, WARZONE (Dec. 15, 2020), https://www.thedrive.com/the-war-zone/38000/here-is-what-the-air-forces-new-robot-dogs-are-actually-capable-of.

[72] Kristin Houser, *Robot dogs are being deployed at a US military base*, FREETHINK (Dec. 13, 2020), https://www.freethink.com/technology/robot-dogs.

[73] Fish, *supra* note 70.

[74] Houser, *supra* note 73.

dogs.[75] Robot dogs cannot sniff out drugs, bombs, or landmines, and they cannot perform rescue missions. They cannot see without a person remotely watching through them; they are equipment operated by humans from a distance.[76] Also, robot dogs were not designed to interact with humans.[77] These machines collect data and are extensions of military personnel,[78] rather than being critically thinking, independent, non-human soldiers.

Robot dogs present serious ethical considerations, particularly regarding whether using them with limited artificial intelligence against humans is appropriate. Because these robots can carry equipment, militaries could attach small firearms or munitions to them, which would allow militaries to remotely use weapons in areas that are difficult to access, with precision.[79] This scenario is concerning, particularly since the US is considering using this technology to patrol and surveil controversy-ridden areas like the US-Mexico border.[80] Though such technology may seem logical in war theaters, using this technology on unarmed humans anywhere in the world to advance one nation's military goals verges on surpassing the threshold of ethical warfare.[81] MWDs are certainly trained to cause harm to and control people, which presents ethical considerations as well. But, MWDs are living, sentient beings that understand human stress, experience empathy, and can choose not to act. In contrast, robot dogs operate under the complete direction and discretion of humans who are not physically present to critically assess situations. And, for this reason, using robot dogs as tools to potentially control other human beings is problematic. Though one Ghost Robotics consultant believes robot dogs will replace MWDs in the field because they are supposedly less expensive than purchasing, training, and maintaining MWDs,[82] robot dogs' and MWDs' capabilities and surrounding ethical considerations suggest otherwise.

To note, scientists from Florida Atlantic University's Machine Perception and Cognitive Robotics Laboratory developed another robot dog of sorts, named 'Astro', which they built for "military applications" and to "serve as a scout."[83] Though scientists equipped Astro with "over a dozen sensors including optical, auditory, olfactory, gas, and radar," artificial intelligence capabilities, and its "key missions include detecting guns, explosives and gun residue to assist police, the military, and security personnel," information about this robot's integration into militaries does not seem to exist after 2019.[84] Furthermore, despite the additional sensory technology, such equipment presents the same ethical considerations as the Vision 60.

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[75] James Wharton, *Watch: Is this robot the future for military dog handlers?*, FORCES (Sept. 16, 2021, 4:30 PM), https://www.forces.net/technology/watch-robot-future-military-dog-handlers.
[76] Spocchia, *supra* note 71.
[77] *Id.*
[78] Fish, *supra* note 70.
[79] Tingley, *supra* note 72.
[80] Catherine E. Shoichet, *Robot dogs could patrol the US-Mexico*, CNN (Feb. 19, 2022), *border*https://www.cnn.com/2022/02/19/us/robot-dogs-us-mexico-border-patrol-cec/index.html#:~:text=The%20photos%20look%20like%20a,how%20it's%20testing%20the%20technology.
[81] The discussion of whether warfare is inherently unethical is a conversation for a different article.
[82] Wharton, *supra* note 76.
[83] Kea Grace, *Astro the Robot Dog Could Replace All Kinds of Working Dogs*, ANYTHING PAWSABLE (Dec. 7, 2019), https://anythingpawsable.com/astro-robot-dog-sar-police-military-assistance/.
[84] *Id.*

2.3 Gastric Dilatation and Volvulus (GDV)

2.3.1 GDV's Development

GDV is a "life-threatening condition" that occurs in 3.9 to 36.7 percent—recorded through hospital admissions—of general dog populations.[85] The condition occurs suddenly, starting with gas building pressure within a dog's stomach, which is then followed by the dog's stomach dilating, and then rotating or twisting.[86] The combined gastric pressure, stomach dilatation, and stomach rotation compress the dog's abdominal vessels.[87] Consequently, blood cannot reach the dog's stomach or digestive organs, which prevents food digestion and causes stomach distention, which then prevents circulating blood to pump to the dog's heart.[88] This process deprives the dog's tissues from blood and oxygen, and as the tissues die, they release toxins into the dog's bloodstream, which causes "impaired cardiac output" (heart arrhythmia or heart rhythm disturbances).[89] Within four hours, a dog suffering from GDV will go into shock and will require emergency corrective surgery (gastropexy[90]), at which point a veterinarian will sew the stomach to the internal lining of the dog's abdominal wall.[91]

2.3.2 Causes

Scientists and veterinarians have not definitively identified the root causes of GDV development; studies and results from GDV research do not provide clear answers. Rather, experts theorize on suspected causes, which include: A dog's breed and size (as of one 2020 study, specifically, large breeds—"great danes, Akitas, Saint Bernards, Dogue de Bordeaux, Gordon setters, Irish setters, standard poodle, basset hound, Doberman pinscher, old English sheepdog and Weimaraners"—because these breeds experience the highest rates of GDV in general populations[92]); physical shape (a deep chest that may allow the stomach to rotate[93]); birth sex and neutering status; diet, including ingesting fermentable foods that cause abnormal amounts of gas[94] or being fed dry kibble[95]; eating patterns, including consuming food quickly or overeating; drinking patterns, including high levels of water consumption; older age (seven-year-old dogs tend to develop GDV at twice the rate as two to four-year-old dogs); physical activity patterns (exercising after eating); increased body weight as well as lean body weights; stomach-related illnesses; genetic predispositions through family histories and "immune-derived issues"; residence in certain countries; birth dates in the 1990s; seasons (winter versus summer, fall, or spring); atmospheric pressure and pressure

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[85] Ignazio S. Piras et al., *Identification of Genetic Susceptibility Factors Associated with Canine Gastric Dilatation-Volvulus*, 11 GENES 1313, 1313 (2020). Percentages may differ slightly between studies.
[86] *Id.* at 1; *Bloat and the Risk Factors*, CANADIAN KENNEL CLUB (June 7, 2022), https://www.ckc.ca/en/The-Dish/June-2022/Bloat-and-the-Risk-Factors.
[87] Piras et al., *supra* note 86, at 1313.
[88] *Id.*; CANADIAN KENNEL CLUB, *supra* note 87.
[89] Piras et al., *supra* note 86, at 1313; CANADIAN KENNEL CLUB, *supra* note 87.
[90] *Infra* Section II(c)(iv).
[91] Piras et al., *supra* note 86, at 1313.
[92] *Id.* at 1314; I. Uhrikova et al., *Risk factors for gastric dilatation and volvulus in central Europe: an internet survey*, 60 VETERINARNI MED. 578, 578 (2015) (quoting a list of breeds from a 1994 study that included German Shepherds because the breed is large).
[93] Piras et al., *supra* note 86, at 1313; CANADIAN KENNEL CLUB, *supra* note 87.
[94] *Bloat*, KENNEL CLUB (last visited Mar. 20, 2023), https://www.thekennelclub.org.uk/health-and-dog-care/health/health-and-care/a-z-of-health-and-care-issues/bloat/.
[95] Marko Pipan et al., *An Internet-based survey of risk factors for surgical gastric dilatation-volvulus in dogs*, 240 J. AM. VETERINARY MEDICAL ASS'N 1456, 1456 (2012).

changes; daily temperatures; living as a companion animal; spending at least five hours a day with a human guardian; being cared for by a person who is not the dog's guardian; being kept outside all day; kenneling; riding in a car; temperament (excitability or fearfulness propensities); "visiting, travelling, and changing location"; and most consistently noted—anxiety, which would include aggression towards people, and "fearfulness or agitation in response to strangers or environmental changes."[96] Many of these factors describe dogs' traits or habits generally, rather than identifying peculiar variables that could cause GDV. Furthermore, every available study includes a slightly different list of suspected variables. Indeed, many researchers and dog specialists openly admit they do not understand the reasons GDV occurs.[97] To note, some of these behaviors and habits align with stress-induced stereotypic behaviors mentioned in the previous section: Pacing, whirling, jumping, wall bouncing (exercising at the wrong time), excessive drinking, and excessive eating.

Anxiety is the only suspected mental health-related cause of GDV, and it is the most consistently suspected cause listed in available studies.[98] In contrast, research shows that calmer dogs—less anxiety—have decreased rates of GDV compared to dogs who experience frequent stress and anxiety-ridden situations.[99] One speculation is that dogs—and most animals generally—tend to swallow a lot of air when they are anxious, a behavior that dogs who are stressed and held in kennels often exhibit.[100] This air intake balloons the stomach, which then alters the organ layout within a dog's abdomen.[101] This speculation underscores the way that mental health and physical behaviors can interact to cause physical injury: The dog's internalized stress and anxiety are the initial reason they swallow air, which then causes the stomach to develop GDV. Arguably, the hypothesized reasons listed in the previous paragraph that cause GDV could also be variables that cause internalized stress and anxiety, depending on the dog's base temperament. Being a dog—being a living, sentient being—is stressful and anxiety-ridden. Perhaps all and none of the proposed causes induce GDV. Rather, GDV's development is unique to every dog's lived experience and whether that experience causes the dog stress that they are not able to manage without developing a physical condition in response. To further illustrate the connection between stress, anxiety, and GDV development, GDV is not only a frequent condition among MWDs, it is a frequent condition among dog populations whom humans use to perform tasks in other stressful environments, including law enforcement initiatives (policing), search and rescue missions, and hunting expeditions.[102]

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[96] Piras et al., *supra* note 86, at 1314; Pipan et al., *supra* note 96, at 1456 (this study noted that the following factors showed a decreased risk for dogs developing GDV: "playing with other dogs and running the fence after meals, fish and egg dietary supplements, and spending equal time indoors and outdoors"); Michael Levine & George Moore, *A time series model of the occurrence of gastric dilatation-volvulus in a population of dogs*, 5 BMV VETERINARY RES. 1, 1 (2009); CANADIAN KENNEL CLUB, *supra* note 87; Uhrikova et al., *supra* note 93, at 578-79; CLARENCE A. RAWLINGS, INCISIONAL GASTROPEXY TO PREVENT AND TREAT CANINE GASTRIC DILATATION-VOLVULUS, *in* COMPENDIUM: CONTINUING EDUCATION FOR VETERINARIANS E1(2013).

[97] KENNEL CLUB, *supra* note 95; Levine & Moore, *supra* note 97, at 1; Pipan et al., *supra* note 96, at 1456.

[98] Ohlms, *supra* note 7.

[99] CANADIAN KENNEL CLUB, *supra* note 87.

[100] KENNEL CLUB, *supra* note 95.

[101] *Id.*

[102] Katherine E. Jones et al., *generally* Worth et al., *supra* note 31; *Search-and-rescue dogs: an overview for veterinarians*, 225 J. AM. VETERINARY MEDICAL ASS'N 854, 858 (2004); Nancy Anisfield, *Canine Concerns: Hunting Dogs Face Risks Most House Pets will Never Encounter*, COVEY RISE (Feb. 12, 2021), https://coveyrisemagazine.com/canine-concerns-hunting-dogs-face-risks-most-house-pets-will-never-encounter/.

The lack of definitive causes, the fact that anxiety is the most consistent factor on experts' list of suspected causes of GDV, and the fact that dogs in traumatic environments experience high levels of stress and in turn, exhibit high levels of anxiety, lead to the following hypothesis regarding a major cause of GDV: MWDs, and dogs in general populations who experience traumatic situations that induce high levels of internalized stress, experience higher rates of anxiety, mental illnesses, and GDV than dogs who live in calm environments. Therefore, GDV may actually be a manifested physical reaction to the trauma and subsequent internalized stress such dogs experience. Just as MWDs develop PTSD from their work as a psychological symptom—or coping mechanism—to trauma, GDV may be a physical coping mechanism to their military work. GDV may occur because MWDs do not have access to resources that can help them recover from trauma and calm their internalized stress and anxiety. If MWDs, and other dogs who experience high levels of stress, have the ability to utilize healthy coping mechanisms rather than internalize stress because of exposure to traumatic experiences, these dogs' rates of GDV may decrease and their lived experiences and welfare may improve. Upcoming sections in this article will further explore this hypothesis. The following subsection on GDV statistics will also illustrate this hypothesis by showing the stark contrast of GDV's presence in MWD populations versus general dog populations.

2.3.3 Statistics (Based on Available Studies)

General statistics. Depending on the study, GDV develops in 3.9 to 36.7 percent of dogs[103]; or 0.3–1.2 percent of general dog populations,[104] twenty-four percent of large breed dogs,[105] and 21.6 percent of giant breed dogs[106]. Dogs who experience GDV, but who do not receive immediate corrective surgery have an eighty percent chance of GDV recurring, and have an average survival rate of six months.[107] Some studies show that dogs who develop GDV and receive surgical treatment experience a mortality rate of sixteen, eighteen, and twenty-four percent,[108] or as one study showed, a survival rate of eighty-five percent.[109] Data indicates that five to six percent of dogs with GDV will experience its recurrence after surgery.[110] And, veterinarians euthanize, or see pass away, ten to forty-four percent of dogs with GDV who need emergency intervention.[111] Great Danes experience the highest rates of developing GDV at 42.4 percent.[112] Given the high mortality rate of dogs who experience GDV, including those who receive emergency care, prophylactic surgical solutions to prevent GDV from occurring initially seem like a logical approach to ensuring the health and well-being of at-risk dogs.

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[103] Piras et al., *supra* note 86, at 1313.
[104] Uhrikova et al, *supra* note 93, at 578.
[105] CANADIAN KENNEL CLUB, *supra* note 87.
[106] *Id.*
[107] Piras et al., *supra* note 86, at 1313.
[108] RAWLINGS et al., *supra* note 97, at E1 (rates may differ slightly between studies).
[109] Michael P. Ward et al., *Benefits of prophylactic gastropexy for dogs at risk of gastric dilatation-volvulus*, 60 PREVENTIVE VETERINARY MED. 319, 319 (2003).
[110] CANADIAN KENNEL CLUB, *supra* note 87; Piras et al., *supra* note 86, at 1313; RAWLINGS, *supra* note 97, at E1; Uhrikova et al., *supra* note 93, at 578.
[111] Piras et al., *supra* note 86, at 1313.
[112] CANADIAN KENNEL CLUB, *supra* note 87.

Military Working Dog statistics. The US Airforce reported that GDV is MWDs' second leading cause of death behind cancer.[113] Indeed, one study that reviewed data from 2001 to 2013,[114] found "diseases" (conditions) were the second most common cause of death in working dogs at twenty-three percent.[115] Of those conditions, the most common one was GDV, which affected one in eleven MWDs.[116] This study aligns with an earlier study that was conducted on data from 1993 to 1996, that showed MWDs' most common reason for euthanasia or death derived from GDV.[117] Though Brazil's records regarding MWDs do not seem consistent or complete, (several dogs' deaths were "unknown"), Brazil's militaries attributed GDV as a cause of death for its MWDs at a rate of 9.5 to 11.11 percent from 2017 through 2021.[118]

Once US militaries required veterinarians to perform prophylactic surgery on all MWDs beginning in 2009/2010, the rate at which MWDs developed GDV decreased to twenty-three percent.[119] Some experts suspect German Shepherds as working dogs have a predisposition for developing GDV.[120] However, this data seems skewed because militaries primarily use German Shepherds as MWDs[121]; militaries do not have GDV data for other breeds—that experts believe have a high risk of developing GDV in general dog populations—to compare their German Shepherd data to. Furthermore, German Shepherds are not on cited lists of breeds in general populations that experts believe GDV commonly afflicts.[122] In fact, data regarding German Shepherds' genetic predisposition for developing GDV "did not yield any significant results."[123] Therefore, German Shepherds' development of GDV seems influenced by external environmental factors, rather than any genetic predispositions.

2.3.4 Surgical Solutions for GDV

Many human guardians of dogs—whose breeds are considered at risk for suffering from GDV—choose to pursue prophylactic gastropexy to prevent GDV development. Before GDV has the opportunity to develop, veterinarians surgically tack or sew the

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[113] Raymond Hoy, *Incirlik defender receives preventive surgery*, U.S. AIR FORCES IN EUROPE & AIR FORCES AFRICA (Aug. 31, 2009), https://www.usafe.af.mil/News/Article-Display/Article/255051/incirlik-defender-receives-preventive-surgery/ (the sourced article does not list the cited studies).

[114] The study's authors recognize this data includes MWDs who started receiving prophylactic gastropexy, which may have skewed its data analysis and underrepresented the prevalence of GDV in MWDs before such surgery became mandatory. The authors recognize the rate at which MWDs experienced GDV may have decreased after 2010. Miller et al., *supra* note 11, at e471.

[115] *Id.* at e467; One study found the rate at which MWDs experience GDV is ten percent. Robert Vogelsang, *Care of the Military Working Dog by Medical Providers*, 7 J. SPECIAL OPERATIONS MED. 33, 39 (2007). The study's authors recognize this data includes MWDs who started receiving prophylactic gastropexy, which may have skewed its data analysis and underrepresented the prevalence of GDV in MWDs before such surgery became mandatory.

[116] Miller et al., *supra* note 11, at e471.

[117] *Id.* at e468.

[118] Alex Noronha, records on file with author. If "unknown" causes of death are included in these calculations, the rates of GDV could increase to as high as 15.78 to 30.76 percent from 2017 through 2021.

[119] Lagutchik et al., *supra* note 23, at 186.

[120] *See, e.g.*, Kate Hill, *Gastric Dilatation And Volvulus In Working Dogs*, SMALL ANIMAL VETERINARY ASS'N (2013), https://www.vin.com/apputil/content/defaultadv1.aspx?pId=11372&catId=35321&id=5709943 (explaining German Shepherds' large size and deep chests make them vulnerable to GDV).

[121] Ohlms, *supra* note 7.

[122] Piras et al., *supra* note 86, at 1314.

[123] *Id.* at 1325.

stomach permanently to the side of the body's internal wall, which prevents the stomach from twisting.[124] Veterinarians can perform this surgery as an open surgery, (cutting open a dog's skin through a large incision to access the stomach), or through a laparoscopic procedure, (multiple tiny incisions to access a dog's stomach).[125] Recovery from prophylactic surgery can require two to three days, but may take multiple weeks, particularly if the dog undergoes open surgery.[126] Though prophylactic surgery decreases the risk of GDV, it presents ethical considerations for veterinarians who, by performing the surgery, might mask underlying causes that instigate GDV and other conditions.[127]

Gastropexy can increase the rate of conditions that are painful and dangerous, and that injure other internal organs, such as mesenteric volvulus and vessel dilatation.[128] Mesenteric volvulus is a condition in which a dog's large intestine experiences similar symptoms a stomach experiences during GDV[129]: The large intestine will suffer from sudden gastric pressure, dilate, and then rotate, which causes "abdominal distension, pain, vomiting, constipation, and bloody stools" as well as fever and the cutoff of blood circulation.[130] The fact that the large intestine experiences the same symptoms the stomach would experience if it was not tacked to the abdominal lining is a strong indication that gastropexy is a metaphorical band aid to prevent GDV. Gastropexy may prevent physical symptoms from manifesting in a dog, but it does not address the root causes of GDV. Otherwise, the large intestine would not suffer the same fate. And, unfortunately, mesenteric volvulus is not an uncommon condition MWDs experience. One study found that MWDs who undergo prophylactic gastropexy, or other abdominal surgery, have a higher risk of developing mesenteric volvulus as a postoperative complication, compared to dogs who do not undergo such surgeries.[131] The study also suggests German Shepherds have a higher propensity for developing mesenteric volvulus.[132] As mentioned in the previous section, perhaps the correlation between German Shepherds as a breed having a propensity to develop mesenteric volvulus exists because the majority of MWDs are German Shepherds who undergo prophylactic gastropexy, rather than the breed being genetically prone to such a condition. Though US military-purchased dogs receive prophylactic surgery, dogs

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[124] Malcom Weir & Catherine Barnette, *Gastropexy*, VCA ANIMAL HOSPS. (last visited Mar. 20, 2023), https://vcahospitals.com/know-your-pet/gastropexy.

[125] *Gastropexy, Elective*, DALLAS VETERINARY SURGICAL CTR. (last visited Mar. 20, 2023), https://dvsc.com/medical_library/elective-gastropexy/; *Preventing Torsion When Bloating with Prophylactic Gastropexy*, AM. KENNEL CLUB CANINE HEALTH FOUND. (Sept. 26, 2011), https://www.akcchf.org/canine-health/your-dogs-health/caring-for-your-dog/prophylactic-gastropexy.html (these surgeries include belt-loop gastropexy and circumcostal gastropexy).

[126] D.J. Brockman, *A Protocol for Management of Acute Gastric Dilation-Volvulus Syndrome in the Dog*, WORLD SMALL VETERINARY ANIMAL ASS'N (2007), https://www.vin.com/apputil/content/defaultadv1.aspx?id=3860693&pid=11242&print=1#:~:text=Intensive%20post%2Doperative%20care%20is,and%20may%20be%20life%20threatening; *Gastric Volvulus and Dilatation*, ANIMAL SURGICAL CTR. MICH. (last visited Mar. 20, 2023), https://www.animalsurgicalcenter.com/gastric-volvulus-and-dilatation.

[127] Ward et al., *supra* note 110, at 319.

[128] RAWLINGS, *supra* note 97, at E1; Piras et al., *supra* note 86, at 1313.

[129] Carol K. Le et al., *Volvulus*, in *StatPearls [Internet]*, NAT'L LIBR. MED. (last updated Sept. 12, 2022), https://www.ncbi.nlm.nih.gov/books/NBK441836/#:~:text=Introduction-,Volvulus%20occurs%20when%20a%20loop%20of%20intestine%20twists%20around%20itself,may%20be%20insidious%20or%20sudden.

[130] *Id.*

[131] Shane J. Andrews et al., *Investigation of potential risk factors for mesenteric volvulus in military working dogs*, 253 J. Am. Veterinary Medical Ass'n 877, 877 (2018).

[132] *Id.*

whom militaries contract from private companies do not consistently receive preemptive surgery and so, they still experience GDV.[133]

Prophylactic surgery prevents the loss of significant financial investments to purchase, raise, and train MWDs. But, performing prophylactic surgery does not take into account the mental and physical trauma dogs may experience by undergoing surgery, including "stress-induced activation of the sympathetic nervous system, hemodynamic compromise, hyperinflammation, coagulopathy, immune dysfunction, metabolic imbalances and hypothermia."[134] Though MWDs experience significant levels of psychological, emotional, and physical trauma through their work in military theaters and from developing GDV—which likely far outweigh the amount of trauma a preemptive surgery induces—recognizing that any type of physically invasive operation induces trauma with short- and long-term effects is critical. For this reason, if humans choose to use dogs to perform tasks humans do not want to do, cannot do, or consider too dangerous for themselves,[135] humans should recognize their responsibility in diminishing the amount of potential pain, suffering, and trauma they force dogs (and other sentient beings) to endure. Therefore, if any type of surgery induces some level of pain, suffering, or trauma, humans have the responsibility to investigate alternative treatment that 1) prevents dogs from experiencing conditions preemptive surgeries prevent, and 2) diminishes dogs' experienced pain, suffering, and trauma during their work in the military, including preparation for service.

3 Analysis: Unexplored Reasons GDV Occurs in MWDs and Addressing Interconnected Symptoms of Trauma and Internalized Stress

Many scientists and animal advocates recognize the need to improve MWDs' quality of life, field performance, and military programs during their service. For this reason, in the past ten years, some scientists and advocates have invested in research to better understand "working dog genetics, rearing, training, and functional performance."[136] Yet, studies that explore root causes of GDV are rare.[137] Preventing GDV from occurring through prophylactic surgery, without understanding the underlying causes of GDV development, seems insufficient in improving MWDs' general well-being. Prophylactic surgery requires myriad dogs to undergo (sometimes invasive) surgery, but it does not protect dogs from the potential psychological pain and suffering that causes GDV, if the argument that GDV results from trauma and subsequent internalized stress and anxiety is correct. This point is illustrated by MWDs' development of mesenteric volvulus after receiving prophylactic surgery, and on a grander scale, by considering the rates of mental illnesses MWDs develop while serving militaries. The following section will return to this article's hypothesis—that GDV is actually a physical manifestation of MWDs' experienced trauma and internalized stress. It will describe and connect symptoms of unmanaged trauma and

[133] Miller et al., *supra* note 11, at e472.
[134] Geoffrey P. Dobson, *Trauma of major surgery: A global problem that is not going away*, 81 INT'L J. SURGERY 47, 49 (2020).
[135] The argument to this reasoning is whether humans should feel morally exculpated for forcing dogs and other animals to perform jobs when humans will not perform the jobs themselves for fear of *their* loss of life and limb.
[136] Cobb et al., *supra* note 51, at 1.
[137] Levine & Moore, *supra* note 97, at 2.

the subsequent development of mental illnesses, physical behaviors, and physical symptoms MWDs frequently experience, that may lead to internal injuries like GDV.

Trauma. Trauma is an emotional reaction to dangerous or stressful events, which can result in short- and long-term mental and physical symptoms.[138] MWDs' lives and responsibilities are objectively traumatic. Though reactions to trauma may be temporary and easily manageable for some beings, other beings may have "prolonged reactions" and "acute symptoms" that have long-term effects on them.[139] Mental and physical symptoms of trauma may include exhaustion, but also insomnia; confusion; sadness; agitation or edginess, including being easily startled and extreme alertness; numbness; dissociation; physical arousal, including an increased heart rate; headaches and muscle pain; changes in eating patterns; blunted affect; and PTSD, Acute Stress Disorder, and other mood or anxiety disorders.[140] Not all these symptoms must exist for a sentient being to suffer from trauma. As mentioned in previous sections, MWDs show clear signs of suffering from trauma: They exhibit many of these symptoms, including PTSD, which US militaries' animal handlers and behaviorists openly acknowledge.[141] Suffering from trauma, including the intense levels MWDs experience daily, induces high levels of internalized stress, by way of increased cortisol (the "stress" hormone) throughout their bodies.[142]

Stress. Internalized stress—or high cortisol levels—is the body's response to emotional and psychological pressure.[143] Stress can physically manifest in the body as general aches and pains; chest pain or feeling one's heart race; exhaustion and trouble sleeping; headaches, dizziness; shaking; high blood pressure; muscle tension and jaw clenching; a weak immune system; and, significant to this discussion, stomach or digestive problems.[144] In application, humans and dogs alike experience stress when they encounter traumatic events; seemingly neutral events may induce trauma; or they may exist in environments that provide continuous external stress, which can create trauma in the body, and then induce internalized stress. In other words, trauma can induce internalized stress, and external stress can induce trauma, which induces more internalized stress. Responses to trauma and stress often lead to mental illnesses and deleterious physical conditions.[145] For MWDs, these scenarios may occur incessantly during their military tenure. Additionally, animals' reactions to externally stressful conditions can induce their exhibition of stereotypic behaviors, which induce more internalized stress and trauma, and lead to further physical injuries.[146] The cycle may look like this:

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[138] *What Is Trauma? Stress vs. Trauma*, NAT'L NETWORK FOR YOUTH (last visited Mar. 23, 2023), https://nn4youth.org/learn/trauma-informed-care-toolkit/stress-vs-trauma/.
[139] SUBSTANCE ABUSE & MENTAL HEALTH SERVS. ADMIN., TIP 57: TRAUMA-INFORMED CARE IN BEHAVIORAL HEALTH SERVICES 7 (2014) [Hereinafter SAMHSA].
[140] *Id.* at 61; *Symptoms, Signs & Effects of Psychological Trauma*, CASCADE BEHAV. HEALTH (last visited Sept. 1, 2022), https://www.cascadebh.com/behavioral/trauma/signs-symptoms-effects/.
[141] Ohlms, *supra* note 7.
[142] *How Does Your Body Remember Trauma?*, PSYCHCENTRAL (Sept. 13, 2022), https://psychcentral.com/health/how-your-body-remembers-trauma.
[143] NAT'L NETWORK FOR YOUTH, *supra* note 139.
[144] *Stress*, Cleveland Clinic (last reviewed Jan. 28, 2021), https://my.clevelandclinic.org/health/articles/11874-stress.
[145] *Trauma and Violence*, SUBSTANCE ABUSE & MENTAL HEALTH SERVS. ADMIN. (updated Sept. 27, 2022), https://www.samhsa.gov/trauma-violence; *Stress*, CAMH (last visited Mar. 23, 2023), https://www.camh.ca/en/health-info/mental-illness-and-addiction-index/stress#:~:text=When%20stress%20becomes%20overwhelming%20and,complaints%20such%20as%20muscle%20tension.
[146] *Supra* Section II(a).

Externally stressful or dangerous event(s) and/or living conditions →

trauma ←→ internalized stress →

PTSD, anxiety, and other deleterious mental conditions →

(perhaps, stereotypic behaviors) →

deleterious physical conditions →

(hypothesis: GDV development).

This chain or cycle of events may connect to GDV in multiple ways: 1) The trauma MWDs experience from externally stressful events during their military tenure induces internalized stress, which then induces mental illnesses, including anxiety, which, when untreated, physically manifests in the body as GDV. (The trauma and stress in this hypothesis could come in different and repeating orders). And/or 2) the external stress and trauma MWDs experience during their military tenure induce stereotypic behaviors, which also happen to cause GDV, as seen in the earlier example in which researchers proposed that anxiety causes dogs to gulp excessive amounts of air, which then distorts the stomach and contributes to GDV. In either of these scenarios, the cycle begins with external stress and trauma, continues with internalized stress and deleterious mental states, and leads to dogs developing physical injuries.

Common ailments of MWDs. MWDs frequently exhibit the following mental states, physical symptoms, and behaviors during their military service: Stress; aches and pains; PTSD, which amounts to becoming fearful of loud noises, increased aggression, forgetfulness, and a lack of desire to work; anxiety; extreme alertness and agitation/edginess; and stomach and digestive problems (including GDV).[147] These symptoms clearly, if not explicitly, overlap with symptoms of trauma and internalized stress. Therefore, externally stressful or dangerous environments and living conditions have a plausible and strong connection to deleterious physical injuries, such as GDV. To support these arguments, studies have shown, and observations have been made, that "[c]rowded and stressful conditions have been associated with feed animals and chickens becoming ill."[148] This fact shows that animals *do* develop internal, physical illnesses from stressful environments, which are traumatic. Therefore, applying this argument to MWDs who experience high levels of trauma, internalized stress, and anxiety through all their military environments, and subsequently develop mental illnesses (i.e., PTSD) and physical conditions like GDV seems like a realistic hypothesis. For this reason, research is necessary to investigate whether a connection between trauma, stress, and the development of GDV in MWDs

[147] Ohlms, *supra* note 7.

[148] MICHELLE R. LLOYD-PAIGE, THINKING AND EATING AT THE SAME TIME: REFLECTIONS OF A SISTAH VEGAN, *in* SISTAH VEGAN: BLACK WOMEN SPEAK ON FOOD, IDENTITY, HEALTH AND SOCIETY 4 (A. Breeze Harper ed., 2d ed. 2020); *see, e.g.*, Robert Dantzer & Pierre Mormède, *Stress in Farm Animals: A Need for Reevaluation*, 57 J. ANIMAL SCI. 6-18 (1983); J.A. Hill, *Indicators of Stress in Poultry*, 39 WORLD'S POULTRY SCI. J. 24-31 (1983); K.S. Schwartzkopf-Genswein et al., *Road transport of cattle, swine and poultry in North American and its impact on animal welfare, carcass and meat quality: A review*, 92 MEAT SCI. 227-243 (2012) (each study interrogating environments and factors that induce stress in farmed animals).

exists. Such research would likely provide new insights into MWDs' welfare and their development of injurious mental and physical conditions.

4 A Proposed Solution: Identifying the Root Causes of GDV and Attempting to Improve MWDS' Welfare

Individual countries are beginning to legally recognize that dogs are sentient beings, as seen through progressive legislation and politics in the European Union, Australia, New Zealand, Canada, the US, and the United Kingdom. Countries can maintain this momentum by requiring changes in militaries' treatment toward MWDs that reflect the changing attitudes of the citizens they represent. Since the MWD industry will likely exist for the foreseeable future, such changes would require militaries to prioritize MWDs' welfare concerns. Therefore, innovative studies in this area could serve two purposes: 1) to understand the reasons MWDs develop GDV and prevent it from occurring, and 2) to identify key factors that improve the mental, psychological, and physical well-being of MWDs. Militaries could apply these studies' findings to new processes and treatments for MWDs, to potentially prevent the need for MWDs to undergo prophylactic surgery, which can lead to physical complications, physical trauma, and psychological trauma. The results of this research could also improve militaries' perspectives toward MWDs and improve MWDs' welfare during their service. This article provides specific examples for proposed research in the following paragraphs.

4.1 New Studies

Research conceptions—GDV.[149] At the time of this article's writing, research that focuses on new approaches to specifically manage MWDs' welfare, particularly as it relates to GDV development, is not prolific beyond studies that only try to identify potential causes of GDV. In turn, this article attempts to initiate discussion regarding stable alternatives to promote MWDs' welfare as it applies to GDV and to decrease the need for prophylactic surgeries for MWDs. Since this article's author is not a veterinary professional, the author proposes suggestions for research—though they may be frustratingly vague and insufficient—with the hope that veterinarians and scientists can use the suggestions to conduct innovative research that will improve MWDs' lives. This being said, the following section lists some suggestions for new research conceptions that may decrease the need for MWDs to undergo prophylactic gastropexy.[150]

Militaries could work with animal scientists and behaviorists to develop safe research environments at military dog training sites (such as the Lackland Airforce Base), to understand the root causes of GDV and to develop new practices that improve MWDs' military experiences. These studies could test variables on 1) dogs who have already received prophylactic gastropexy, and then eventually 2) dogs who have not received prophylactic gastropexy, after concrete evidence shows that decreasing

[149] The proposed research strategies in this section are either the author's own or based on the limited research on this topic or related topics, which have been cited within the article.

[150] Citations in the following paragraphs mostly refer to studies that evaluate welfare practices on captive dogs, working dogs, and service animals since these classes of dogs can experience similar environments and welfare practices as MWDS.

external stress in MWDs' environments,[151] and decreasing trauma and internalized stress in MWDs, prevents GDV's occurrence. Tests could include measuring the presence of cortisol levels, serotonin levels, and oxytocin levels in dogs[152] when they have exposure to important welfare variables, including nutrition, environment, physical health, behavioral interactions, and sleep.[153] For instance, researchers conducting these studies could measure MWDs' cortisol, serotonin, and oxytocin levels when militaries incorporate variables that either show some evidence of decreasing GDV, or improve MWDs' welfare that might lead to lower GDV occurrences. Example variables include: Allowing MWDs to sleep and rest for longer periods of time than they currently experience in the field; allowing MWDs to play with other dogs and have communal interactions; providing areas that allow MWDs to rest together (touch each other), rather than being isolated in kennels; allowing MWDs to lightly exercise after eating; giving MWDs fish and egg supplements; allowing MWDs to evenly divide their time between indoor and outdoor environments when they are off duty; and teaching MWDs methods to turn on and turn off aggressive behaviors so they can maintain substantial periods of time in a calm state.[154] Success or failure in integrating these variables in MWDs' lives will inspire ideas for new variables to introduce into MWDs' lived experiences, which researchers can measure.[155] This investigation into new, prospective living conditions will eventually provide dispositive data regarding which variables really do make MWDs feel comfortable, lower their cortisol levels and so, decrease their trauma, stress, and anxiety; and

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[151] *See, e.g.*, *generally* A. BODNARIU, A REVIEW OF HOUSING SYSTEMS FOR KENNELLED DOGS AND THEIR IMPLICATIONS FOR DOG WELFARE, *in* SUSTAINABLE ANIMAL HUSBANDRY: PREVENTION IS BETTER THAN CURE, VOLUME 1. PROCEEDINGS OF THE 14TH INTERNATIONAL SOCIETY FOR ANIMAL HYGIENE 353-56 (A. Briese et al. eds. 2009) (studying external environments' impact on the welfare of kenneled dogs) *and* J.A. SERPELL ET AL., 23 – WELFARE CONSIDERATIONS IN THERAPY AND ASSISTANCE ANIMALS, *in* HANDBOOK ON ANIMAL-ASSISTED THERAPY 481-503 (3d ed. 2010).

[152] *See* Gwang-Hoon Lee et al., *Assessment of Stress Caused by Environmental Changes for Improving the Welfare of Laboratory Beagle Dogs*, 13 ANIMALS 1-13 (2023) (discussing additional measurement options, including body weight, cortisol levels, alkaline phosphatase activity serum, steps per hour, and clinical sign observations).

[153] Cobb et al., *supra* note 51, at 1-9; Pierre Mormède, *Exploration of the hypothalamic—pituitary—adrenal function as a tool to evaluate animal welfare*, 92 PYSCHOL. & BEHAV. 317-39 (2007); BODNARIU, *supra* note 153, at 353-56 (discussing the study's use of measuring cortisol levels in dogs after exposure to certain variables within their environments to determine whether those variables decrease or increase stress and impact welfare); Admin, *Essay: Decreasing undesired aggression in military working dogs and improving their welfare*, VETERINARIAN (June 20, 2011), https://theveterinarian.com.au/?p=547 (citing several studies to argue that MWDs' required increased aggression for their roles and their forced living in isolated kennels increases cortisol levels and decreases their welfare).

[154] CANADIAN KENNEL CLUB, *supra* note 87; Cobb et al., *supra* note 51, at 1; VETERINARIAN, *supra* note 155; Nicola Rooney et al., *A Practitioner's guide to working dog welfare*, 4 J. VETERINARY BEHAV. 127, 127 (2009) (explaining that the study showed working dogs exhibit high levels of stress because of isolated kenneling practices, which influences working dogs' poor performance during training and work); Rebecca Sommerville et al., *Why do dogs play? Function and welfare implications of play in the domestic dog*, 197 APPLIED ANIMAL BEHAV. SCI. 1, 1 (2017) (explaining that dogs play for different reasons and within different contexts, but that play—though not necessarily a positive welfare indicator—can improve motor skills, social cohesion, and training for unexpected events. These improved functions would support MWDs' improved performance.).

[155] MWD handlers may be vital in offering new ideas and variables given their intimate relationships with their MWDs. *See generally* Ioannis Chaniotakis et al., *Improving Military Dogs' Welfare: Is there a Place for Handlers' Beliefs and Perceptions*, 26 SOC'Y & ANIMALS 388-401 (2018) (explaining that MWD handlers can provide insight to MWDs' welfare needs, which can provide insight to improving welfare standards for MWDs).

increase their serotonin and oxytocin levels that enable relaxation and potentially decrease GDV occurrences.[156]

During these studies, in no way should militaries subject participating dogs to new environments and variables that provide a potential risk of making them develop GDV, if they have not received prophylactic gastropexy. Participating dogs' health and welfare is the top priority in every point of this discussion; the process to finding solutions should benefit the study's participating MWDs, not just future MWDs. Therefore, this proposed study's researchers and handlers must take all precautions to prevent MWDs from developing GDV while existing within these test environments.[157] This assured prevention would occur by working with MWDs who have already received prophylactic gastropexy. This practice would not decrease participating MWDs' welfare or lived experiences more than would occur if the dogs did not participate, since prophylactic gastropexy is mandatory, at least if the study occurred in the US. Once introduced variables show clear evidence that they do decrease MWDs' trauma and internalized stress—which may occur after years and multiple generations of dogs participating in the program—only then would the study start working with MWDs who have not received prophylactic gastropexy. Until that time occurs, one way researchers can prove whether certain variables decrease trauma and stress, improve MWDs' welfare, and effectively prevent GDV from occurring, is by recording whether participating dogs continue to develop mesenteric volvulus, because this condition frequently develops in dogs who receive gastropexy.

Another way to measure variables without risking participating dogs' health, would be for the study's researchers to compare study data to US MWDs' environments and data from GDV occurrences prior to 2010, when prophylactic surgery was not mandatory. Though this historical data will not include MWDs' measured levels of cortisol to determine existent levels of trauma and internalized stress, or serotonin and oxytocin levels to determine existent levels of relaxation and contentment, the data will provide the rate at which these dogs experienced GDV or mesenteric volvulus. Researchers could then set a working hypothesis that MWDs who experienced GDV had high cortisol levels and low oxytocin and serotonin levels. Researchers could confirm this hypothesis by measuring cortisol levels in dogs in general populations who receive emergency gastropexy and, perhaps, MWDs who experience mesenteric volvulus. They could then compare this data to the study's participating dogs' actual cortisol, oxytocin, and serotonin levels in tested environments and on tested variables to measure any hormonal changes. Comparing the experiences and welfare of MWDs in military theaters before the study's execution, to GDV and/or mesenteric volvulus rates and experiences of current MWDs and the study's MWDs, could provide insight on whether a life with improved welfare variables decreases MWDs' rates of GDV and GDV-related conditions, and ultimately, improving MWDs' performance and survival during their service.[158] Additional variables the study will need to consider include, but are not limited to, participating

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[156] *See generally* Lee et al., *supra* note 154, at 1 (discussing a study that similarly focused on evaluating stress levels of dogs held in captive environments and determining whether introducing environmental and social enrichment improved the dogs' well-being).

[157] J.A. SERPELL ET AL., *supra* note 153, at 481 (describing a study that evaluated assistance animals in their raising and training environments to determine whether those environments caused or exacerbated assistance animals' degradation).

[158] *See, e.g.*, *generally* Mia Cobb et al., *The advent of canine performance science: Offering a sustainable future for working dogs*, 110 BEHAV. PROCESSES 96-104 (2015) (describing established, evidence-based, "canine performance science" that improves working dog welfare while simultaneously improving working dogs' performance, to support this article's research proposal and to affirm the need for research in this area).

dogs' ages, breeds, origins of purchase, and roles within the military (i.e., does a dog's training focus on rescue missions, raids, bomb detections, etc.). The study's researchers would also need to collect information on these variables from pre-2010 data.

Research conceptions—general welfare. In addition to studies that specifically investigate root causes of GDV, militaries could work with scientists and animal behaviorists to further research methods to improve MWDs' welfare, to decrease their experienced trauma, internalized stress, and resulting mental illnesses. This research would build onto welfare research Cobb et al. and many others have commenced.[159] This type of research could facilitate environments that holistically promote MWDs' emotional, psychological, and physical well-being, which could include increased attention to dogs' coping styles; personalities; behavioral cues; rest and sleep; social (healthy interactions and socialization with other dogs), environmental, and mental enrichment; and promoting individual agency.[160]

Studies on service animals could support GDV and welfare research and shed light on effective and conscientious research options since such studies have shown that service animals experience similar forms of diminished welfare standards in their work serving humans with special needs (i.e., therapy dogs, and dogs who support individuals with autism or who are visually impaired).[161] In studies that evaluated strategies to improve service animals' lived experiences, studies observed oxytocin and cortisol levels in service dogs during training and during their interactions with humans.[162] Importantly, such studies considered individual dogs' temperaments, which may influence each dog's ability to cope with different environments and stress levels.[163] By evaluating hormonal (cortisol, serotonin, and oxytocin) levels and recognizing that all dogs' personalities and responses to lived experiences are unique, these types of studies can provide a range of welfare variables that will ensure dogs in stressful environments have appropriate resources to manage and recover from external stress and trauma. Recognizing each dog's unique temperament can provide MWD handlers with a variety of resources and handling tricks to respond to their MWD's specific agitation instigators and deleterious (stereotypic) behaviors, to help them remain calm and better cope with stressful environments.

Any research or studies will need to use evidence-based practices and be transparent about measured factors, whether those factors focus on changing hormone levels or animal welfare variables that promote MWDs' stable psychological, emotional, and mental health.[164] This approach would be a necessary shift away from traditional animal welfare science, which anthropocentrically focuses on animals' improved performance and productivity without actually focusing on animals' basic needs and requirements to thrive.[165] Militaries may not be able to decrease the amount of external stress MWDs experience during their service, since their role in militaries is to perform dangerous and life-threatening tasks. However, the information in

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[159] Cobb et al., *supra* note 51, at 1-9.
[160] *Id.* at 7-8.
[161] *Id.* at 3.
[162] Sharmaine L. Miller et al., *The Importance of Evaluating Positive Welfare Characteristics and Temperament in Working Therapy Dogs*, 9 FRONTIERS VETERINARY SCI. 1, 1 (2022); Emmy A.E. van Houtert et al., *Do Service Dogs for Veterans with PTSD Mount a Cortisol Response in Response to Training?*, 11 ANIMALS 650, 650 (2021).
[163] Miller et al., *supra* note 164, at 650.
[164] Cobb et al., *supra* note 160, at 96 (explaining science that focuses on working dog performance should be transparent, objective and traceable, and align with community/evolving societal expectations).
[165] Cobb et al., *supra* note 51. at 8.

studies like these will hopefully lead to militaries facilitating environments for MWDs that allow them to recover from their experienced trauma and so, decrease their internalized stress and anxiety levels. In turn, MWDs could serve without undergoing surgery or developing injurious physical conditions, and still live healthy and satisfying lives.

4.2 Implementing Strategies to Improve MWDs' Welfare, Generally

Animal welfare scientists have already conducted studies that identify certain variables, which influence MWDs' welfare. Until militaries invest in studies like those previously mentioned, militaries can use data from these existing studies to implement practices that improve MWDs' well-being.

Sleep. One important variable that improves MWDs' lived experiences is complete rest and sleep, which promotes sentient beings' ability to maintain healthy and stable emotional states.[166] Maintaining healthy emotional states allows sentient beings to recover from trauma, internalized stress, and anxiety.[167] Therefore, if MWDs receive adequate amounts of sleep and rest, they may be able to psychologically and physically recover from their experiences in combat and in the field.

Proper sleep and rest does not mean holding MWDs in cramped kennels and commanding their stillness until the next time militaries need them. Such an environment may actually contribute to sleep deprivation because MWDs are isolated from one another—they do not have the ability to receive comfort from other dogs, which induces internalized stress.[168] They are kept in environments in which they are on call without any assurance they can sleep free of interruption. Furthermore, dogs are kept in barracks or kennels surrounded by human soldiers,[169] the commotion of which may also disrupt sleep. Interestingly, symptoms of sleep deprivation in dogs are similar to expressed PTSD symptoms: MWDs become easily triggered and react to stressful stimuli, they can become irritable, and they experience decreased memory capabilities.[170] Sleep deprivation also increases cortisol levels, which in turn, increases stress and anxiety.

Proper rest and sleep, instead, require a consistent sleeping schedule, sleeping on a comfortable bed in a quiet and dark space, and consistent periods of rest throughout the day.[171] Implementing an appropriate sleeping infrastructure for MWDs could be an easy strategy to greatly improve the general welfare of MWDs. In turn, if this article's argument is correct—that GDV occurs because it is one method the body uses to manage internalized stress and anxiety—adequate rest may be one important variable that protects MWDs from developing GDV. Adequate amounts of sleep also promote sentient beings' ability to learn, improve immune function, improve performance, and recover from work, all of which would improve their military benefit to humans.[172]

Other considerations. Some animal welfare scientists and experts have found that certain behavior and nutrition patterns decrease dogs' experienced rates of GDV.

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[166] *Id.* at 7.
[167] *Id.*
[168] Rooney et al., *supra* note 155, at 127 (explaining that isolated kennel environments increase stress in dogs).
[169] Calloway, *supra* note 59.
[170] Tom Ryan, *How Many Hours A Day Do Dogs Sleep?*, SLEEP FOUND. (June 10, 2022), https://www.sleepfoundation.org/animals-and-sleep/how-much-do-dogs-sleep.
[171] *Id.*
[172] Cobb et al., *supra* note 51, at 7.

These variables include dogs at risk for GDV playing with other dogs (AWF[173]—behavioral interaction), receiving fish and egg dietary supplements (AWF—nutrition), spending an equal amount of time inside and outside (AWF—environment), and participating in light activity after eating (AWF—physical health).[174] One study also showed that certain personality factors decreased rates of GDV.[175] These factors include a "'happy' and easy going temperament, submission to other dogs or people, high activity levels" and general interactions or being in close proximity to other dogs.[176] Essentially, dogs with calmer temperaments experience a decreased risk of GDV.[177] As mentioned in this article's proposed study section, if certain animal welfare variables and temperamental factors affect dogs' rates of GDV, then perhaps militaries can change MWDs' housing conditions and work with animal behaviorists to implement these strategies. For instance, animal behaviorists could teach MWDs to 'switch on' the alertness and aggression militaries expect of them—as their role requires—when they have to work, but then behaviorists could also teach MWDs to 'turn off' aggressive behavior so that they can spend their inactive duty periods resting, recovering, and existing with a calm psyche.

Researchers have observed that dogs who receive adequate intellectual stimulation and socialization during their first year of living tend to be more well-adjusted, which allows them to stay calm and maintain an easy going temperament.[178] If this observation is correct, militaries could work with MWD breeders and handlers at MWD training sites to ensure MWD puppies experience adequate socialization with other dogs, and to develop innovative ways to improve MWDs' welfare.[179] This method would allow MWDs to learn they can be calm and sociable when they are in a relaxed environment (i.e., when dogs are free to roam), but they would also know to be attentive and alert when they are with their handlers, as is needed during their missions. If animal scientists and behaviorists agree that MWDs suffer from trauma, militaries should try to make MWDs' tenure more humane so they can survive the responsibilities militaries expect of them.

4.3 Incentives for Militaries to Invest in Studies and Practices that Decrease GDV and the Need for Prophylactic Surgery, and to Improve MWDs' Welfare

Since militaries throughout the world use MWDs who provide critical services during war; international governing bodies have not recognized a legal status for MWDs, but do recognize norms in considering MWDs' welfare during their service; MWDs experience disproportionately high rates of GDV compared to non-MWDs; and many MWDs do not reach retirement age because of physical injuries that seem strongly related to GDV, developing strategies to decrease the need for MWDs' prophylactic surgeries, as well as investigating ways to improve MWDs' welfare during service would behoove all nations' militaries. Furthermore, since dogs do not have the ability to be heard in the same way that humans who work in militaries do, militaries need to proactively work with animal scientists, behaviorists, MWDs' handlers, and other

[173] 'Animal welfare factor.'
[174] CANADIAN KENNEL CLUB, *supra* note 87; Cobb et al., *supra* note 51, at 1.
[175] CANADIAN KENNEL CLUB, *supra* note 87.
[176] *Id.*
[177] *Id.*
[178] *Id.*
[179] Chaniotakis et al., *supra* note 157, at 388.

necessary specialists to identify the best way to preserve MWDs' well-being while also accomplishing their military goals. In the past, militaries have not had any need to change their behavior towards MWDs because the status quo worked well enough, even if it seriously injured MWDs in the process. Additionally, the financial investment for MWDs is significant. Therefore, studies that focus on MWDs' welfare could allow militaries to save money and resources, particularly for countries that have limited financial means or limited access to dogs, compared to larger countries like the US or China. Countries might become incentivized to prioritize MWDs' well-being because it benefits them, and also happens to benefit MWDs. Indeed, perhaps militaries would be willing to invest in research that benefits MWDs if the research results provide insights into ways militaries could save financial resources by no longer having to pay for prophylactic surgeries, prolonging MWDs' length of service, and purchasing and training fewer replacement MWDs. Of course, these propositions and research are not meant to increase the amount of time MWDs have to serve militaries. In fact, one could hope that militaries would change their cultural perspectives towards dogs and realize that dogs should not be in military theaters at all. But, until that shift occurs, perhaps these proposed studies and welfare modifications could at least improve the lives of MWDs while they serve, by facilitating environments that induce less trauma and internalized stress, and prevent MWDs' development of mental illnesses and deleterious physical conditions.

5 Conclusion

(Most) militaries respect MWDs, but still use them as tools and expendable resources. Militaries, and society generally, should interact with and support MWDs (and all animals) as the sentient beings they are. Militaries must recognize that MWDs are colleagues who improve the lives of humans and so, require greater protections than those they currently receive. Improved protections must illustrate society's recognition that it owes MWDs respect and ethical considerations because they ease human life.[180] Therefore, militaries should not treat symptoms of physical, psychological, and emotional trauma and internalized stress with solutions that prevent the symptoms, but that do not resolve the symptoms' root causes. Rather, militaries should address these causes by facilitating environments that promote MWDs' well-being and so, resolve those causes and subsequent symptoms. This approach could increase MWDs' quality of life and increase their longevity. If this work does shed light on ways to improve MWDs' welfare and lived experiences, it may also influence the treatment and improve the welfare of dogs whom humans contract to militaries and use in other stressful and trauma-inducing environments. Through interest, purposeful investment in studies and welfare applications, and a desire to improve MWDs' lives, militaries have the power to improve MWDs' living conditions. Until the day comes that countries deem MWDs unnecessary to their missions, innovative studies could bring humans one step closer to making the lives of MWDs throughout the world a little more comfortable.

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[180] Cobb et al., *supra* note 51, at 3.