A

Almost 23 million military Veterans in the United States are evaluating the availability, access, and feasibility of getting health services at the Veterans Health Administration (VHA), civilian community facilities, or possibly both (Mohler & Sankey-Deemer, 2017). Congress and the VHA are trying to improve access to private-sector health care for Veterans with different convenient programs (Philpott, 2017). As Veterans review their options, healthcare providers in civilian facilities should understand each Veteran’s military service “is unique and a life-altering experience” (Jennings, Melvin, & Belew, 2017, p. 455).

Identification First

Identifying persons with Armed Forces involvement may not be easy (Mohler & Sankey-Deemer, 2017). Nurses in civilian health facilities can make a big difference through their careful, poignant examination on patient admission. Rather than proceeding immediately to the history and physical documentation in the electronic medical record to record the patient’s immediate symptomology, they can start by asking an important assessment question: “Have you served in the military?” (Dursa, Barth, Schneiderman, & Bossarte, 2016). According to Mohler and Sankey-Deemer (2017), when this screening is not done, specific pertinent questioning surrounding the patient’s past assignments may not be asked, creating the potential for “missing or misdiagnosing major health conditions” (p. 26). The Military Health History Pocket Card for Clinicians (available at www.va.gov/oaa/pocketcard/) presents further signature wound guidelines associated with U.S. wars/conflicts and specific duty stations. Applicable care for Korean and Vietnam War Veterans has been published previously (Conard, Armstrong, Young, Lacy, & Billings, 2016; Young, Conard, & Armstrong, 2017).

The purpose of this article is to present information about Gulf War 1 (GW1) to illustrate how understanding of the demographics, environmental concerns, and signature medical problems (e.g., Gulf War Illness [GWII]) of this prior-era military conflict can help civilian nurses plan the Veteran’s specific cultural interventional care (Young et al., 2017). With the integration of this information, civilian nurses also can plan appropriate care for dependents (spouses and/or children) and private (civilian) military contractor personnel.

Gulf War 1 and the Signature Wounds

GW1 began in mid-January 1991 with over 700,000 U.S. men and women deployed to close regions of the Persian Gulf area (U.S. Department of Veterans Affairs [VA], 2017a). For 42 days, more than 100,000 air missions were flown and over 88,000 tons of bombs were dropped on enemy territories, followed by 100 hours (4 days) of harsh ground fighting (White et al., 2016). This quick military action (codename Desert Storm) produced a declared cease-fire February 28, 1991, with many deployed service members returning home by late spring 1991. By late summer 1991, most of the remaining 50,000 troops assigned in the Persian theater for environmental clean-up work and security left the area (VA, 2017b).
While GW1 should be remembered for its limited combat action, it is remembered more often for the multiple detected and undetected hazardous exposures that could have predisposed Veterans to what is still known commonly as GWIL (National Academies of Sciences, Engineering, and Medicine [NASEM], 2016). These hazards included chemical and biological warfare agents and environmental factors of munitions destruction, nerve agents (e.g., sarin, cyclosarin), depleted uranium, mandatory vaccination prophylactics, oil well fire contaminants, and high ambient temperatures (Barth, Dursa, Bossarte, & Schneiderman, 2017). In addition, pyridostigmine bromide was used as a prophylactic agent against potential nerve agent exposure (NASEM, 2016). To combat bothersome desert fleas, various service members wore pesticide-embedded uniforms then sometimes applied additional pesticides to their exposed skin. Any of these listed agents could have impacted the nervous and reproductive systems, while predisposing service members to respiratory and lung diseases. A few years after the war, however, the U.S. General Accounting Office (1997) reported most military GW1 exposure records with frequency, intensity, or duration data were never recovered to document the possibility of actual contact.

The Problems

After the War

Shortly before leaving the combat region in 1991, some GW1 deployed service members began to mention a cascade of indefinable, lingering health problems (Department of Defense Gulf War Illness Research Program [DODGWIRP], 2016). As they continued into their civilian reintegration, members related persistent fatigue, widespread pain, muscle aches, chronic headaches, joint pain, gastrointestinal problems, weight loss, insomnia, skin rashes, dizziness, and respiratory disorders, as well as memory, concentration, and mood problems (Steele, 2014).

Neurological disorders, such as migraines, neuritis, and neuralgia, also increasingly occurred. By the end of 1992, this set of multiple symptoms was beginning to affect 25%-33% (175,000-210,000) of previously deployed GW1 Veterans (NASEM, 2016).

Initially these symptoms were thought to be caused by post-traumatic stress disorder (PTSD), a common condition often associated with many previous combat experiences. However, the low presence of PTSD in GW1 Veterans (3%-6%) compared to the higher symptomology presence of GWIL was identified by multiple authors (Binn et al., 2014; Steele et al., 2014; White et al., 2016). Whatever the phenomenon, it affected multiple organ systems (NASEM, 2016). White and colleagues (2016) called it “persistent pathology due to chemical intoxication” ... [while] the GW1 Veterans call it “toxic wounds” (p. 469).

The Present

The prevalence of GWIL has remained consistent (VA, 2015, 2017b). Validated with their medical records, affected Veterans have cited higher levels of functional and work limitations when compared with non-deployed Veterans. Some have had little (2%) or no recovery, 36% remained about the same, and 15% already had declining health and more disabilities (DODGWIRP, 2016). Meanwhile, between 1994 and 2014, the DODGWIRP also noted more than $500 million were spent to understand GWIL, with numerous Congressional actions, major medical studies, and several extensive agency reports. Animal studies have tried to replicate exposure situations but generally have arrived at similar conclusions (NASEM, 2016). Little progress has been made to explain the pathophysiological mechanisms that underlie this illness.

Inconsistencies

Etiology

This condition remains a series of baffling inconsistencies as not all GW1-affected Veterans served in the same locations and were exposed to the same toxic elements (NASEM, 2016). In addition, no standard diagnostic or laboratory tests have detected any specific biomarkers for GW1 previous exposure effects (Gwini, Forbes, Sim, & Kelsall, 2016; Gwini, Kelsall et al., 2016).

Definition

Soon after GW1, several state groups (IA, KS, PA, HI, OR, MA, WA, LA) conducted residents’ studies on their deployed Reservists/National Guard Veterans for almost a decade. This important research eventually led to an agreement of two major definitions (see Table 1); however, at the time of this writing, no definite agreement for one definition has been found precise enough to produce strong evidence for both clinical and research applications related to the GWIL, yet be broad enough so individuals are not missed (NASEM, 2016).

Terminology

Agreement also has not been reached regarding the name for the documented pattern of symptomology found in this large number of GW1 Veterans. Some federal agencies (NASEM, Department of Defense [DoD]), researchers, clinicians, and Veteran organizations still use the term GWIL (Gwini, Forbes et al., 2016; White et al., 2016). However, in 2014 the VHA changed the presumptive label to chronic multisymptom illness (CMI) (VA and Department of Defense [VA/DoD], 2017).

Clinical Management

NASEM (2016) and the Institute of Medicine (IOM, 2014) have emphasized GWIL is not psychosomatic and they have not associated it with any known psychiatric disorder. Yet both concluded in the latest reviews there is “sufficient evidence of a causal relationship for the presence of PTSD,” and “sufficient evidence of an association to generalized anxiety disorder, depression, and substance (particularly alcohol) abuse” (NASEM, 2016, p. 274). It is
TABLE 1. Two Definitions of Gulf War 1 Illness

<table>
<thead>
<tr>
<th>Centers for Disease Control and Prevention Definition</th>
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<tbody>
<tr>
<td>This definition requires one or more symptoms in at least two of the fatigue, pain, and mood or cognition categories to identify a case. It has been used widely by researchers and identifies 29%-60% of U.S. Gulf War-deployed Veterans as CMI cases depending on the population studied.</td>
</tr>
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<tr>
<th>Kansas Definition</th>
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<tbody>
<tr>
<td>The Kansas definition requires symptoms in at least three of the domains of fatigue or sleep, pain, neurologic or cognitive or mood, gastrointestinal, respiratory, and skin to identify a case. It identifies CMI in 34% of Gulf War Veterans from Kansas who were the subjects of that study.</td>
</tr>
</tbody>
</table>

CMI = chronic multisymptom illness

Source: NASEM, 2016

The depth of evidence/association of those behavioral health issues that is producing further scientific debate (Hauser, 2016) as well as ire from Veteran organizations (Olson, 2017). Although PTSD remains scientifically different than GWIL (Binn et al., 2014; Steele, 2014; White et al., 2016), with the NASEM report (2016), Veterans are concerned the VHA will overemphasize behavioral health issues for the GWIL symptomology (Hauser, 2016).

The Concern

For over 25 years, this diagnostic investigation of GWIL has been difficult. GW1 Veterans believe they are in the middle, with many of their VHA disability claims denied as they are told there is “nothing wrong with you” (Olson, 2017, p. 22). Those affected “fear the discussion of the psychological [such as PTSD and depression] aspects of their symptoms questions the legitimacy of their GWIL health problems” (NASEM, 2016, p. 127). GW1 Veterans frequently are sent to the VHA Mental Health Clinic for their stress, rather than receive other serious examinations for their present conditions (NASEM, 2016; Olson, 2017).

Scientists, researchers, health-care providers, and financial authorizers (VA/VHA, private insurers) have a limited tolerance to ambiguous phenomena (Binn et al., 2014). They remain concerned about the subjective (self-reported) information rather than objective data, especially when summary reports conclude, “little progress has been made in elucidating the pathophysiological mechanisms that underlie the condition, the exposures that may have caused it, or treatments that are generally effective for veterans who suffer from it” (NASEM, 2016, p. 264). This time-consuming, lengthy process is viewed within the scientific/medical community as part of gathering the evidence for the development of the science. Specific information about occurrences/exposures, terms, definitions, and diagnostic direction has to be finalized for acquisition of an International Classification of Disease (ICD) code, which then helps categorize the condition, measure outcomes, direct diagnostic procedures, and guide reimbursement (Gwini, Forbes et al., 2016; Gwini, Kelsall et al., 2016). The VHA’s decision for the broad diagnostic term of CMI allows overlap with fibromyalgia, functional gastrointestinal disorders, chronic fatigue syndrome, and undiagnosed illness, all of which have ICD codes (VA/DoD, 2017).

This tedious scientific inquiry could be similar to what happened with the signature wounds of Vietnam, Agent Orange and PTSD (Friedman, 2014). For Agent Orange, that wait lasted almost 40 years despite growing evidence; appeals for Agent Orange coverage still are being submitted 65 years later (Szymanski, 2018). With approved diagnostic nomenclature, at least six chronic illnesses, 18 types of cancer, and intergenerational effects finally are recognized for consideration of VHA benefits and VA disability coverage (Conard et al., 2016). The long-awaited ICD code for PTSD also has experienced numerous difficult changes since 1952, with reflective and continuing medical research in 1968, 1980, 1987, 1994, 2000, and 2013 (Friedman, 2014).

Specific Effects

The GW1 troop composition was different; for the first time, an all-U.S. volunteer active duty contingent consisted of large numbers of Reservists/National Guard personnel (230,000, 32%), an increased activation of women (2% in Vietnam to 7% in GW1), further ethnic diversity (Blacks, 23%, Hispanics, 5%), and more military couples deployed simultaneously (Jennings et al., 2017; NASEM, 2016). Yet over the past 25 years, specific prevalence data for the short- and long-term lingering outcomes of the various GW1 troop populations has been limited, with their issues increasingly turning into chronic problems (Coughlin, 2016). In addition, more than 35% of these GW1 Veterans were ages 17-25 at the time of that conflict; they thus also could have served in the 2001-2014+ Iraq and Afghanistan wars for more situational exposures (DODGWIRP, 2016).

Branch Service and Assignments

GW1 Army and Marines enlisted ground troops increasingly have reported more GWIL symptomology than members in the Navy and Air Force (Binn et al., 2014). The quick activation of large numbers of GW1 Reservists/National Guard personnel was a first for them. During their deployment, they often were separated from their fellow stateside
service members and used to fill other active duty units. With the loss of camaraderie, many of the Reserve/National Guard personnel reported an inherent lack of support within their newly formed troop units. These troops later reported a higher presence of PTSD and depression than experience by active duty personnel (Friedman, 2014). Twenty years later, many of them are experiencing high body mass index (BMI) (>28), are close to the 30 point for BMI, still smoke cigarettes, and now present with multiple chronic conditions (2-3.5) (Dursa et al., 2016).

Race and Ethnicity

Ethnic diversity also was different during GW1 (NASEM, 2016). When compared to White GW1 Veterans, Hispanic and Black GW1 Veterans reported “increased rates of PTSD, major depressive disorder, GWIL, neurological conditions and multiple sclerosis” (NASEM, 2016, p. 271). This report also recommended Blacks be assessed genetically for greater risk of amyotrophic lateral sclerosis and heart disease.

Private Military Contractors

While often not discussed, the U.S. military historically has used civilian private military contractors (PMCs) as troop multipliers to free troops by outsourcing and privatizing some vital support functions so service members could fulfill their fighting mission. These PMCs have served in various valuable capacities, while their recent presence (and expense) have increased exponentially (Baker, 2014). During GW1, almost 100,000 PMCs assisted with transportation, supply, labor, security, maintenance, and engineering needs close to active theaters of operation. This service often exposed them to the same situations as military personnel when they were in conflict environments. Data on the PMC groups were more difficult to obtain as many of the civilian contractual organizations were not obligated to submit data about GW1 causalities, injuries, or other concerns (Baker, 2014). Thus, little is known about their physical, behavioral, and other long-term health remnants. Findings of one study of PMCs from the Iraq and Afghanistan wars included similar probable PTSD and behavioral health issues with their military counterparts (Dunigan, Farmer, Burns, & Setodji, 2014). While some PMCs have previous military training and consequently could have access to VHA care, most who experienced any lingering problems from GW1 may be coming to community health facilities for care.

Gulf War 1 Women Veterans

GW1 deployment of women was also the fastest and largest ever done in the nation’s history, with almost 50,000 military women from the U.S. active duty (7%) and Reserve/National Guard (17%) forces (Coughlin, 2016). Their mean age was 26.5, over half were single (58%), often divorced, without children (75%), and most were from enlisted ranks (85%) (Carney, 2003). They served in a broader variety of military occupations than the traditional health care and administrative/logistic assignments, including important combat support positions as communications specialists, jet/helicopter pilots, Patriot missile launchers, security, truck drivers, and equipment maintenance; some were in command positions for these occupations. Unfortunately, during their GW1 service, 13 were killed in the line of duty and two were taken as prisoners-of-war.

Although expanded and non-traditional roles in more intense combat-zone environments for these women increased their toxic exposures, few studies have examined gender-specific concerns (NASEM, 2016). Only limited general information was found in the literature. Coughlin and co-authors (2017) and Mohanty and colleagues (2015) identified more GWIL in women than men and suggested further studies as the most current information is over 12 years old.

Other than GWIL concerns, women had gynecological and reproductive health challenges in the austere environmental exposures (e.g., contraception accessibility, menstruation management, genitourinary concerns) (Krulwich, 2016). Other concerns included sexual assault and sexual harassment, breasts lumps/cysts, abnormal Pap results, serious mood problems before their period, difficulty getting pregnant, miscarriages, spontaneous abortions, and ectopic pregnancies (Coughlin et al., 2017). Increased pregnancy outcome defects were documented in GW1 men and women, but Coughlin (2016) indicated these have decreased gradually. These differing effects have been noted with cardiovascular disease, musculoskeletal disorders, trauma events, and some cancers, as well as an increased prevalence of severe migraines and fibromyalgia (Coughlin et al., 2017).

Women historically seek more health care services so the GW1 female Veterans already could be within the community health system (D’Aoust et al., 2017). In a recent pilot study, D’Aoust and colleagues found “a significant relationship and presence of fibromyalgia, depression, PTSD” (p. e1832) and other lingering problems if women had reported military sexual trauma. Women also have more presence (75%) of severe migraines (NASEM, 2016). GW1 female Veterans with increased PTSD symptomology often have reported early childhood sexual and physical abuse (Rivera & Johnson, 2014). NASEM (2016) recommended menopause be assessed in GW1 female Veterans to examine the effects of neuro-immune mechanisms and an increase in specific serum markers (II-1, II-6, TNF-alpha); estrogen-related cancer examinations also are needed. Suicide ideologies should be assessed for all female Veterans. With their firearms knowledge, they are 1.6 times more likely to use a gun when attempting suicide (Rivera & Johnson, 2014).
Dependents

With further research, spouses/significant other, and children have been found to be “collateral wounds of war” with problematic abuse, neglect, and psychosocial maladjustment risks during the Veteran’s early deployment and later in the reintegration periods (Rossiter, Dumas, Wilmoth, & Patrician, 2016, p. 488). Currently, many of them are receiving their health care within community facilities; again, as these military-associated spouses and/or children are not easily identifiable, an introductory question of “Do you have a parent/spouse/significant other who has ever served in the military?” is important so better nursing assessment, diagnosis, and treatments can be implemented (Rossiter, Dumas et al., 2016, p. 487).

Spouses

Recently, Blanchard and co-authors (2017) studied spouses of GW1 Veterans to determine if there was a negative relationship when there was psychological stress of CMI and/or PTSD. The presence of poorer physical and mental symptomatology was confirmed in spouses with CMI and/or PTSD compared to Veteran spouses without CMI or PTSD. More research on this will be important (Rossiter, D’Aoust, & Shafer, 2016).

Children

While Reservist/National Guard parents are deployed, their children often do not have access to or the family unit may not try to get any assistance from the active duty military system regarding health, child, or recreational care (Rossiter, Dumas et al., 2016). Little information is available but the Health and Medicine Division (formerly the IOM) continues to review intergenerational effects of GW1 military deployments. Another report is scheduled for 2019 (VA, 2017a) to provide better care for members’ children when and after the service member is deployed (Rossiter, D’Aoust et al., 2016).

Targeted Research and Limited Interventions

GW1 Veterans’ concerns about the “prominent symptoms of fatigue, pain, and cognitive problems, especially in three functional domains of attention and executive function, visuospatial skills and learning/memory” are being examined with several ongoing interventional studies (Janulewicz et al., 2017, p. 1). Further examinations of biological determinants across systems are being encouraged (Hauser, 2016). Another research team is examining the reprogramming of cells from GW1 Veterans into neurons based on the belief genetic or epigenetic factors might have some involvement (Quiang et al., 2017).

Current interventional care for GW1 remains limited. Given the GW1 complexity, a combination of approaches is recommended rather than seeking a single cause (Steele, 2014). This is supported by the joint CMI VHA/DoD (2017) report advising a strong interprofessional team approach so efforts from a variety of clinical specialties can be emphasized to individualize approaches to GW1 Veteran medical care and affected multiple organ systems (NASEM, 2016). This might include direct electrical nerve stimulation and the repurposing of several approved pharmaceuticals (DOD-WIRC, 2016). Meanwhile, in the absence of specific treatments, several complementary or alternative therapies and holistic approaches (e.g., yoga, exercise, lifestyle changes, mindful-based meditation) have been implemented with varying levels of promise (Kearney et al., 2016).

Nursing Advocacy Is Important

Many GW1 Veterans are frustrated. They have been reclassified with service members before September 10, 2001, known as the Pre-9/11 era, while those who served in Iraq and Afghanistan (after September 11, 2001 to the present) are identified with the Post-9/11 era (VA, 2017b). They believe their situation has been trivialized and minimized as a non-acknowledgment of their concerns (Olson, 2017). Nurses can be their advocates. Their healthcare concerns should be heard and believed. Once the GW1 Veteran has been identified with the universal assessment question about service, a specific line of questioning can be pursued related to persistent fatigue, widespread pain, muscle aches, chronic headaches, joint pain, gastrointestinal problems, weight loss, insomnia, skin rashes, dizziness, respiratory disorders, and memory, concentration, and mood problems (Steele, 2014). Almost 30 years since GW1, many of these Veterans and PMCs still suffer with this unexplainable illness, and are experiencing more disabilities and decreased quality of life, without a reason for the multiple symptoms (DOD-WIRC, 2016). The following advocacy concerns will be important for the GW1 Veteran during care planning.

Awareness of Military Culture

Culturally, male and female military personnel are known for their strongly held beliefs in honor, stoicism, and personal denial, as well as their proficiency in using survival skills of emotional control and hyperawareness to complete the mission. These attributes help them prepare and perform in combat, but also create reluctance to seek help for personal and behavioral health issues (Rivera & Johnson, 2014). Many military values, attitudes, and behaviors remain with them throughout their lives, so seeking professional medical help can be seen as a sign of weakness.

Visible physical symptoms have been easier to explain than invisible behavioral health wounds, so building trust to help Veterans describe all their injuries will be important. Sharing information with civilian healthcare providers may be the first time they have talked openly about their concerns. Providers should show interest, spend time talking about their military experi-
ences, and be watchful for verbal and nonverbal responses as they share their stories (Jennings et al., 2017). During conversation, further resources could be shared with Veterans (see Table 2).

Registry

All GWI and Iraq/Afghanistan (2001-2014) Veterans should be encouraged to enroll in the VA Gulf War Registry (see Table 3). This valuable resource will provide additional information about possible long-term effects of any environmental exposures during their deployment (VA, 2015). Additionally, registry participation could be an avenue for involvement in rigorous epidemiologic studies or with control groups to estimate prevalence of symptoms among Gulf War Veterans and compare them to rates among otherwise similar troops who were not deployed to the Gulf War.

Effects of Age

As GW1 Veterans continue to age, understanding how GWIL symptomology may manifest in the long term becomes crucial (Gwini, Kelsall et al., 2016). It will be increasingly difficult to distinguish deployment effects from effects of aging (NASEM, 2016). Some health conditions from military conflicts (e.g., certain neurological conditions, types of cancers) can be latent for years or decades before surfacing (Coughlin, 2016).

Conclusion

With continuing physical and psychological health issues, healthcare providers need to acknowledge the prevalence and magnitude of symptoms of GW 1 Veterans. They also should be aware of the need for timely assessments and changes for health care (Gwini, Kelsall et al., 2016). The most important responsibility for nurses will be to remain interested and knowledgeable about the latest GWIL evidence to advocate, treat, and manage their health situations effectively (NASEM, 2016). 

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**TABLE 2.
Resources for Gulf War Veterans**

<table>
<thead>
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<th>Source: Olsen, 2017</th>
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- **Boston University School of Public Health**
  Gulf War Illness Consortium
  sites.bu.edu/gwic

- **Department of Defense**
  Congressionally Directed Medical Research Programs
cdmrp.army.mil/gwirp

- **Gulf War Illnesses Facebook Group**
  www.facebook.com/groups/125208941896

- **National Veterans Legal Services Program**
  www.nvls.org

- **The American Legion**
  War Era Benefits & Programs brochure
  www.legion.org/publications

- **U.S. Department of Veterans Affairs**
  Gulf War Illness and the Health of Gulf War Veterans
  www.va.gov/rac-gwvi/docs/committee_documents/gwiiandhealthof
  gwiveterans_rac-gwivireport_2008.pdf

  - Gulf War Veterans’ Illnesses
    www.publichealth.va.gov/exposures/gulfwar/

  - Research Advisory Committee on Gulf War Veterans’ Illnesses
    www.va.gov/rac-gwvi

  - War Related Illness and Injury Study Center
    https://www.warrelatedillness.va.gov/

- **91outcomes.com**
  Gulf War illness health and news
  www.91outcomes.com

**Source:** Olsen, 2017

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**TABLE 3.
Persian Gulf Registry for All Gulf War 1 and Iraq/Afghanistan Veterans**

<table>
<thead>
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<th>Source: VA (2015)</th>
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| **Airborne Hazards & Open Burn Pit Registry** |
| Designed to address Veterans’ health concerns by voluntarily documenting their exposures and reporting their health concerns by completing an online survey (www.publichealth.va.gov/exposures/burnpits/registry.asp) |

| **Gulf War Registry Health Exam** |
| Free evaluation to include a comprehensive health exam, an exposure and medical history, laboratory tests if needed; as of January 1, 2017, over 180,000 initial and follow-up exams had been conducted. |

**Source:** VA (2015)
REFERENCES


