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Chairman Murray, Ranking Member Burr, members of the Committee, honored guests, fellow service members, I thank the Committee on Veterans Affairs for inviting me to testify.

It's an honor and privilege to testify before the Senate Committee on Veterans Affairs in support of Senate Bill 3313. This Bill provides critically needed support for soldiers within the Department of Veterans Affairs who have suffered fertility-impairing trauma in battle. My comments have the support of many organizations that have tangibly dedicated themselves to the care, rehabilitation, and restoration of fertility to soldiers who have suffered urogenital and other forms of trauma that threaten fertility. These organizations include the American Urological Association, The Men's Reproductive Health Alliance, the American Fertility Association, and the Men's Health Network. This is by no means an exhaustive list of the professional organizations and patient advocacy groups with a vested interest in this subject, many of whom are represented in the room today.

I am a Urologist, a specialist who treats genitourinary disease and injury, in private practice in Salisbury, MD. I am a husband and the father of three children 10, 7, and 5 years old. I am also an Army Reservist of 10 years. I have been called to active duty 3 times: first to Walter Reed Army Medical Center in 2004, one tour with the 399th Combat Support Hospital in Mosul, Iraq in the winter of 2006, and finally a tour at Tripler Army Medical Center in 2009. I have seen and treated genitourinary trauma in the theater of operations and have participated in its chronic management at our largest military medical centers stateside.

To begin, a brief review of the mechanics of natural human fertilization may be helpful. The testicle produces two elements essential to fertility: sperm and testosterone. After going through the stages of maturation, sperm leave the testicle through a series of tubes (the epididymis and vas deferens) and wait temporarily in the section of vas deferens that enters the prostate gland (ejaculatory duct). When ejaculation occurs, the supporting fluid (semen), is released from the seminal vesicles, sperm is released from the ejaculatory ducts (emission), and the mixture is propelled forward to be deposited in the vagina. Sperm then begin their journey across the cervix, into the body of the uterus. Eventually a very small percentage of the original populations make it to the fallopian tube to meet the egg which upon penetration of a single spermatozoon, is

then fertilized. The fertilized egg (zygote) then implants in the wall of the uterus for the remainder of gestation.

Normal female physiology is as follows: Eggs mature in the ovaries and once per cycle, an egg (oocyte) is released into the fallopian tube and begins its migration toward the body of the uterus. If it encounters a sperm on the way and becomes fertilized, the resulting zygote (fertilized egg) implants into the wall of the uterus and gestation ensues. If not, the oocyte is expelled and the process repeats on a monthly basis.

It's important to understand the breadth of types of injuries that result in threats to fertility. The most common mechanism of injury to the genitourinary organs in Operation Iraqi Freedom and Operation Enduring Freedom is blast effect from improvised explosive devices (IEDs), followed by gunshot wounds. The most common types of male genitourinary injuries, sometimes seen in isolation, but commonly in combination are: testicular rupture (unilateral or bilateral), penile shaft/pendulous urethral injury, posterior urethral injury, and bladder injury. Spinal cord injury and traumatic brain injury are two major classes of non-urological injury that can impede fertility through ejaculatory dysfunction. If testicular rupture injuries present within a few hours as most do with current evacuation systems, salvage is possible with rates of up to 74% reported recently. Bilateral testicular loss is a devastating injury that obviously precludes future fertility.

Blast injuries to the phallus often result in either erectile dysfunction or otherwise render it mechanically incapable of intercourse to achieve a natural pregnancy. Urethral injuries of either the pendulous or posterior aspect often result in stricture (scar tissue) formation that renders ejaculation either impaired or impossible. Schrapnel often penetrates the perineum, the area that includes the sexual organs and rectum. The perineum, even with proper use of the current protective gear, is unprotected. In these instances, the external sexual organs may be preserved but injury can occur to the portion of the erectile bodies (the tissue cylinders in the penis responsible for erection) that attach to the pubic bones or to the nerve and vascular supply responsible for erectile function. Even if the testicles are uninvolved or salvaged after a schrapnel injury, damage to the ductal system anywhere from epididymis to ejaculatory duct may result in lack of sperm delivery to the ejaculate.

There is a groin- protective garment that is issued to soldiers as they are deployed. It is a triangular shaped shield that attaches to the front of the Improved Outer Tactical Vest (IOTV). Its design and location, however, are felt by many soldiers to be cumbersome and to inhibit mobility and so it is not worn by many. There is a critical need to invest in the research and development of protective gear for the genital organs that is effective and practical for the tactical environment.

Blast or gunshot wounds to the female pelvis can also result in a variety of fertility-impairing injuries. Trauma to the perineum and vagina can easily result in an altered vaginal vault that renders intercourse impossible. Additionally, penetrating schrapnel injury to the female pelvis can disrupt the ovaries, fallopian tubes, body of the uterus or the vaginal vault. Fallopian tube injuries can preclude the normal passage of the egg and therefore prevent fertilization. Uterine injury can result in a uterus incapable of sustaining a pregnancy which then opens the issue of surrogacy.

Women also experience non-ballistic risks to maintenance of reproductive health while in theater. A recent white paper developed by the Army's Women's Health Assessment Team identified several barriers to optimal genitourinary health for female soldiers in theater. These included lack of secure facilities for women to attend to personal hygiene. There is in some instances a lack of confidence in unit-level health care provides with respect to competence in women's health issues and concerns around confidentiality leading to avoidance of care-seeking. There are underappreciated psycho-social issues with female family separation that can have both psychological and physiological effects that lead to sexual dysfunction and fertility issues. The issues of military sexual trauma, which can have profound impact on sexual function and fertility, continue to be addressed military-wide through the Sexual Harassment/Assault Response and Prevention (SHARP) program. S. 3313 seeks to meet these needs in two critical ways. First, by increasing the number of retreat-style counseling opportunities for returning female soldiers, and second, by improving the functionality of the female veterans' call center.

Given the many ways that injured soldiers can return to their home units or civilian life and their families with fertility-threatening injuries, the question becomes how are we willing to help them? Though genitourinary trauma is not publicly visible it is no less physically or psychologically debilitating than loss of limb or other overtly disfiguring injury. Procreation is one of the most fundamental of human instincts.

The range of male and female injuries described above can all result in the inability for couples to achieve a pregnancy in standard fashion. That's where advanced reproductive technology is brought to bear and where S. 3313 will have an immediate and profound impact for fertility-impaired soldiers, and their spouses. The advanced techniques are specifically intrauterine insemination (IUI) and in-vitro fertilization (IVF). IUI involves processing sperm that have been obtained either from the ejaculate or harvested from the testicle or epididymis, and implanting them directly into the uterus to complete the remainder of the natural fertilization process. In-vitro fertilization (IVF) is the process by which sperm and egg are united in a controlled laboratory environment and post-fertilization the zygote is placed in the uterus for implantation. IUI is employed when female anatomy is intact and functional from the cervix up, but either a male or female injury precludes depositing a requisite number of sperm into the vagina. As IUI is less technology and labor intensive, it is also less expensive per cycle. IVF is employed when a male and or female injury precludes the natural union of sperm and egg in the fallopian tube for any number of the reasons mentioned above. In cases where the uterus has been rendered incapable of sustaining a pregnancy, a surrogate can be engaged to carry the fertilized egg for the natural parents. More labor intensive than IUI, IVF also costs more but it is important to note that the cost per cycle of IVF in government facilities is tens of thousands of dollars less than in the private world, where VA couples are now forced to seek care at $20-30,000 dollars per cycle. The per-cycle success rate depends on a variety of factors including age. Pregnancy rates range between 20 and 45% per cycle and live birth rates range between 10% and 30% per cycle.

An important provision of S. 3313 provides treatment to the spouse of the injured soldier. It's important to understand the concept of sub-fertility. It is possible that a soldier with a fertility impairing injury, given a normally functioning partner, could still conceive naturally. Should the partner, however, have a condition resulting in sub-fertility (low sperm count, low sperm volume

for men or hormonal cycle variables or minor anatomic variation for women), the partner under S. 3313 would be eligible for treatment.

Currently the Department of Defense as of April 2012 (DoD instruction 1300.24) provides for advanced fertility treatment for soldiers who have suffered genitourinary injury. This DoD policy is a start but as currently written only covers those soldiers with the most severe general injury status who may be infertile. There are soldiers in the DoD who may have suffered isolated genitourinary injury and despite their infertility may remain functional in their MOS and this class of soldiers is not covered for infertility care under current policy. It's important that the Department of Veterans Affairs create policy based on "infertility injury" and not a more general injury scale so as to capture every soldier who has been rendered infertile from battle injury. Every soldier with battle injury infertility deserves access to advanced reproductive technology.

There is a desperate need, not only within the Department of Veterans Affairs but including the Departments of Defense and Health and Human Services to fund a longitudinal, prospective database of soldiers with genitourinary injury to better study the continuum of care from prevention, to initial management in theater, to reconstruction at higher levels of care to fertility treatment and outcomes. S. 3313 takes a critical step in calling for the Dept of Defense and NIH to conduct collaborative research to address long-term reproductive health care needs of veterans with service-connected GU/reproductive injuries. Also to this end, I want to bring to the Committee's attention HR 1612 which has been re-introduced this session with the sponsorship of Congressman Brett Guthrie along with 25 co-sponsors in the House. The Bill, promulgated by the American Urological Association, seeks to establish a National Commission on Urotrauma. The 16 member Commission, a collaboration of the Departments of Defense, Veterans Affairs, and Health and Human Services, will be a sunset Commission with defined objectives as follows: 1) To conduct a comprehensive study of the present state of knowledge of the incidence, duration, and morbidity of, and mortality rates resulting from urotrauma and of the social and economic impact of such conditions; 2) To evaluate the public and private facilities and resources (including trained personnel and research activities) for the prevention, diagnosis, and treatment of, and research in such conditions; and 3) To identify programs (including biological, behavioral, environmental, and social programs) in which, and the means by which, improvement in the management of urotrauma can be accomplished. The Bill has been scored at a nominal cost and the offset has been identified. I would be happy to discuss the Bill further with any members of the Committee who would like to learn more and perhaps support it.

There is a wealth of expertise and the infrastructure is in place within the Department of Veterans Affairs and Department of Defense to provide soldiers with fertility-impairing injuries comprehensive management so that they may have their own children. S. 3313 unlocks that capability for soldier in the VA system to protect them from the $20-30,000 per cycle fees in the private sector where they now by necessity seek treatment. This is a wrong that S. 3313 rights. We as a nation have done better recently at addressing the physical disability that results from war injury. Appropriately, hundreds of millions of dollars have been dedicated to the research and development of prosthetics to return soldiers with loss of limb to a higher degree of physical ability. We are getting better at detecting and addressing the psychological wounds of war from PTSD and traumatic brain injury. There's an important group who have been left behind: those suffering the publicly-invisible but intensely emotionally painful loss of fertility as a result of

genitourinary injury. Let's together show these finest of Americans that we are willing to go beyond our current efforts of physical and emotional support. Let us use the expertise and tools that we have in place today to restore their fertility so that they may one day look into the eyes of their own children and see the family history, pride, and hope for the future that so many of the rest of us have been blessed to know. We owe these brave Americans no less for the sacrifices they have made for our great nation.