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## PESTICIDE EXPOSURES DURING ODS

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### INTRODUCTION:

The anticipated endemic diseases and other health problems based on medical intelligence reports- AFMIC- that could have been dispersed by various pests led those of us who were members of the 12<sup>th</sup> Preventive Medicine Command; the theater command and professional staff for occupational and public health; to specifically identify, recommend, acquire, and use various pesticides to control pest vectors and consequent exposures. As stated in the OSAGWI report: Pesticides were identified and selected for use in areas where individuals ate, slept, worked, and relaxed during leisure activities. Pesticides included liquid, solid, and gaseous formulations. While some pesticide were sprayed or placed on terrain, equipment, or structures; other pesticides were sprayed directly onto clothing, bedding, or the skin. Pesticides were used prior to deployment, during deployment in theater, and upon re-deployment. Consequently, individuals were exposed to a continuous mixture of pesticides. Some pesticides used during ODS were acquired through official sources. These pesticides can be classified as: (1) organophosphorous compounds, (2) carbamate compounds, (3) organochlorine compounds, (4) pyrethroid compounds, (5) and DEET. However, while pesticide compounds available for purchase and use in the United States are usually approved by the EPA or FDA, pesticides acquired in other countries are not. Additional pesticides were acquired through local purchase because of Army, Navy, and Air Force supply system failures. Consequently; the purity, chemical composition, quantity, or concentration of these local purchase pesticides is unknown because records were destroyed. Therefore the determination of actual dispersal formulations, appropriate dispersal techniques, consequent environmental persistency may be difficult if not impossible. The result is that the health and environmental effects caused by exposures to these pesticides may be difficult to anticipate because correlation between exposures and health or environmental effects escaped detection. These last concepts are very important and must be considered during any discussion of pesticide use with consequent human and animal exposures during all phases of the Persian Gulf War. Today, irrefutable evidence exists that pesticide exposures have, do, and will cause adverse health effects. These effects depend on: (1) type of pesticide (chemical composition); (2) pesticide concentration; (3) route of exposure; (4) duration of exposure; (5) combinations or reactions with other types of chemical, biological, or radiological exposures; (6) decontamination efforts, effectiveness, and timeliness; and (7) the scope, type, and timeliness of medical care provided to any person or animal that has been exposed to a particular pesticide or combination of pesticides.

#### TRAINING AND EDUCATION:

The safe use of pesticides was and still is a concern. Although, we knew we that we must use pesticides to control various pests very little if any education and training was completed. Individuals assigned to preventive medicine units, usually with the military medical occupational specialty (MOS) code 91S, military police, and individuals assigned to unit field sanitation teams (FST), any MOS, were responsible for pesticide application. Therefore, these individuals should have been provided specific training and education on safe use of pesticides. Initial or minimal civilian pesticide training is at least 24 hours if not 40 hours in length. These programs are usually prepared and conducted by professional scientists employed by the USDA Cooperative Extension service. Although, individuals involved in pesticide applications during ODS should have completed similar training they did not for many reasons. Consequently, misuse of pesticides was a rampant problem.

#### PRE-DEPLOYMENT:

The medical intelligence regarding potential pests and consequent diseases provided by the Armed Forces Medical Intelligence group (AFMIC), information available from non-military and non-governmental sources, and discussions with other PM personnel identified many serious concerns that we should consider. Consequently, we as preventive medicine and military operations personnel analyzed the information and determined that pesticides must be acquired, distributed, and used to control the various vectors that could carry or transmit these diseases. Once this analysis was complete pesticides and various procedures were identified to meet anticipated needs. We then ordered the identified pesticides and additional equipment needed to use these pesticides. While we were able to acquire some pesticides prior to deployment that we loaded on our trucks and took with us, we had to wait for other pesticides to be acquired and shipped to us in theater by the military supply (logistics) command. Although, some pesticides and some dispersal equipment was acquired no personnel protective equipment other than standard issue NBC protective equipment was available and thus it was not acquired and taken with us to Saudi Arabia.

#### DEPLOYMENT:

The urgent need for pesticides and non-availability of U.S. source EPA and FDA approved pesticides to meet the identified needs resulted in the local purchase of pesticides throughout the theater of operations. Therefore, the chemical composition, purity, uses, and PPE requirements for these pesticides were not known. In many cases we did not even know what they were other than they would kill pests. While OSAGWI report authors acknowledge this on page 57 of the January 3, 2001 report both they and the RAND report authors decided to ignore this potential problem with consequent exposures and adverse health and environmental effects. One of the reasons that information is incomplete is that documentation was deliberately destroyed. This includes the theater chemical and biological logs that were ordered destroyed in Florida during December 1996. This deliberate destruction has been verified by Seymour Hersch (refer to "Against All Enemies" page 71) and GAO investigators. As reported by the OSAGWI report authors pesticides were applied in all areas. However, because pesticides included local purchase and U.S. supplies, in many cases the actual pesticide

quantities, specific name of the pesticides, pesticide formulations, application procedures, application locations, required safety precautions, and expected effects were unknown. Once more, the deliberate disregard by OSAGWI investigators of the local purchase issues suggests that IOM must specifically contact those PM personnel who were involved in actual pesticide work during ODS. Pesticides were applied where individuals ate, slept, and worked as reported by OSAGWI. Individuals also applied pesticides directly to their uniforms and to their skin. Pesticides were also used extensively to delouse enemy prisoners of war (EPW's) and on cots, clothing, basically all over. Lindane was used via sprayers to delouse EPW's. The DELOUSING procedures and equipment are WWII vintage. Another issue that has been ignored until considered by my colleagues as we prepared this paper on the potential pesticide exposures storage and consequent outgassing, with temperature variations, of pesticides from wood that was used as flooring and other structures. Pesticides were liberally sprayed over on to the wood once built but also may have come with impregnated pesticides. The next issue was local purchase and consumption of food, specifically fresh fruits and vegetables that may have pesticide residuals. These foods were served in military dining facilities and also consumed in host nation facilities. Although several preventive medicine and medical personnel were on scene, the delousing was done by military policemen. OSAHA / NIOSH approved PPE was not used and pesticide training and education for these individuals was extremely limited. Consequently, individuals were exposed with several nurses now reporting serious adverse health effects. As usual recognition of exposures, health effects, and medical care is ineffective. In almost all instances of pesticide use in theater safety precautions were incomplete or ineffective. Therefore we know that unacceptable exposures occurred. However, it is very difficult to determine actual extent of exposures because of record destruction, retaliation against anyone who spoke up about problems a time of use, and lack of prompt medical assessment and care.

#### RE-DEPLOYMENT:

The preparation for shipment of equipment and movement of personnel from Iraq, Saudi Arabia, Kuwait, and other wartime support locations required decontamination including pesticide application to eliminate any pests that could threaten our agricultural system. Consequently various facilities were set up to clean (decontaminate) equipment. Unfortunately, the process was incomplete because of time constraints, individual carelessness, equipment deficiencies, and inadequate training. The important consideration is the transfer of pesticides and consequent uncontrolled individual exposures.

#### PERSONAL PROTECTIVE EQUIPMENT:

All pesticides sold in the U.S. are provided with material Safety data Sheets (MSDS's) that specify PPE requirements. Preventive medicine and other military personnel who applied pesticides during any phase of the war did not possess nor use appropriate personnel protective equipment to include: respirators, eye protection, coveralls, boots, or gloves. Personnel only had their M17 or M40 protective mask, MOPP of BDO chemical agent suit, standard uniforms, and issue gloves. This equipment does not meet OSHA or NIOSH standards! Respirators with OSHA / NIOSH approved

organic filters were never acquired. Safety glasses or goggles were unavailable. I raised this issue of PPE before deployment, during deployment, and as we re-deployed. However, appropriate PPE was never provided to any individual involved in pesticide application that I am aware of through observation or discussions with my PM and FST colleagues during or since ODS. It is very disturbing that the OSAGWI report authors barely discussed the fact that approved PPE was unavailable. The OSAGWI report authors also did not define PPE (page 73) and thus a serious issue is avoided because to PPE would verify the dangerous PPE deficiencies that exist in PM units.

#### COMBINED EXPOSURES:

Any analysis of pesticide exposures and potential adverse health effects and environmental must not be done in isolation. ODS was fought on a toxic battlefield with many different types of exposures. These exposures included: (1) uranium, (2) other low-level radioactive materials, (3) chemical warfare nerve agents, (4) biological warfare agents, (5) industrial chemicals, (6) endemic diseases, (7) pyridostigmine bromide, (8) various immunizations, (9) oil well fire combustion byproducts, (10) CARC paint, (11) non-ionizing (RF) radiation, (12) human and animal waste, (13) pesticide solvents or carriers (14) and pesticides. Each of these individual exposures may or will affect the same physiological systems that may or will be affected by pesticide exposure.

Consequently any discussion of pesticide exposures must consider the inter-relationships between multiple exposures and how these combined exposures may affect individual health. These interactions thus make a study of individual exposures and potential adverse health or environmental effects complicated. Physiological assessments, medical treatment, and a prognosis must consider all additive, subtractive, synergistic, or potentiating effects for not just single but combined exposures. For example: An individual who was exposed to a carbamate pesticide such as carbaryl after consuming PB (Mestinon), which is itself carbamate compound will experience an additive effect and consequent nerve agent poisoning. Both of these compounds are cholinesterase inhibitors that affect nerve impulse transmission. The detected releases of nerve agents from collateral damage releases also contributed to adverse health effects from combined exposures. This could account for the thousands of soldiers who got sick immediately upon ingestion of PB during ODS. This is just one example that must be considered. Consequently because very few if any studies published in peer review literature or any other literature have looked at the health effects of these combined exposures, the members of the committee must expand their search for answers beyond limited single agent or peer reviewed literature.

#### HEALTH EFFECTS:

We did have immediate reports of adverse health effects (neurological) caused by pesticide exposures similar to those reported by farmers and people who were exposed to pesticides in their homes or where they worked. While very few if any were acute exposure cases, too many individuals experienced minor neurological problems for this to be ignored. However, because of other more pressing problems individuals just kept on working without adequate medical assessment or care. If individuals received fat soluble pesticide exposures during any phase of military service and then received an additional exposures they bodies threshold level could be exceeded with consequent adverse health effects. Today, Gulf War veterans from around the world are experiencing and reporting

neurological problems that may be related to the misuse of and consequent inhalation, ingestion, or absorption of pesticides and / or pesticide mixtures. I am personally experiencing and my physicians have documented neurological problems.

**RECENT EVENTS:** During 1992, while assigned as an environmental scientist and educator (IPA) with the U.S. Army Corps of Engineer's Construction Engineering Research Laboratory, co-located with the University of Illinois at Urbana – Champaign, I visited Sheppard Air Force Base in Texas. As part of my responsibilities I completed a hazardous materials use assessment and found serious misuse, that I reported, of pesticides. These findings and incident correspond with the subsequent exposure and serious neurological degradation of Major Michael Donnelly. Major Donnelly had originally been exposed to preventive medicine applied pesticides and collateral damage released nerve agents during Military operations in Iraq and Saudi Arabia. Then again, during the summer of 2000, military medical personnel participating in Golden Medic 2000, under the command and control of the 330<sup>th</sup> Medical Brigade, were deployed to the field to live and work in tents and fixed structures located at Camp Parks, California. Pesticides had been liberally sprayed into these structures and on to the terrain just prior to the arrival of the military medical personnel. Several dozen individuals became very sick requiring immediate medical care. However, Camp Parks installation officials had not made adequate arrangements for emergency medical care because they refused to authorize assigned medical assets to provide emergency care to the deployed personnel. Consequently individuals who became ill had to obtain medical care at their own expense from private agencies. Today, some of those medical professionals are still experiencing adverse health problems caused by misuse of pesticides and ineffective medical care.

#### **SUMMARY:**

As one of the few licensed pesticide applicators in the 12<sup>th</sup> P.M. during ODS, I was very disturbed by: (1) the limited acquisition of some pesticides; (2) unavailability of approved pesticides; (3) local purchase of pesticides; (4) unavailability of and lack of use of PPE; (5) inadequate reporting; (6) destruction of records; (7) inadequate knowledge of pesticide formulations; (8) inadequate knowledge of specific pesticide adverse health effects; (9) inadequate knowledge of adverse health effects from combinations of pesticides, chemical warfare agents, PB, and other hazardous materials; and (10) inadequate education and training of PM or FST personnel. Historically and today, individuals in agriculture community, pesticide applicator community, and the general public who have been exposed to various pesticides show subtle and acute adverse health effects. Since most of these exposures were single in nature and not combined with a multitude of toxic exposures such as individuals encountered during ODS we must consider not only the suspected or proven adverse health effects of pesticides exposures but the previously unknown adverse health effects when we combine pesticides with immunizations, chemical and biological warfare agents, ingestion of pyridostigmine bromide (PB), depleted uranium, other radioactive materials, endemic diseases, oil well fire combustion byproducts, CARC paint, industrial chemicals, hazardous materials, and other occupational and environmental exposures.

Another significant problem that IOM must address is the method by which the committee members derive their conclusions. As previously discussed the use of only

peer reviewed literature to derive your conclusions while ignoring actual written or verbal reports from those who were involved is a serious error. During the Gulf War those of us who were there as scientists, engineers, and physicians investigated events, collected data, analyzed collected information, and made decisions. Although, it would have been ideal if we could have followed procedures such as required for peer reviewed report publication that was impossible. When things are blowing up around you, people are dying, you have incomplete information because it is unavailable, you can not acquire it, and you do not possess proper instrumentation you can not prepare reports that fulfill per reviewed publications criteria. Consequently, there is very little if any information about what actually happened regarding pesticide use and effects published in peer reviewed journals. I do not know of anyone who was actually involved in pesticide operations who has written and published an article in a peer reviewed journal. However, many reports were written, verbal reports or comments made, and recommendations offered by those of us who were involved with pesticides or other exposures during any phase of ODS. Consequently, DA and DOD officials have tried to quash this information through retaliation that includes: lost jobs, verbal threats, directives to shut up, ransacked houses, lost pay, denial of medical care, destroyed documents, burned offices, blown up cars, and any other technique that will prevent information dissemination and correlation between exposures and consequent adverse health and environmental effects. Today, Army Regulation 40-5: Preventive Medicine is being rewritten. However, those of us with the most experience and who will have the primary obligation for safety are not being permitted to participate in the review and rewriting process. The majority of preventive medicine and medical assets are in reserve units. However, reserve personnel participation in development of guidelines is restricted to ensure political correctness.

#### RECOMMENDATIONS:

1. The committee members must request that DOD officials provide all copies of actual ODS pesticide reports.
2. While per reviewed literature should be used; the committee members must not limit the derivation of their conclusions to only these documents.
3. The committee members should recommend based on acknowledged misuse of pesticides, willfully denied or delayed physical medical assessments, inability to determine actual exposures, inability to identify which pesticides were used in theater, inadequate safety procedures, and reported neurological problems in ODS veterans that veterans be awarded presumption of exposures and consequent medical care and / or compensation for documented adverse health effects such as neurological abnormalities, respiratory problems, and cancers.
4. The committee members should recommend that all military personnel involved in pesticide application complete an initial USDA approved pesticide applicators certification course (at least 40 hours) and that they maintain proficiency through annual re-certification.
5. The committee members should recommend that specific pesticide use protocols be adopted and implemented by DOD officials.
6. The committee members should recommend that Reserve and National Guard medical professionals be involved in all protocol development specifically Army Regulation 40-5: Preventive Medicine.

