

A Detailed Review of Systems: An Educational Feature

Angela Phillips, DNP, APRN, Arthur Frank, MD, PhD, Collette Loftin, PhD, and Sara Shepherd, MAMS

ABSTRACT

Assessment is the foundation of health care. A goal in health care is to attain a comprehensive history and review of systems during the first encounter with the patient. The evidence-based recommendations presented in this article are informed by unpublished data from real-life experiences using a detailed review of systems during an ongoing medical surveillance program involving former nuclear workers from a United States Department of Energy site.

Keywords: assessment, nurse practitioners, primary care, review of systems

© 2017 Elsevier Inc. All rights reserved.

INTRODUCTION

Assessment is considered the basis, or foundation, of health care. The act of gathering information about a patient is the first step in the nursing process. Adequate information from the patient drives the plan of care. The goal is to attain a comprehensive history and review of systems (ROS), if possible, on the first encounter with the patient.

The evidence-based recommendations presented herein are informed by unpublished data from real-life experiences using a detailed ROS during an ongoing medical surveillance program of former nuclear weapons workers from a United States Department of Energy (DOE) site.

WHY IS DETAILED ASSESSMENT IMPORTANT?

Primary care (PC) is an essential element within the health care system. Nurse practitioners (NPs) are skillful at providing PC and acute care, and are often the first contact with patients. This initial contact may include discovering an undiagnosed sign, symptom, or health concern. Specific case causes can be difficult to determine. Therefore, we understand that medical screening is important in PC. Medical screening includes an ROS.

American Association of Nurse Practitioners (AANP) members may receive 1.0 continuing education contact hours, approved by AANP, by reading this article and completing the online posttest and evaluation at aanp.inreachce.com.

Within the PC setting, patients seeking care are often working individuals with possible occupational exposures, and thus employee health will cross over into PC. Providers should have knowledge of occupational and environmental risk factors, as they are likely to encounter occupational injuries and/or diseases related to exposures if they are looking for them. Increasingly, knowledge of occupational and environmental risk factors are included as part of a comprehensive health inventory, accurate differential diagnosis, and an evidenced-based plan of care.¹

Primary care providers (PCPs) who encounter patients and workers with job-related diseases or injuries may be involved in the workers' compensation system. As a result, a careful ROS will include necessary documentation as the provider elicits a diagnosis and plan of care.

SURVEILLANCE AND SCREENING WITHIN PUBLIC HEALTH AND PC

There is growing attention in the scientific literature on the health care of a population, not just on individual patients. According to Kindig, population health is defined as "the health outcomes of a group of individuals, including the distribution of such outcomes within the group."^{2(p1)} Public health is the science involved in protecting and improving the health of families and communities.³ Medical screening often plays an important role in prevention

of serious illnesses. It is also an essential process in all types of health care. The public health system has ongoing systematic collection, analysis, interpretation, and dissemination of data regarding health-related events.⁴ Surveillance data are used to guide immediate action within the public health system and is thus vital to a PC practice. Also, within occupational health, surveillance and screening are central activities. Surveillance includes data collection to measure the magnitude and trends of health changes in a defined population. Occupational health screening is testing to identify individuals with disease and is aimed at early detection. A detailed ROS is used within public health and occupational health surveillance and screening activities. As such, a PCP will need a basic understanding of occupational and environmental risk factors for disease and disability.¹

These ideas and procedures about the importance of careful ROS evaluations are all accepted tenets of our assessment role. However, does the ROS always get the attention it needs in a busy patient encounter? As a clinician, do you always follow best practices?

THE ROS

The ROS is an integral part of an evidence-based nursing assessment practice. The use of some type of a ROS is widely accepted and recognized throughout health care.⁵ A ROS is a systematic list of questions arranged by organ systems that is useful in aiding clinicians to uncover clinical problems that may be at the root cause of a disease process and that may otherwise go unnoticed. The ROS serves as a guide to help identify potential or underlying illnesses or disease states subjectively, thus allowing the NP to prioritize systems for follow up in the objective examination. The ROS can also help the provider obtain information about a chief concern as well as the history of present illness. Many potential problems can be “red flagged” to be explored during the objective portion of the assessment—the head-to-toe physical exam.⁶ The danger of not using an ROS as the guiding element in a whole-patient assessment is potential inadvertent omission of essential information.

The literature overwhelmingly demonstrates the importance of completing an ROS for a patient who

does not have life-threatening illness or injury within the primary care setting. Knowing the history of a patient helps focus the interview on specific patient complaints to identify possible health care concerns.⁷ In addition to establishing rapport between the provider and patient, new diagnoses can be found.⁸

There is no “gold standard” for completing the ROS. There are dual objectives in ROS completion, namely: (1) to obtain additional information about the patient’s chief complaint and history of present illness; and (2) to elicit symptoms of potential problems in uninvolved systems. The NP asks the patient questions and the conversation builds layer upon layer of information about the patient’s physical status. As each body system is addressed, going head to toe, the NP explores any abnormalities reported. The questions posed by the NP may often remind patients about health concerns they have but did not think about reporting. Through candid discussion about occupational hazards, environmental risks, past health, and surgical history, augmented by stories told by the patient, valuable information can be obtained.⁸

DOE FORMER WORKER PROGRAMS

As a meaningful example to illustrate these concepts, the National Defense Authorization Act for Fiscal Year 1993 called for the DOE to provide ongoing medical evaluations, at no cost, to all former DOE federal, contractor, and subcontractor workers. The Former Worker Medical Screening Program is conducted within the DOE Office of Environment, Health, Safety and Security and has provided over 128,000 exams.⁹

This DOE program provides ongoing medical screening examinations for all former DOE federal, contractor, and subcontractor workers who may have been at risk for occupational disease. It reflects a commitment to the health and safety of all DOE workers, past and present, who have served the nation in security and other missions.¹⁰ Surveillance evaluations were first mandated in 1993 by the National Defense Authorization Act to document baseline health status, specific exposures, and adverse effects among former nuclear weapons workers.¹¹

The Pantex Former Worker Medical Surveillance Program (PFWMSP, which is sponsored by the DOE

under contract grant number DEFCO1-06EH06003) is 1 of 4 regional DOE programs that began in 2005 and is ongoing. The PFWMSP offers former employees and contract workers the opportunity to obtain an independent, objective, comprehensive health care screening at no cost. Assessment of a former worker's (FW) health status in relation to exposures is completed by a provider experienced in occupational medicine. The PFWMSP program also communicates results to participants and to PCPs and specialists.

As part of this program, research data from a retrospective chart review were collected on all exams conducted in this PFWMSP program between 2005 and September 2016. The records were compiled electronically by the database manager. A careful evaluation was completed to include initial visits as well as rescreen visits. Each new problem identified during the visit was noted and each problem was examined individually as a finding during the careful ROS. Only the new problems identified as a result of the ROS were included in the data described in this unpublished contract study. A total of 2,588 charts were included. Of these visits, 1,034 were first-time patients and 1,554 were rescreening exam patients. In all, over 90% of the visits were completed by NPs.

From the 2,588 charts reviewed, 2,010 new problems were identified based on physical exam, spirometry, lab findings, chest X-rays, and ROS. There were 177 new problems identified exclusively as a result of only careful ROS. This equates to 11.36% of the new findings directly related to careful ROS. As a result of these newly identified health concerns, the FWs were directed to their health care provider for further evaluation and management.

IMPLICATIONS FOR PRACTICE

This example of occupation and environmental issues that may be linked to patient problems underlines and illustrates clearly the importance that the PCP must place on completion of an accurate medical history. A detailed ROS should be included as this may be the only chance a patient has to have unsuspected problems properly detected/identified.¹²

The foundational part of PC has been described as resting on several essential components: the

longitudinal, trusted relationship with the patient; diagnostic skill; therapeutic understanding; and compassion. These components intertwine for the benefit of the patient.¹ One of the most important parts of being an NP is the ability to utilize skills from a nursing background. The discipline of nursing, in general, advocates that nurses get to know their patients to better understand their problems and needs.¹³ NP students and clinicians are always challenged to utilize this person-centered approach to care.

The current health care environment pushes PCPs to handle an increased number of patients. Anecdotal, PCPs commonly complain that, due to time constraints dictated in the care of patients, a thorough ROS often is pushed aside. The PCP must be firmly convinced of the value of the information obtained through the ROS if they and their institution are willing to spend the time collecting these data. A message that NPs must send to administrators is that this time is well used, as the identification of these conditions may save money in the future for the patient and the health care system and may have a positive impact on morbidity and mortality.

Using the example related to occupational and environmental evaluation, within PC practices, there is perhaps a particularly large and unrecognized gap in collection of occupational exposures that may relate to disease processes. Walker et al¹ argued that the knowledge of a patient's potential risks to exposures through their working environment and/or hobbies is essential in providing comprehensive care. As PCPs today have made it routine to ask about smoking status, it should become common routine to ask about the details of a patient's occupation.

The idea of exploring the patient's occupation was illustrated in a research study by Santacana et al,¹⁴ who documented asthma related to occupation as a major finding within PC practices. Another report suggested that newly diagnosed adults with asthma should always be asked about their occupation and whether their symptoms improved when away from work.¹⁵ A PCP can initiate investigations to confirm that the symptoms are indeed due to asthma and occupational exposures. Serial peak flow monitoring and early referral to a pulmonology specialist can then be completed.

IMPORTANCE FOR EVALUATION AND MANAGEMENT CODING TO PRACTICE

A patient history and ROS are elements of the Evaluation and Management (E&M) history component. The US Centers for Medicare and Medicaid Services defines the ROS as “an inventory of body systems obtained by asking a series of questions in order to identify signs and/or symptoms that the patient may be experiencing or has experienced.”^{16(p7)} There are 14 recognized systems making up the ROS. The provider asks pointed questions to coax additional and potentially important pieces of medical information. The systems with positive or pertinent negative responses must be individually documented to qualify for the overall code level for the visit. A detailed ROS is needed to move the E&M service beyond the problem-focused level.¹⁷

To make good use of the ROS, it is important to use or develop an ROS template specific for a given population or organization, such as the one included in the [Figure](#). As a provider uses the template repeatedly, they become comfortable with the content on the template. Additional questions should be added as needed and as the chief complaint dictates. For example, if the chief complaint is fever, the ROS question set will focus on inflammation within each body system. The ROS will allow providers to capture valuable information to make an accurate diagnosis and manage the case rather than minimally complying with E&M coding requirements.¹⁷

IMPORTANCE OF ELECTRONIC HEALTH RECORDS IN PRACTICE

Electronic health records (EHRs) were mandated as part of the American Recovery and Reinvestment Act of 2009. We know that PC practices that did not implement EHR systems by 2015 had a 1% reduction in Medicare reimbursements.¹⁸ The benefits underlining the switch to an EHR system may be reflected in improved provider decisions and patient outcomes and better population and public health.^{19,20}

There has been some debate regarding the reality of EHR use within PC.²¹ When used correctly, EHRs may increase access to broader and more standard documentation. The ROS for an institution or practice should be included in the initial setup of an EHR system and should be accessible to all

relevant people for calculation of the correct level of care for each visit.

When the PC practice sets up the ROS templates within their EHR system, NPs should ask for a role in what is included in the ROS. Again, returning to our example, this is a chance to make sure there is no gap in occupational exposure questioning. Prompts in the system to inquire about a patient's occupation while taking a history will make it easy to document in the EHR in a standard place in the ROS.

IMPLICATIONS FOR EDUCATION RELATED TO OCCUPATIONAL AND ENVIRONMENTAL RISKS

When viewed from an occupational and environmental perspective, it is clear that workplace exposures encompass a wide range of human disability and death in American society.²² When learning basic assessment formats or orientation in a practice that has patients who have high occupational or environmental risks, clinicians should be taught that abnormal complaints may arise from work-related asbestos-related diseases, silicosis, pneumoconiosis, lung nodules, obstructive airway dysfunction, mesothelioma, and other types of cancers.¹⁰ Without an exposure history it is difficult to make the correct diagnosis. The assessment and history-taking skills of the NP who takes a complete exposure history plays an important role in detecting, treating, and preventing disease due to unrecognized exposures.²²

PCPs in their initial assessment interaction with the patient may identify a sentinel event relating to an occupational or environmental exposure. NP educational programs should include information regarding the overlap within occupational medicine and primary care, as well as appropriate techniques for documenting potential harmful exposures. NP education should stress that students always complete evaluation of the history of present illness, past history, and the detailed ROS as a standard essential practice for any problem, but this should be done in such a way that it will also identify any potential illness related to exposures. As patient exposures to harmful substances may emerge as a public health problem, PCPs need to know when and how to refer a patient, and to whom, when harmful exposure is suspected. Although standard EHR templates may help identify patient symptoms or problems due to

Figure. Sample review of systems (ROS) format from the Pantex program.

REVIEW OF SYSTEMS

<p>SKIN</p> <p><input type="checkbox"/> Rashes</p> <p><input type="checkbox"/> Itching</p> <p><input type="checkbox"/> Change in hair or nails</p> <p>HEAD</p> <p><input type="checkbox"/> Headaches</p> <p><input type="checkbox"/> Head injury</p> <p>EYES</p> <p><input type="checkbox"/> Glasses or contacts</p> <p><input type="checkbox"/> Change in vision</p> <p><input type="checkbox"/> Eye pain</p> <p><input type="checkbox"/> Double vision</p> <p><input type="checkbox"/> Flashing lights</p> <p><input type="checkbox"/> Glaucoma/Cataracts</p> <p><input type="checkbox"/> Last eye exam</p> <p>EARS</p> <p><input type="checkbox"/> Change in hearing</p> <p><input type="checkbox"/> Ear pain</p> <p><input type="checkbox"/> Ear discharge</p> <p><input type="checkbox"/> Ringing</p> <p><input type="checkbox"/> Dizziness</p> <p>NOSE/SINUSES</p> <p><input type="checkbox"/> Nose bleeds</p> <p><input type="checkbox"/> Nasal stuffiness</p> <p><input type="checkbox"/> Frequent colds</p> <p>ALLERGIES</p> <p><input type="checkbox"/> Hives</p> <p><input type="checkbox"/> Swelling of lips or tongue</p> <p><input type="checkbox"/> Hay fever</p> <p><input type="checkbox"/> Asthma</p> <p><input type="checkbox"/> Eczema/Sensitive</p> <p><input type="checkbox"/> Sensitivity to drugs, food, pollens, or dander</p> <p>MOUTH/THROAT</p> <p><input type="checkbox"/> Bleeding gums</p> <p><input type="checkbox"/> Sore tongue</p> <p><input type="checkbox"/> Sore throat</p> <p><input type="checkbox"/> Hoarseness</p> <p>NECK</p> <p><input type="checkbox"/> Lumps</p> <p><input type="checkbox"/> Swollen glands</p> <p><input type="checkbox"/> Goiter</p> <p><input type="checkbox"/> Stiffness</p> <p>BREAST</p> <p><input type="checkbox"/> Lumps</p> <p><input type="checkbox"/> Pain</p>	<p><input type="checkbox"/> Nipple discharge</p> <p><input type="checkbox"/> BSE</p> <p>RESPIRATORY/CARDIAC</p> <p><input type="checkbox"/> Shortness of breath</p> <p><input type="checkbox"/> Cough</p> <p><input type="checkbox"/> Production of phlegm, color</p> <p><input type="checkbox"/> Wheezing</p> <p><input type="checkbox"/> Coughing up blood</p> <p><input type="checkbox"/> Chest pain</p> <p><input type="checkbox"/> Fever</p> <p><input type="checkbox"/> Night sweats</p> <p><input type="checkbox"/> Swelling in hands/feet</p> <p><input type="checkbox"/> Blue fingers/toes</p> <p><input type="checkbox"/> High blood pressure</p> <p><input type="checkbox"/> Skipping heart beats</p> <p><input type="checkbox"/> Heart murmur</p> <p><input type="checkbox"/> HX of heart Medication</p> <p><input type="checkbox"/> Bronchitis/emphysema</p> <p><input type="checkbox"/> Rheumatic heart disease</p> <p>GASROINTESTINAL</p> <p><input type="checkbox"/> Change of appetite or Weight</p> <p><input type="checkbox"/> Problems swallowing</p> <p><input type="checkbox"/> Nausea</p> <p><input type="checkbox"/> Heartburn</p> <p><input type="checkbox"/> Vomiting</p> <p><input type="checkbox"/> Vomiting blood</p> <p><input type="checkbox"/> Constipation</p> <p><input type="checkbox"/> Diarrhea</p> <p><input type="checkbox"/> Change in bowel habits</p> <p><input type="checkbox"/> Abdominal pain</p> <p><input type="checkbox"/> Excessive belching</p> <p><input type="checkbox"/> Excessive flatus</p> <p><input type="checkbox"/> Yellow color of skin (jaundice/hepatitis)</p> <p><input type="checkbox"/> Food intolerance</p> <p><input type="checkbox"/> Rectal bleeding/Hemorrhoids</p> <p>URINARY</p> <p><input type="checkbox"/> Difficulty in urination</p> <p><input type="checkbox"/> Pain or burning on urination</p> <p><input type="checkbox"/> Frequent urination at night</p> <p><input type="checkbox"/> Urgent need to urinate</p> <p><input type="checkbox"/> Incontinence of urine</p> <p><input type="checkbox"/> Dribbling</p> <p><input type="checkbox"/> Decreased urine stream</p> <p><input type="checkbox"/> Blood in urine</p> <p><input type="checkbox"/> UTI/stones/prostate infection</p> <p>PERIPHERAL VASCULAR</p> <p><input type="checkbox"/> Leg cramps</p> <p><input type="checkbox"/> Varicose veins</p>	<p><input type="checkbox"/> Clots in veins</p> <p>MUSCULOSKELETAL</p> <p><input type="checkbox"/> Pain</p> <p><input type="checkbox"/> Swelling</p> <p><input type="checkbox"/> Stiffness</p> <p><input type="checkbox"/> Decreased joint motion</p> <p><input type="checkbox"/> Broken bone</p> <p><input type="checkbox"/> Serious sprains</p> <p><input type="checkbox"/> Arthritis</p> <p><input type="checkbox"/> Gout</p> <p>NEUROLOGIC</p> <p><input type="checkbox"/> Headaches</p> <p><input type="checkbox"/> Seizures</p> <p><input type="checkbox"/> Loss of Consciousness/Fainting</p> <p><input type="checkbox"/> Paralysis</p> <p><input type="checkbox"/> Weakness</p> <p><input type="checkbox"/> Loss of muscle size</p> <p><input type="checkbox"/> Muscle spasm</p> <p><input type="checkbox"/> Tremor</p> <p><input type="checkbox"/> Involuntary movement</p> <p><input type="checkbox"/> Incoordination</p> <p><input type="checkbox"/> Numbness</p> <p><input type="checkbox"/> Feeling of "pins and needles/tingles"</p> <p>HEMATOLOGIC</p> <p><input type="checkbox"/> Anemia</p> <p><input type="checkbox"/> Easy bruising/bleeding</p> <p><input type="checkbox"/> Past Transfusions</p> <p>ENDOCRINE</p> <p><input type="checkbox"/> Abnormal growth</p> <p><input type="checkbox"/> Increased appetite</p> <p><input type="checkbox"/> Increased thirst</p> <p><input type="checkbox"/> Increased urine production</p> <p><input type="checkbox"/> Thyroid trouble</p> <p><input type="checkbox"/> Heat/cold intolerance</p> <p><input type="checkbox"/> Excessive sweating</p> <p><input type="checkbox"/> Diabetes</p> <p>PSYCHIATRIC</p> <p><input type="checkbox"/> Tension/Anxiety</p> <p><input type="checkbox"/> Depression/suicide ideation</p> <p><input type="checkbox"/> Memory problems</p> <p><input type="checkbox"/> Unusual problems</p> <p><input type="checkbox"/> Sleep problems</p> <p><input type="checkbox"/> Past treatment with Psychiatrist</p> <p><input type="checkbox"/> Change in mood/change in attitude towards family/friends</p> <p>SIGNATURE _____</p> <p>DATE _____</p>
--	---	---

exposures, the single most important aspect in the approach to a patient with potential occupational or environmental exposures is to have a suspicion and to follow up on that suspicion. Although many clinicians recognize the importance of taking a work and exposure history to evaluate certain problems, most have had little training or practice in doing so.

HOW CAN NP STUDENTS LEARN TO TAKE A COMPLETE ROS?

There are many types of health care personnel involved in assessing and treating patients. As a result of a focus on identifying the importance of a thorough ROS, an increased emphasis may be built into didactic experiences regarding the ROS. Taking a detailed ROS should be included in objective structured clinical examination case studies. Through the experience of objective structured clinical examination, NP students can be involved in using the ROS as a key tool in driving decision-making as they create a plan for the standardized patient they encountered. Just as medical workers are educated about the potential of blood and body fluid exposure in their line of work, patients within a PC practice can be taught by the provider to look for potential exposures in their line of work. This mandate is stressed both in foundational educational classes taken by the health care provider but also emphasized consistently within clinical experiences. Within PC and population and public health care, a careful ROS is important in thorough assessment of patients.

In this study we have shown that taking time to complete a careful ROS can yield positive findings. The benefits of careful ROS utilization for E&M coding, EMRs, and education have been described. JNP

References

1. Walker B, Adenuga B, Mouton C. The relevance of occupational medicine to primary care in the 21st century. *J Natl Med Assoc.* 2011;103(4):306-312.
2. Kindig D. What are we talking about when we talk about population health? *Health Affairs Blog.* 2015. <http://healthaffairs.org/blog/2015/04/06/what-are-we-talking-about-when-we-talk-about-population-health/>. Accessed June 26, 2017.
3. US Centers for Disease Control Foundation. What is public health? 2017. <http://healthaffairs.org/blog/2015/04/06/what-are-we-talking-about-when-we-talk-about-population-health/>. Accessed June 27, 2017.
4. US Centers for Disease Control and Prevention. Updated guidelines for evaluating public health surveillance systems. 2001. <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5013af.html>. Accessed June 28, 2017.
5. Jenkins S. History taking, assessment and documentation for paramedics. *J Paramed Pract.* 2013;5(6):310-316.
6. Celia F. Taking a patient history. *Ophthalmol Times.* 2013(iTech Suppl):8-12.
7. Saccomano S. Dizziness, vertigo, and presyncope: what's the difference? *Nurse Practitioner.* 2012;37(12):46-52.
8. Bishop J. Subjective experience and medical practice. *J Med Philos.* 2012;37:91-95. <http://dx.doi.org/10.1093/jmp/jhs013>.
9. Office of Environment, Health, Safety & Security. 2016 Former Workers Annual Report, p 1. <https://www.energy.gov/sites/prod/files/2017/06/f34/2016-FWP-Annual-Report.pdf>. Accessed June 20, 2017.
10. Office of Environment, Health, Safety & Security. 2016. <https://safetyfestnn.org/blog/clients/u-sdepartment-of-energy-office-of-environment-health-safety-security/>. Accessed September 7, 2016.
11. National Defense Authorization Act for Fiscal Year 1993, Public Law 102-484, October 23, 1992.
12. Cegolon L, Lange J, Mastrangelo G. The primary care practitioner and the diagnosis of occupational diseases. *BMC Public Health.* 2010;10:405.
13. Rhynas F. Taking a patient history: the role of the nurse. *Nursing Stand.* 2012;26(24):41-46.
14. Santacana V, Panades-Walls R, Vila-Rigat R, et al. Prevalence of work-related asthma in primary health care: study rational and design. *Open Respir Med J.* 2015;9:127-139.
15. Levy M, Nicholson P. Occupational asthma case finding: a role for primary care. *Br J Gen Pract.* 2004;54(507):731-733.
16. US Department of Human Services. Centers for Medicare & Medicaid Services. Evaluation and management services. 2016. <https://www.coursehero.com/file/16626992/eval-mgmt-serv-guide-ICN006764/>. Accessed June 26, 2017.
17. Goldsmith H. Review of systems, *PM's Newsletter Series.* September 2013. <http://podiatrym.com/pdf/2014/12/Goldsmith1114weyR.pdf>. Accessed June 26, 2017.
18. National Electronic Health Records Survey. 2015 state and national electronic health record adoption summary tables. 2015. https://www.cdc.gov/nchs/data/ahcd/nehrs/2015_nehrs_web_table.pdf. Accessed June 26, 2017.
19. Blumenthal D, Tavenner M. The "meaningful use" regulation for electronic health records. *New Engl J Med.* 2010;363(6):501-504.
20. Friedman D, Parrish G, Ross D. Electronic health records and US public health: current realities and future promise. *Am J Publ Health.* 2013;103(9):1560-1567.
21. Balestra M. Electronic health records: patient care and ethical and legal implications for nurse practitioners. *J Nurse Pract.* 2017;13(2):105-111.
22. Agency for Toxic Substances and Disease Registry. Case studies in environmental medicine taking an exposure history. 2015. <https://www.atsdr.cdc.gov/csem/csem.html>. Accessed July 5, 2017.

Angela Phillips, DNP, APRN is an assistant professor at West Texas A&M University in Canyon, TX. She can be reached at aphillips@wtamu.edu. Arthur L. Frank, MD, PhD, at Drexel University in Philadelphia, PA. Collette Loftin, PhD, RN, is an assistant professor in the Department of Nursing at West Texas A&M University. Sara Shepherd, MAMS, is a database coordinator at the University of Texas Health Science Center in Tyler, TX. This work is based on the Pantex Former Worker Medical Surveillance Program (contract grant sponsor: United States Department of Energy; contract grant number: DE-FC01-06EH06003).

In compliance with national ethical guidelines, the authors report no relationships with business or industry that would pose a conflict of interest.

1555-4155/17/\$ see front matter
© 2017 Elsevier Inc. All rights reserved.
<http://dx.doi.org/10.1016/j.nurpra.2017.08.012>