

MEDICAL EXAMINATIONS

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2-1. Introduction

1. Occupational radiation exposure criteria are based upon the concept that there may be some degree of risk from any level of radiation exposure, although medical knowledge shows the risk from radiation exposure within limits to be small. No radiation injuries have been scientifically proven to be causally related in man to exposures which were compliant with existing radiation protection guidelines.

2. Radiation workers receive focused medical examinations to establish whether or not cancer is present which would medically disqualify a person from receiving occupational radiation exposure. In determining the scope of the radiation medical examination (RME), the primary determinants were clinical value as well as logistic feasibility. The RME is not intended to replace the routine health screening exams that may be recommended by a worker's primary care provider.

3. The medical standards are based on:

a. Guidelines established by the United States Preventive Services Task Force, American Cancer Society, and early cancer screening methods issued by the National Cancer Institute.

b. Stochastic (without a dose threshold, random) and deterministic radiation health effects.

4. Ionizing RMEs are documented on NAVMED 6470/13, Medical Record - Ionizing Radiation Medical. When performing multi-purpose examinations (i.e., submarine, nuclear field, and ionizing radiation work) the NAVMED 6470/13 is used only for RMEs and is independent

of other examination forms (i.e., DD Form 2807-1, Report of Medical History and DD Form 2808, Report of Medical Exam). The NAVMED 6470/13 is filed together with other examination documents, but not as an addendum. In these cases, the NAVMED 6470/13 should be filed on top of other examination documents.

2-2. Types of Ionizing Radiation Medical Examinations (RMEs)

1. *Preplacement Examination (PE)*

a. The following personnel require a PE:

(1) Individuals being considered for assignment as radiation workers prior to assignment or transfer to those duties.

(2) Individuals who have been radiation workers at one time or another, received a termination examination, and are now being considered for re-entry into the program.

b. The following personnel do not require a PE:

(1) Non-radiation workers and members of the general public.

(2) Visitors including messengers, service personnel, and delivery personnel.

(3) Personnel exposed sporadically such as emergency response personnel; dentists, dental technicians and other dental paraprofessionals; nurses and ward personnel; explosive ordinance disposal (EOD), SEALs, Navy Divers, and Marine Force Recon personnel; and personnel who receive less than 100 millirem of occupational ionizing radiation dose annually unless required by the appropriate radiological controls manuals for specific program requirements.

c. Individuals who are not required to have a PE but who exceed 500 mrem (5 mSv) exposure in a calendar year, must have a PE within one month of the date they exceed 500 mrem (5 mSv) or as soon thereafter as documented operational requirements permit.

2. *Reexamination (RE)*. Personnel who are to continue in routine duties as radiation workers must have an ionizing RME, defined as a RE, as follows: Periodicity between examinations will not exceed 5 years up to age 50. After age 50, periodicity will not exceed every 2 years, e.g., an individual examined at age 46 would be re-examined at 51, an individual examined at age 47, 48, 49, or 50 would be re-examined at age 52. Beginning at age 60 the examination is required annually. The exam may be performed earlier than the required frequency to distribute medical examination workload evenly, or to combine the RE with a

medical exam required for another purpose, or for any other reason. BUMED strongly encourages combining examinations whenever possible. The RE must be performed no later than the end of the month following the anniversary date (month and year) of the previous RME's physical examination date, i.e., for an exam performed on 15 February 2005, the reexamination must be completed by 31 March 2010. When constrained by ship operating schedules, the examination is to be performed at the earliest opportunity.

3. **Situational Examination (SE).** Any individual who has exceeded the radiation protection standards for radiation workers as stated in Chapter 4, or has ingested or inhaled a quantity of radioactive material exceeding 50 percent of an ALI, or whom an attending physician deems necessary must be given an ionizing RME, defined as an SE. ALIs are listed in International Commission on Radiological Protection, Publication Number 30 or in Appendix B of Title 10, Part 20, of the Code of Federal Regulations. ALIs for commonly used isotopes are reprinted for convenience in Appendix B of this manual. The medical history must contain summary statements which provide the basis for performing the examination.

4. **Termination Examination (TE).** Radiation workers will be given a TE as near as practical to, but no earlier than 6 months prior to satisfying one of the following conditions:

- a. Upon separation or termination of their active duty or employment if they received a PE, and have documented occupational radiation exposure (including personnel monitored for exposure but who received 00.000 rem).
- b. When permanently removed from duties as a radiation worker.

If a TE is not completed or not performed, e.g., due to lack of employee cooperation, etc., a NAVMED 6470/13 will be prepared and completed to the maximum extent practicable. The reasons why the form is incomplete will be recorded in the Summary of Abnormal Findings and Recommendations block of the NAVMED 6470/13.

5. **Other Examinations.** Medical examinations in the worker's medical record other than RMEs and results of consultations for individuals physically qualified as radiation workers will be reviewed by a physician or medical department representative for findings or evaluations affecting continued qualification as a radiation worker.

- a. Medical examinations performed outside the Department of Defense should not be requested for routine review. Individuals may submit medical information from their private physicians for consideration by the attending physician for specific criteria required for completion of the NAVMED 6470/13 as well as required information relating to diagnosis, treatment, and continued presence of cancer. In these cases, the Navy remains solely responsible for determining whether the medical information from the private physician will be accepted or rejected.

b. Outside examinations from private health care providers or specialty consultations and outside diagnostic studies required to complete evaluations listed in articles 2-3 and 2-4 must be tracked by the medical department administering the RMEs to ensure completion of the examination. This tracking should start with a face-to-face discussion with the worker concerning the need to complete the evaluation by the private resource within 45 days of the date the RME is started. Failure to comply will result in supervisor and worker notification that the worker may have his or her medical qualification suspended for ionizing radiation work. Medical staff should seek to assist the worker in completing this requirement by providing the worker with a written statement delineating the tests/medical evaluation required. In any case, the period for renewal of radiation worker medical qualification noted in article 2-2, paragraph 2 shall not be exceeded.

2-3. Scope of Examination. The RME will include:

1. **Medical History.** A *focused* medical history will include:

(a) History of accidental or occupational exposure to ionizing radiation above the Table 1 limits.

(b) History of cancer.

(c) History of anemia or Hematuria.

(d) History of radiation therapy.

(e) History of radiopharmaceuticals received for therapeutic purposes.

(f) History of work involving handling of unsealed sources.

(g) Significant illnesses or changes in medical history since the last ionizing RME that might be related to cancer. Positive results of the medical history blocks 3 through 10 shall be documented in the Summary of Abnormal Findings block of the NAVMED 6470/13.

2. **Physical Examination.** The examination will consist of the items described in the Physical Examination blocks of NAVMED 6470/13. *The date of the physical examination shall be the date of the Reviewing Physician's signature in Block 23 of NAVMED 6470/13.* The medical examination will place particular emphasis on determining the existence of cancer. All RMEs shall normally be performed by physicians, nurse practitioners or physician assistants who have received BUMED-approved radiation health training. Examinations performed by a physician assistant or nurse practitioner must be signed by a physician reviewer trained per above. The reviewing physician's signature also satisfies the counter-signature requirement.

3. *Special Studies.* The required documented special studies are:

a. White Blood Count (WBC) and Hematocrit (HCT) within 3 months prior to conduct of the physical examination.

b. Urinalysis. Urine will be tested for red blood cells using either dipstick or microscopic high-powered field within 3 months prior to conduct of the physical examination.

c. Breast examination (manual/clinical breast examination) is required for females age 40 and older. Civilian female workers may have this examination performed by their civilian provider and submit the documentation to the Navy examiner. Civilian female workers may also submit results of mammography examinations for consideration. Female pelvic examination is not required.

d. Digital Rectal Exam (DRE) is required for males age 40 and older. The DRE may be performed by the worker's private physician if so desired by the worker. Documentation of the results of the DRE must be provided if performed by a private physician. The DRE results shall be recorded on the NAVMED 6470/13.

e. In addition, the following special studies may apply:

(1) Occupational intake of radioactive material and assessment of the committed effective dose equivalent or committed dose equivalent shall be performed following Chapter 3 of this manual.

(2) When deemed necessary by the responsible physician, radiation health officer, or radiation health director, a radiobioassay may be performed on body tissues, secretions, and excretions to estimate an exposure from internal contaminants. If a command lacks the capability to perform the appropriate radiobioassay or to perform committed effective dose equivalent or committed dose equivalent calculations, a request for assistance shall be submitted to one of the support facilities designated in Chapter 3.

(3) Additional requirements to perform special exams due to specific work environments can be provided in the applicable program radiological controls manual with Chief, BUMED approval.

f. The periodicities for renewal of radiation worker medical qualification listed in article 2-2, paragraph 2 shall not be extended to accommodate outside physical examinations or special study results. Workers who do not complete outside private testing within the limits of article 2-2, paragraph 5b will be temporarily designated not physically qualified (NPQ), have their dosimeter issue privileges suspended, and where applicable, be placed on the command dosimetry issue not allowed (DINA) (disqualification) list. The worker's dosimeter issue privileges shall be reinstated when the RME is completed and the worker is found physically qualified.

2-4. Standards

1. These standards apply to all occupationally exposed personnel, regardless of classification.

2. Individuals found NPQ based upon these requirements may be reevaluated at a later date. Unless specified, the following will be cause for rejection or disqualification unless the condition is reviewed and the individual found qualified for radiation work by the BUMED REAB (see article 2-8). If a potentially disqualifying condition requiring further evaluation by or reports from a private health care provider or private/government specialist is found during a reexamination, the examining physician shall make a determination as to whether the individual's radiation medical qualification should be suspended pending receipt of the additional information.

a. History of cancer or of cancer therapy. Note: Adequately treated actinic keratosis (AK) or basal cell carcinoma (BCC) is not disqualifying. A medical provider may visually determine if AK has been adequately treated. However, any patient with BCC requiring surgical removal, including shave biopsy and Mohs microscopic surgery, will be considered not physically qualified for radiation work until pathology results of the surgery are obtained. If the pathology report reveals complete excision of the lesion, the BCC is adequately treated and is no longer disqualifying for radiation work. Colon polyps removed during a colonoscopy are not considered disqualifying, but a report from the physician/medical facility performing the colonoscopy is required. If prior treatment for BCC or colon polyps are noted during a reexamination, the individual may remain qualified pending receipt of the pathology report subject to the requirements of article 2-2, paragraph 5b above.

b. History of radiation therapy including radiopharmaceuticals administered for treatment of a disease. Radiopharmaceuticals administered for diagnostic reasons are excluded.

c. History of polycythemia vera.

d. History of leukemia.

e. Workers with open wounds or lesions (including lacerations, abrasions, and ulcerative, eruptive, or exfoliative lesions) that cannot be protected from contamination are subject to temporary disqualification from work in controlled surface contamination areas (CSCA) or handling radioactive material which is not hermetically sealed. Radiation workers with continuous generalized skin lesions noted above are subject to permanent disqualification from work in CSCAs or handling radioactive material which is not hermetically sealed, and require REAB review.

f. Abnormal HCT and WBC

(1) HCT or WBC values that are outside of laboratory normal ranges are considered disqualifying if the repeat HCT or WBC remains abnormal. In each case, the local or attending physician must perform further clinical evaluations to determine the reason for the abnormal HCT or WBC and record this reason. The physician's evaluation of the HCT or WBC and his or her requests for other studies or consultations must be directed toward ruling out cancer and/or bone marrow suppression. The repeat studies will be documented in the Summary of Abnormal Findings block. If a repeat study falls within the laboratory normal range, a comment will be made in the Summary of Abnormal Findings block with an annotation of not considered disqualifying (NCD). If it remains outside the laboratory normal range, the comment will include an annotation of considered disqualifying (CD) if due to cancer and/or bone marrow suppression. If the condition is chronic, has been evaluated during a previous physical examination and determined not to be due to cancer, and laboratory results do not indicate a change in patient status, the condition does not need to be reevaluated.

(2) If cancer or bone marrow suppression is determined, the case shall be submitted to the REAB. Otherwise, the responsible physician can medically qualify the individual for radiation work. The basis for a determination of CD or NCD must be given by the responsible physician as a comment in the Summary of Abnormal Findings block of NAVMED 6470/13.

(3) The laboratory normal values ranges for the HCT, and WBC must be transcribed on the NAVMED 6470/13.

g. Urinalysis. Urine will be tested for red blood cells using either a standard clinical dipstick method or by microscope. The result of the initial test will be written in block 12 of NAVMED 6470/13. The result from the laboratory report shall be transcribed verbatim.

(1) Red blood cells in the urine of 3 or more per high power field require repeat urine microscopy. If the dipstick method is used, a positive dipstick result must be followed by at least 2 microscopic exams to determine if hematuria of 3 or more red blood cells per high power field is present. Document repeat urinalysis results in the Summary of Abnormal Findings block. In each case, the local or attending physician must perform further clinical evaluations to determine the reason for the hematuria (if present) and record this reason. The physician's evaluation of the hematuria and his or her requests for other studies or consultations must be directed toward ruling out cancer. If the repeat study shows fewer than 3 RBCs per high power field, a comment will be made in the Summary of Abnormal Findings block with an annotation of NCD. If the repeat urinalysis shows 3 or more RBCs per high power field, a definitive evaluation by private or government physician will be performed. If definitive evaluation results in a finding of cancer, the Summary of Abnormal Findings comment will include an annotation of CD. If the hematuria is chronic, has been evaluated during a previous physical examination and determined not to be due to cancer, and laboratory results do not indicate a change in patient status, the condition is not disqualifying and does not need to be reevaluated.

(2) If cancer is the suspected cause of the hematuria, the case shall be submitted to the REAB. Otherwise, the responsible physician can medically qualify the individual for radiation work. The basis for a determination of CD or NCD must be given by the responsible physician as a comment in the Summary of Abnormal Findings and Recommendations block of NAVMED 6470/13.

h. If an individual has internally deposited radionuclides associated with an intake of 50 percent of an ALI or more in 1 year, the individual shall be disqualified from duties involving occupational radiation exposure pending REAB review. ALI values for some common isotopes are provided in Appendix B: Annual Limit on Intake.

2-5. Special Documentation Requirements

1. The following specific requirements will be adhered to when completing NAVMED 6470/13. Local reproduction of this form is authorized.

a. NAVMED 6470/13 should be placed at the top of other special duty exams and collected in this position for ready review and audit.

b. RMEs should be performed by physicians, nurse practitioners or physician assistants who have received BUMED approved radiation health training. Examinations performed by a physician assistant or nurse practitioner must be signed by a physician reviewer trained per above. The reviewing physician's signature also satisfies the countersignature requirement.

c. All RMEs must be reviewed to ensure that all components are complete, including special studies and other information to determine qualification. This review requires a credentialed physician's signature, printed name or stamp, and date of review in the reviewing physician block. The reviewing physician may be the same as the examiner, and must have completed BUMED approved radiation health training prior to reviewing radiation health medical examinations for NNPP radiation workers. All reviewing authority signatures need to identify their qualification with the pertinent designation, "UMO" for Undersea Medical Officers, "RAM" for Aerospace Medicine Specialist, and "RHI" for those trained at the Naval Undersea Medical Institute (NUMI) Radiation Health Indoctrination (RHI) course.

d. Any entry in the Summary of Abnormal Findings block of NAVMED 6470/13 concerning an abnormal finding will have an indication of "NCD" or "CD."

e. The examiner and/or the reviewing physician shall discuss the results of the ionizing RME with the examinee. Completion of this discussion shall be documented by the examinee's signature on NAVMED 6470/13.

f. Non-completion of a RME must be documented in the Summary of Abnormal Findings and Recommendation block of NAVMED 6470/13 with specific reasons for non-completion.

g. The physician or examiner will assess whether the individual is physically qualified (PQ) or NPQ for ionizing radiation work, and document the results of this assessment and the basis for CD/NCD findings in the Summary of Abnormal Findings block of NAVMED 6470/13. The basis for a finding of NPQ for ionizing radiation work shall also be documented in the Summary of Abnormal Findings block. If the examiner finds the individual NPQ, review and signature for review of the medical examination shall be performed after receipt of the response from the REAB with the final qualification determination.

h. The requirement for a termination RME will be entered on the front of the individual's health record jacket or employee medical file as "Termination Radiation Medical Examination Required."

2. Results of radiobioassay, internal monitoring, etc., which document monitoring for internally deposited radioactivity, will be documented as required in Chapter 5 of this manual.

3. Consultation reports from specialists for radiation health purposes shall be readily accessible in the patient's medical record for review and audit.

4. No RME report or portion thereof shall be removed from an individual's health record.

2-6. Correction of Deficient Examinations

1. RMEs are considered deficient in scope when clinical evaluations unique to the examinations are missing or incomplete.

a. If the examination is deficient in clinical scope, or found lacking on audit, the appropriate clinical studies and procedures will be performed which satisfy the missing requirements. This information will be added to the deficient examination in the Summary of Abnormal Findings block of the NAVMED 6470/13.

(1) Laboratory studies from previous examinations may be transcribed onto the NAVMED 6470/13 subject to the time limits stated in article 2-3.

(2) Once the examination is sufficient in clinical scope to meet the requirements of a RME, the additional tests or examination elements performed and interval history (e.g., "Member's thyroid exam normal this date, no significant interval history noted since the examination completed on DDMMYYYY. PQ for Ionizing Radiation Work.") will be entered in the notes block of the examination form and signed and dated by the reviewing physician.

(3) The date of the next required RME will be based on the date of the original uncorrected physical examination.

2. Administrative corrections for ionizing RMEs will be made by drawing a single line through the erroneous entry, initialing and dating the change, then adding the correct entry. Corrected entries may also be made in the Summary of Abnormal Findings block of NAVMED 6470/13.

3. Medical examination and health record entries will conform to the standards existing at the time of the examination. Clinically upgrading or administratively correcting an examination to meet current requirements in this manual that were implemented after conduct of the examination is not required.

4. A medical examination previously conducted for another purpose may not be upgraded to an ionizing RME. Laboratory studies from previous examinations may be transcribed onto the NAVMED 6470/13 subject to the time limits stated in article 2-3.

2-7. Radiation Effects Advisory Board (REAB). The REAB determines the effects of ionizing radiation on personnel as an authority established by Chief, BUMED. The Board may be consulted in an official capacity for reference opinions germane to the Department of the Navy (see BUMEDINST 6470.21 series).

2-8. Reporting Requirements for the REAB

1. The following medical examinations and supporting medical documents (see article 2-9) must be submitted to the BUMED, Director of Undersea Medicine and Radiation Health for review by the REAB.

- a. Any finding of cancer.
- b. Findings on a medical history or medical examination of:

(1) History of ionizing radiation exposure in excess of that allowed by article 4-3, paragraph 1a.

(2) History of, or ongoing cancer therapy.

(3) An intake in excess of 50 percent of an ALI of radioactive material not intentionally administered for medical diagnosis or treatment. A description of the analysis technique must be included with the submission.