



U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

ACRS

SECY-12-0064

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Presentation Outline

- **Background**
- **Risk**
- **Occupational Exposure Data**
- **Regulatory Approaches Considered**

Background

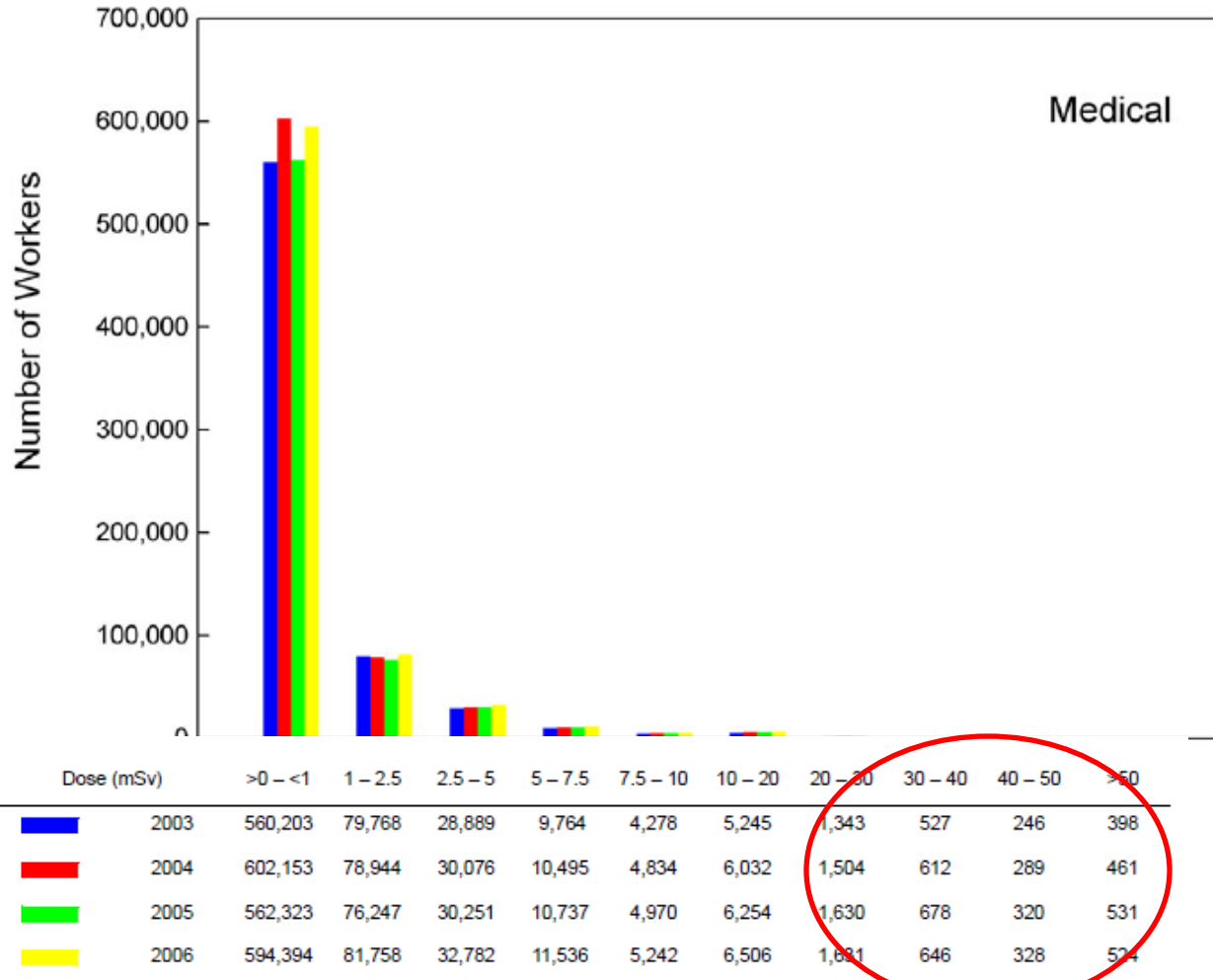
- **SECY-12-0064, April 25, 2012**
- **Staff met with ACRS Subcommittee on Radiation Protection and Nuclear Materials on April 27 and September 18, 2012**
- **Staff met with ACRS on June 6, 2012**

Regulation Risk Basis

- **10 CFR Part 20 Occupational Dose limits based on assumed risk of 1.25×10^{-2} per Sv cancer mortality and risk of heritable disease**
- **Current radiation risk $\approx 5 \times 10^{-2}$ per Sv**
 - **Considered mortality, morbidity and hereditary effects**
 - **Comparable results from UNSCEAR, ICRP, BEIR, NCRP**
 - **EPA “Blue Book” values for U.S. Population**
 - Incidence: 1.16×10^{-1} (5.6×10^{-2} to 2.1×10^{-1})**
 - Mortality: 5.8×10^{-2} (2.8×10^{-2} to 1.0×10^{-3})**

Selection of the Limit Value

- **1977 – ICRP 26**
 - average annual risk of accidental death in industries generally accepted as safe working environment – 1×10^{-4}
 - 5 rem value based on expectation that most individuals would be unlikely to exceed 1 rem
- **1990 – ICRP 60**
 - Multi-attribute approach
 - Objective to prevent cumulative exposure to less than 100 rem (1 Sv)
 - Average and maximum values to provide flexibility for implementation

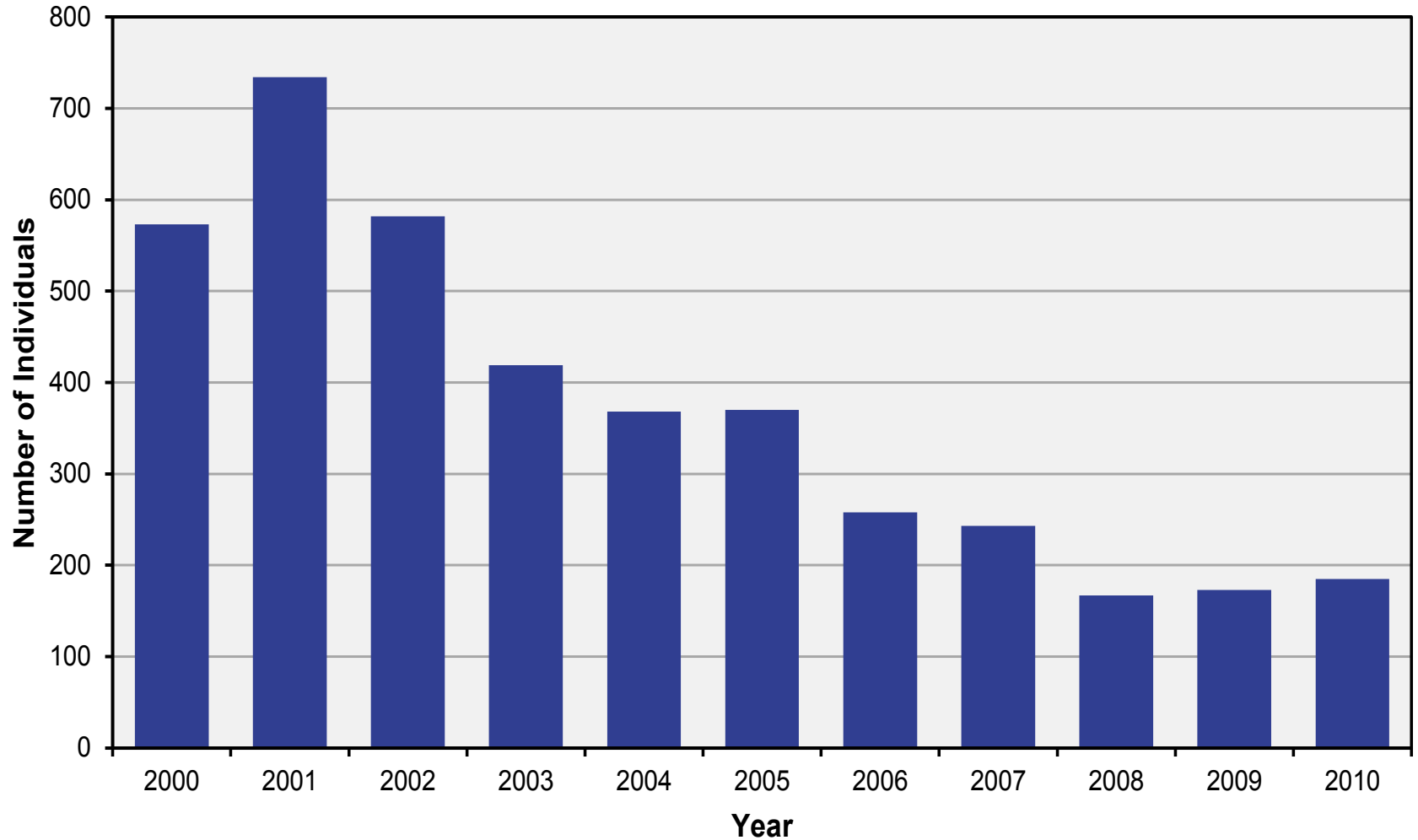


< 20 mSv = 99.57%

Fig. 7.5. Dose distribution for workers with recordable dose for the medical category, 2003 to 2006.

REIRS Data

Individuals with Dose Greater than 2 rem



Findings

- **For reported exposures, almost all exposures are below limits**
- **Individual exposures occur each year in excess of ICRP recommended average**
- **The number of individuals exceeding 2 rem each year is small**

Findings

- **For the individuals at the high dose end of the distribution, multiple years of exposure can exceed recommended lifetime value**
- **The person-rem total of higher dose individuals is small, because of the small number of individuals**
- **By traditional regulatory analysis, little justification for changes**

The Challenge

- **What is the most efficient and effective method to ensure that each individual is adequately protected?**
- **Method must be clear, predictable, and reliable**
- **Method must be applicable to all types of occupational exposures, for all types of uses**

What did Staff Consider?

- **Strengthen ALARA**
- **ICRP Recommended Average and Maximum Limit**
- **Single Lower Dose Limit**

Staff Conclusions

- **A change to limits is a more straight forward, performance based approach than additions to ALARA program requirements**
- **Rulemaking would require designation of adequate protection and/or backfit justification on both quantitative and qualitative grounds**

Staff Conclusions

- **Additional efforts will be needed to develop regulatory basis for a proposed rule**
 - **Explore possible draft rule text**
 - **Explore possible guidance for implementation**
 - **Dose coefficients needed before Appendix B values can be revised**
 - **Detailed cost-benefit information needed for specific proposals**

Questions and Discussion

