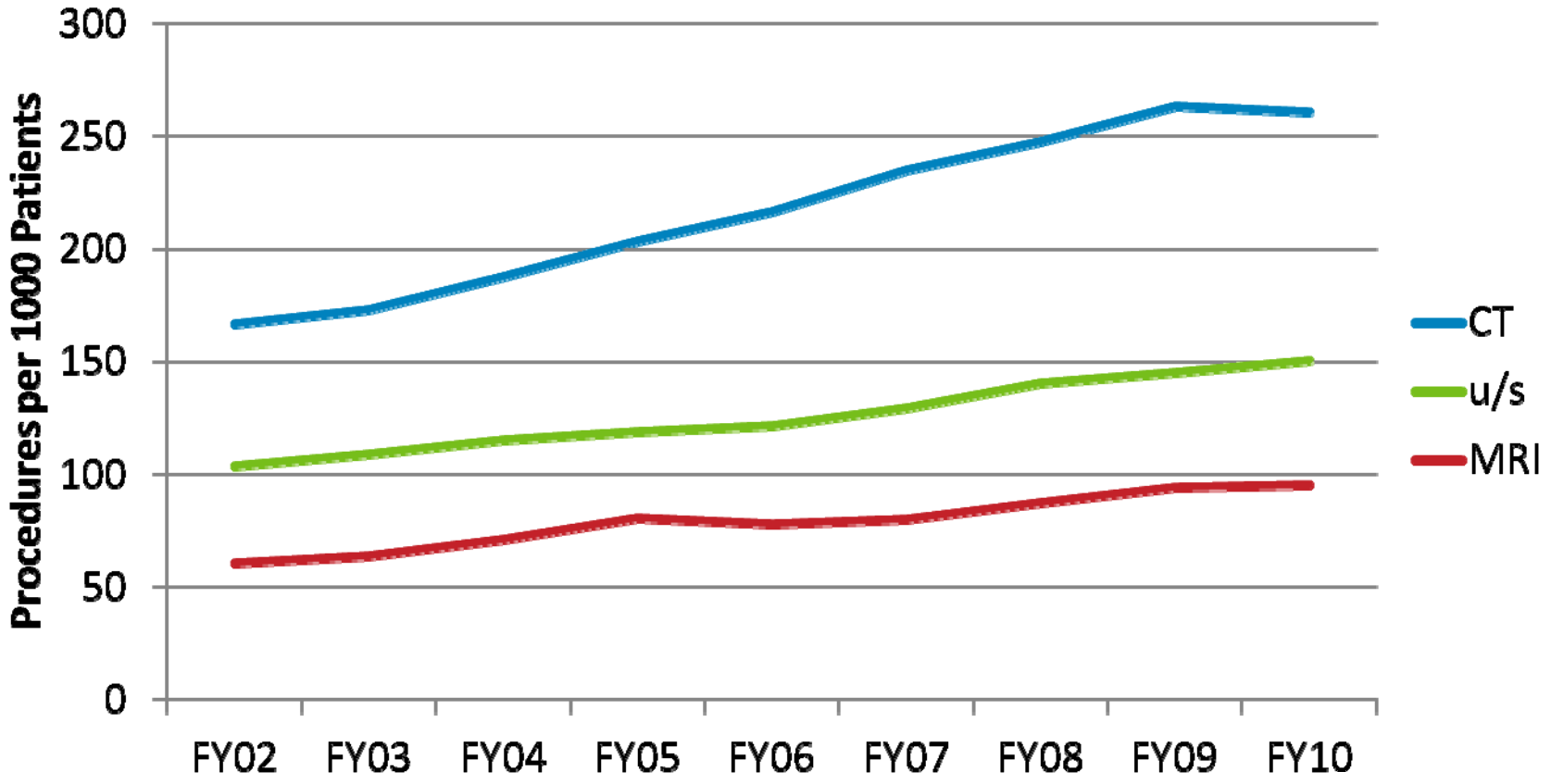
VA HEALTH CARE | Defining EXCELLENCE in the 21st Century

Computed Tomography (CT), Magnetic Resonance Imaging (MRI), & Ultrasound (u/s) / 1000 Patients
Rise per year: CT 8%, MRI 7%, u/s 5%

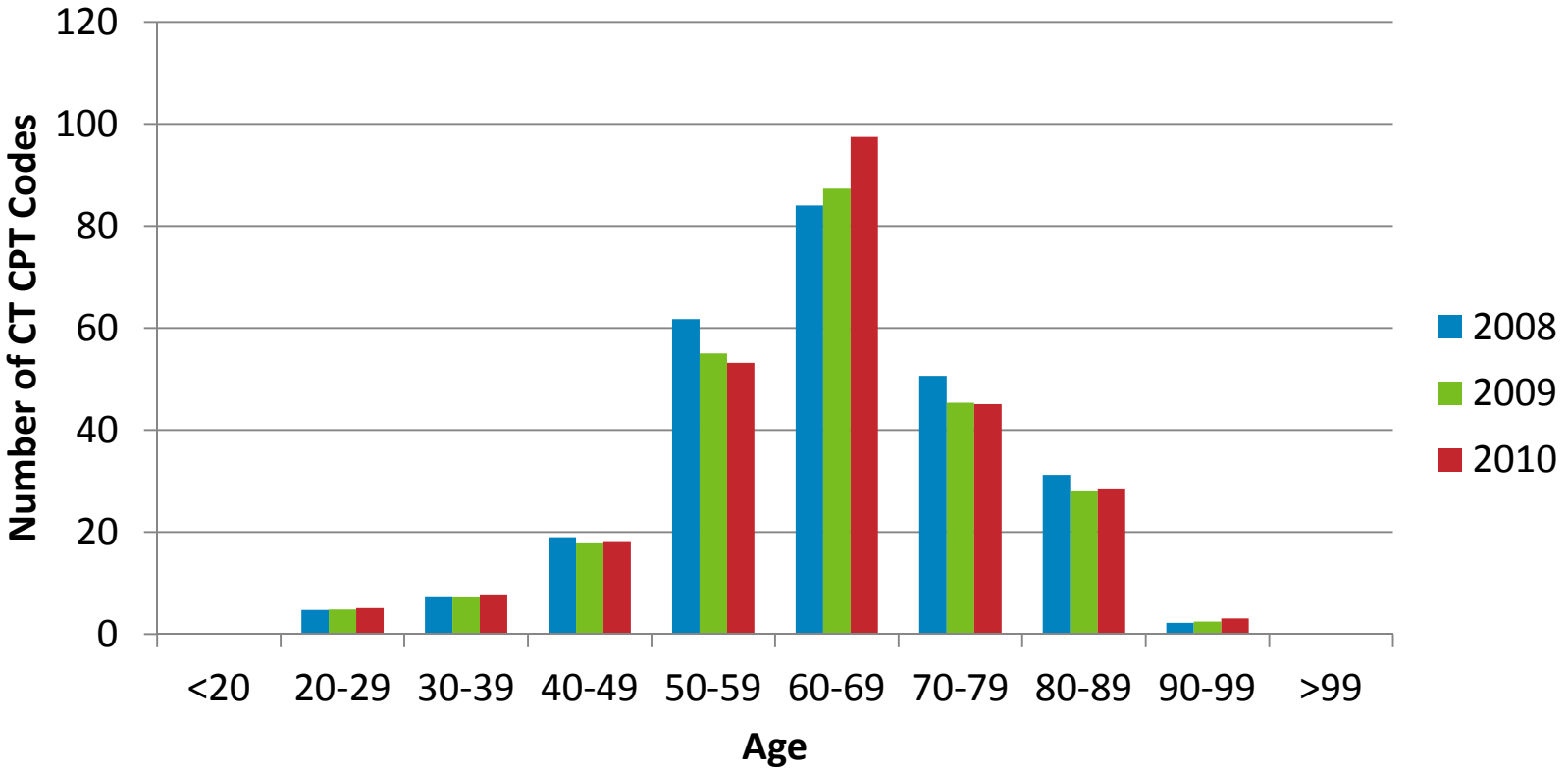


Effect of Publicity of Radiation Effects on CT Utilization

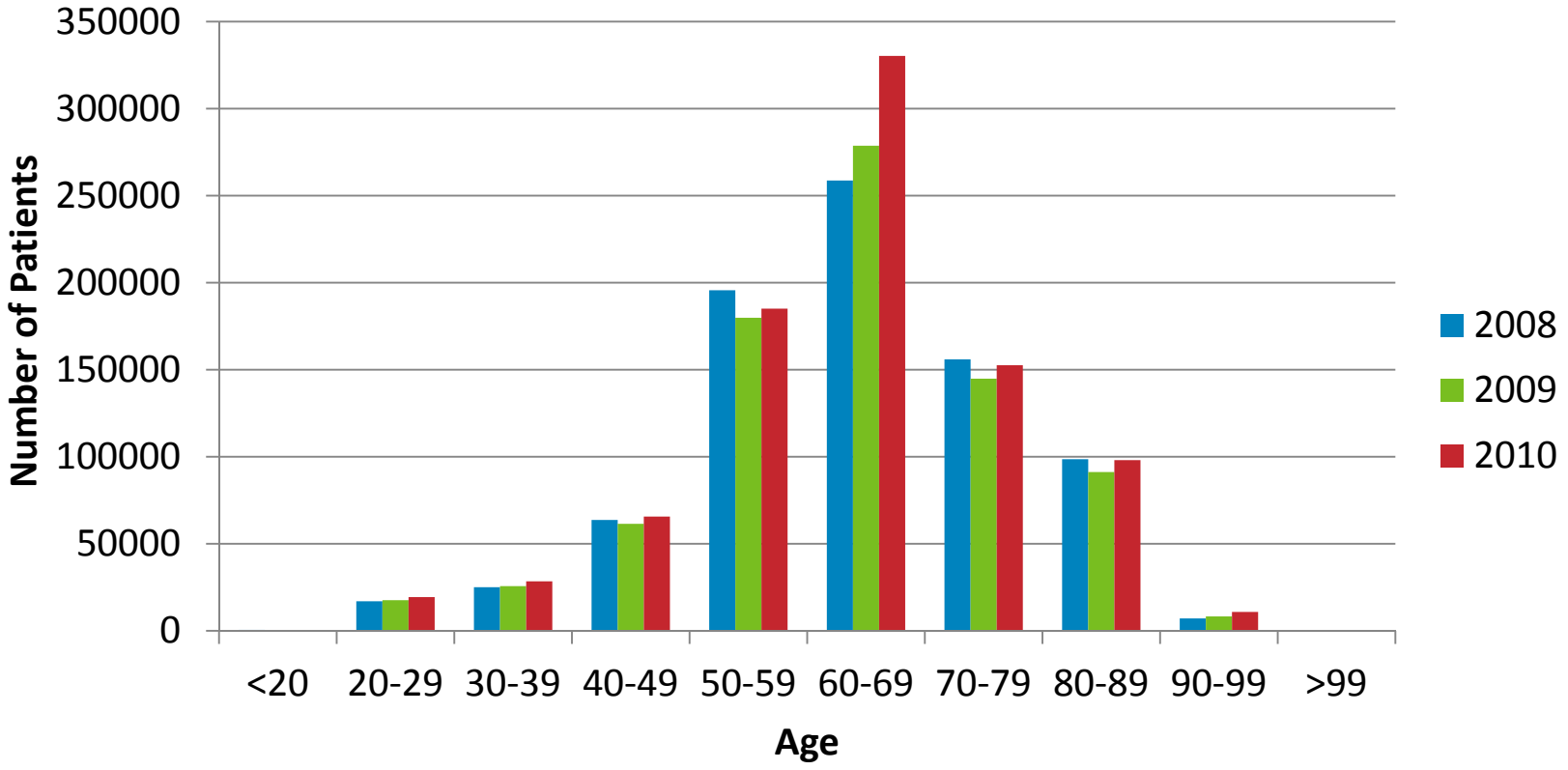
- There has been no reduction in use.

	CT	CT/1000	MR	MR/1000
Apr08-Mar09	1,382,344	261	489,920	92
Apr09-Mar10	1,350,973	248	482,960	88
Apr10-Mar11	1,455,247	259	542,372	96

CTs per 1000 Active Patients per Decade of Age

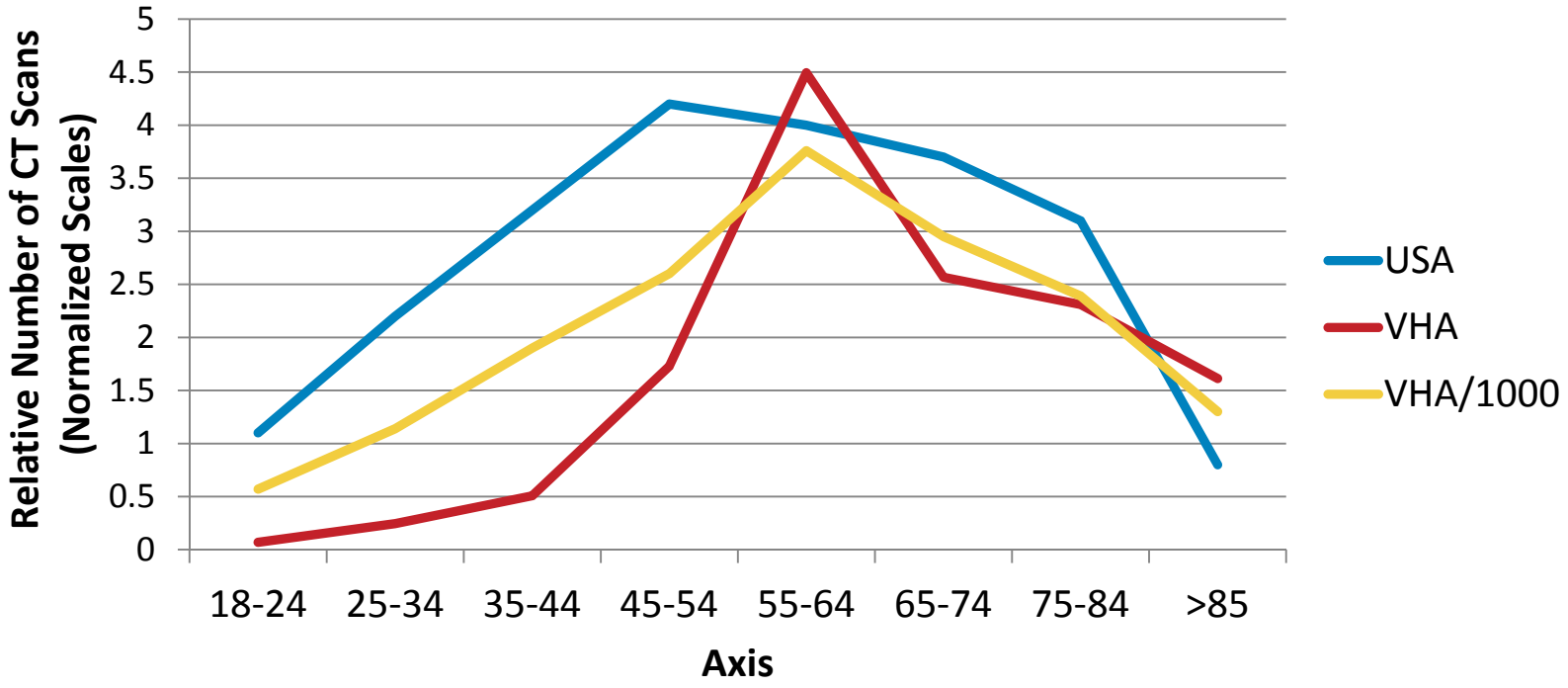


Patients Who Received a CT per Decade of Age

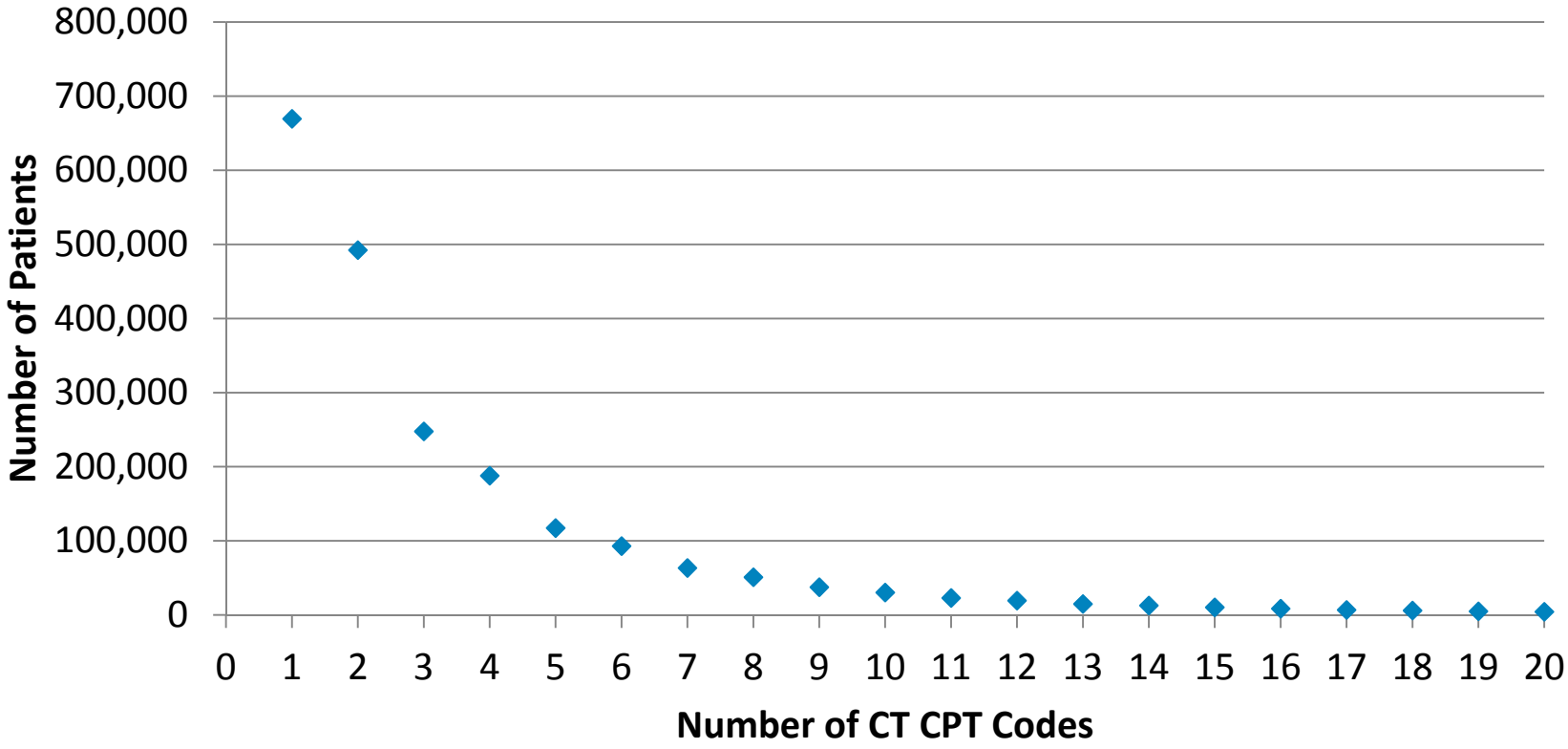


Age Distribution of CT Studies: USA vs. VHA

- USA distribution from Berrington de Gonzalez et.al. Projected Cancer Risk from Computed Tomographic Scans Performed in the United States in 2007. Arch Int Med 2009;169:2071-2077.



Distribution by Patient of CT Scans Performed from 2002 to 2009



Conclusions of Utilization Data

- CT utilization is raising rapidly, however impact on stochastic risk is mitigated by fact that growth is primarily in the 60 to 70 age range.
- Utilization is increasing despite the fact that VA practitioners are protected from personal malpractice liability.
- Utilization is increasing despite the fact that VA physician salary is not dependant on procedure volume.
- Utilization in VHA parallels community practice standards and is not simply driven by economics.

CT Safety

- A study was made of all brain perfusion studies ever performed in VA. No dose exceeded the threshold for deterministic effects.
- A protocol optimization guide was written, explaining
  - Factors that control radiation dose
  - Diagnostic Reference Levels
  - Alerts and Notifications
- After testing the guide at several facilities, protocol optimization was made mandatory.

Fluoroscopy Safety

- All physicians operating equipment must be privileged.
- A course in fluoroscopy safety was written, and placed on the employee education website, with test and certificate. Successful completion of the test can be tracked. Six Continuing Medical Education (CME) credits.
- A comprehensive policy was written on Fluoroscopy safety, including training requirements, defining employees that can operate the equipment, testing of equipment, documenting dose, reporting excessive doses, and recommending patient follow-up.

Informed Consent

- CT patients are given an educational brochure stating there is a cancer risk.
- Consent is obtained for fluoroscopic studies that might exceed 3 Gy Peak Skin Dose.
- Consent is obtained for CT studies that might exceed 3 Gy Computed Tomography Dose Index ($CTDI_{vol}$), however, in practice that level should never be reached.

Reporting Excessive Doses

- Fluoroscopy
  - Peak skin dose in excess of 3 Gy must be documented in the record.
  - Peak skin dose in excess of 5 Gy must be reported to the RSO.
  - Cumulative dose in excess of 15 Gy, or permanent patient injury, is sentinel event.
- CT
  - CTDIvol greater than 3 Gy. However, we would not expect a procedure of this dose to be performed.

Dose Registry

- This is a long range effort.
- Digital Imaging and Communications in Medicine (DICOM) Radiation Exposure Monitoring (REM) structured reports will be sent from the fluoroscope to the local VA image archive. Data will be placed into the radiology information system using VA software.
- Data will be periodically abstracted and placed in a national Corporate Data Warehouse which will serve as patient identified dose registry.

Dose Registry (continued)

- Ultimately, dose history will be available at time of electronic order entry, and can be provided to patient.
- Outstanding issues: historical data, outside studies.

Utilization Management

- Goal is to integrate a software based decision support system at computerized order entry. This will provide detailed utilization data at the national, facility and provider level.
- If this is not feasible, then will use pop-up windows at time of order entry.