Abstract
Background: Quality assurance of percutaneous coronary intervention (PCI) is particularly important at programs where the volume is low (<400 yr/center) as in all Military Treatment Facilities. In addition to statistical analysis of all cardiovascular outcomes, a detailed review of individual deaths is an important part of quality assurance.

Methods: We analyzed multiple risk factors used in regression analysis of outcomes in two large registries, as well as procedural, operator and other variables to attempt to determine what we might do differently to achieve better outcomes after PCI. Furthermore, each individual death within 30 days of the index procedure underwent a detailed chart review to assess other risk factors and variables that were not addressed within our database.

Results: PCIs were performed 929 times in a total of 795 patients, for an average PCI volume of 88/yr. The 30-day and long-term outcomes are reported separately. Eighteen patients died within 30 days of a PCI. Whereas the 30-day risk of death after PCI was high for some patients (up to 97% by NY State regression model), mortality expected on the basis of risk factors was low for others (as low as 0.5%; mean 35%). While some were very elderly (up to 89 years), others were not (as young as 41 years old; mean age 70). Twelve had current heart failure prior to PCI, 11 had acute STEMI as the indication for attempted PCI; 14 had multi-vessel disease, and more than 5 had prior CABG. Six developed multi-organ failure leading to death of which 2 occurred prior to PCI. In 5 patients who died, a decision was made to withdraw support, and in 3 it was determined that anoxic brain injury occurred prior to PCI, raising the question of whether they were candidates for aggressive therapy in the first place. Two patients died after failed attempts at PCI for acute STEMI. Half the patients who died had definite or probable stent thrombosis after PCI; three fourths of those were still on clopidogrel. Two died from massive pulmonary embolism. Two had PCI in the immediate post-op state.

Discussion. We need to: (1) identify why young patients and patients with low pre-procedural risk subsequently die; then try to improve procedural technique and operator expertise to reduce the risk of stent thrombosis and other complications; (2) treat heart failure before performing non-emergent PCI; (3) sustain and improve management of patients with acute STEMI which is a high risk subgroup undergoing PCI; (4) defer or avoid invasive management of cases which may be near end-of-life prior to their acute coronary event; (5) remember pulmonary embolism as a cause of death after PCI, and (6) remember that patients are in a prothrombotic state immediately after major surgery, and (7) continue diligence in respect to long-term antiplatelet therapy. Perhaps we should make greater use of prasugrel in lieu of clopidogrel.

Conflict of Interest
The authors report no conflict of interest.

Correspondence to:
Emilio Fentanes MD; emilio.fentanes@us.army.mil