

to various reasons that rendered them ineligible), but they had sufficient data to analyse the outcome of 29 events that collectively produced 8364 casualties and 903 immediate deaths. They examined the relative mortality and morbidity rates for three types of bombing – open air blasts, confined blasts and blasts that resulted in structural collapse. One in four victims died in bombings involving structural collapse, one in twelve in confined space explosions and one in twenty five in open air bombings. They also found a biphasic response in the mortality curves for bombings – a high immediate death rate, followed by a low early (Emergency Department) and late (in hospital) mortality. This may be due to the out of hospital care, which tends to be delayed when compared to conventional trauma (where a triphasic distribution is seen characterised by immediate deaths, early deaths [within 60 minutes] and late deaths [24-48 hours]) [15]). Another contributory factor may be the arrival rates of critically injured patients; it is rare that an Emergency Department will be overwhelmed with simultaneously dying patients.

A4.3.5 Also of note in Reference 14 are the injury proportions of hospitalized patients by bombing type. This report documents a much higher incidence of blast lung, eardrum rupture and burns (i.e. primary, tertiary and quaternary injury) for explosions in confined spaces, when compared to bombings in the open or those involving structural collapse. Explosions involving structural collapse were dominated by crush and fracture injuries, and explosions in open environments were characterised by a high proportion of penetrating (i.e. secondary) injuries in casualties. This demonstrates the differing blast injury mechanisms that can exist in each blast environment.

A4.3.6 Many reports have been written to document the increasing ability of computational models to simulate blast environments. Stuhmiller [5] gives a summary of the progression of the biological, physical and mathematical models to predict blast injury; however, he also highlights that the possibility to validate these models is limited. This presents the situation

