study	method and assumptions	optimal shelter time depends on	optimal shelter time in poor shelters	optimal shelter time in poor shelters
Davis *et al.* [9]	recommendations based on subject matter expertise and analysis of a simple, hypothetical fallout pattern	knowledge of overall fallout pattern	no dependence on shelter quality fallout pattern known: do not shelter (evacuate immediately) fallout pattern not known: wait for responder guidance (may be 1–2 days)	
Florig & Fischhoff [10]	analytic solution assuming a spatially homogeneous outdoor radiation field	shelter quality evacuation time (independent of outdoor dose rate)	remain only the first few hours	remain several days
Poeton *et al.*[11]	scoping estimate based on a simple, hypothetical fallout pattern and criteria to avoid exposure to 1+ Sv (threshold for acute health effects)	shelter quality distance from detonation (used as a surrogate for outdoor dose rate)	distance from detonation: <16 km: remain only shortly after fallout arrival (implicitly a few hours) >16 km: remain 1–2 days	remain 1–2 days
US federal guidance [4]	recommendations based on existing knowledge and techniques	knowledge of overall fallout pattern outdoor dose rate shelter quality impending hazards (e.g. fire) medical needs food and water operational and logistical considerations	no quantitative value or method provided (typical expected shelter time of 12–24 h) sheltering advised until basic fallout pattern is known and appropriate evacuation path determined (likely to be at least several hours) individuals in poor shelters should be prioritized for evacuation or transit to higher quality shelter self-evacuation strongly discouraged in first day	
Archibald & Buddemeier [12]	numerical analysis of evacuation for five complex, hypothetical fallout patterns along an ‘optimal’ or similar evacuation path	shelter quality indoor dose rate (outdoor dose rate = indoor dose rate×shelter quality)	outdoor dose rate ($Sv\,h^{-1}$ at 1 h post detonation): >0.4: remain first few hours <0.4: remain up to 1 day	outdoor dose rate ($Sv\,h^{-1}$ at 1 h post detonation):>0.4: remain several hours <0.4: remain at least 1 day
Buddemeier & Dillon [5]	numerical analysis of shelter and evacuation dose for several complex, hypothetical fallout patterns	shelter quality outdoor dose rate evacuation dose knowledge of overall fallout pattern (optional criterion)	shortly after fallout arrives (evacuation implied to occur after the first hour)	more than 12 h (recommends to err on side of late evacuation)
Wein *et al.* [3]	system analysis that considered nuclear effects (prompt and fallout), population distribution, responder actions, traffic flow patterns, evacuation, and health effects	shelter quality fraction of individuals evacuating evacuation method evacuation route evacuation starting location	pedestrian evacuation: 5 h vehicle evacuation: ideal: 5 h realistic: no optimal time within the first day	more than 12 h
Brandt & Yoshimura [1,2]	numerical analysis of shelter and evacuation dose for two complex, hypothetical fallout patterns for a variety of shelter and/or evacuation response strategies and evacuation routes using city-specific shelter quality estimates study examined minimization of (i) total casualties and (ii) dose at an exemplar, high outdoor dose rate location	shelter quality evacuation route specific response strategy knowledge of overall fallout pattern	early transit to a better quality shelter (within the first few hours) fallout pattern is: known: evacuate high outdoor dose rate regions after 1 h not known: shelter for 8+ h	shelter for an extended period (owing, in part, to uncertainty in identifying the optimal evacuation route)