

BAPTISM OF FIRE

APPLICATIONS TO THE FORENSIC CONTEXT

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TODAY'S AIMS...

By the end of our session, we will have:

1. Considered burning within the remit of forensic taphonomy
2. Discussed the nature of mass disasters
3. Considered some forensic contexts for the application of burned bone knowledge and research

BAPTISM OF FIRE



THE FORENSIC CONTEXT

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FORENSIC ANTHROPOLOGY IN THE UK



THE CHANGING CONTEXT OF PRACTICE

The *Daubert* tests for forensic science can be thought of as the following:

- That the theory or technique must be falsifiable, refutable and testable, that is subject to empirical testing;
- That the theory or technique has been subjected to peer-review and publication;
- That error rates are known or can be calculated;
- That the theory or technique is generally accepted by the relevant scientific community, and;
- That standards and controls concerning the application of a given technique exist and are maintained.

BAPTISM OF FIRE

FORENSIC TAPHONOMY

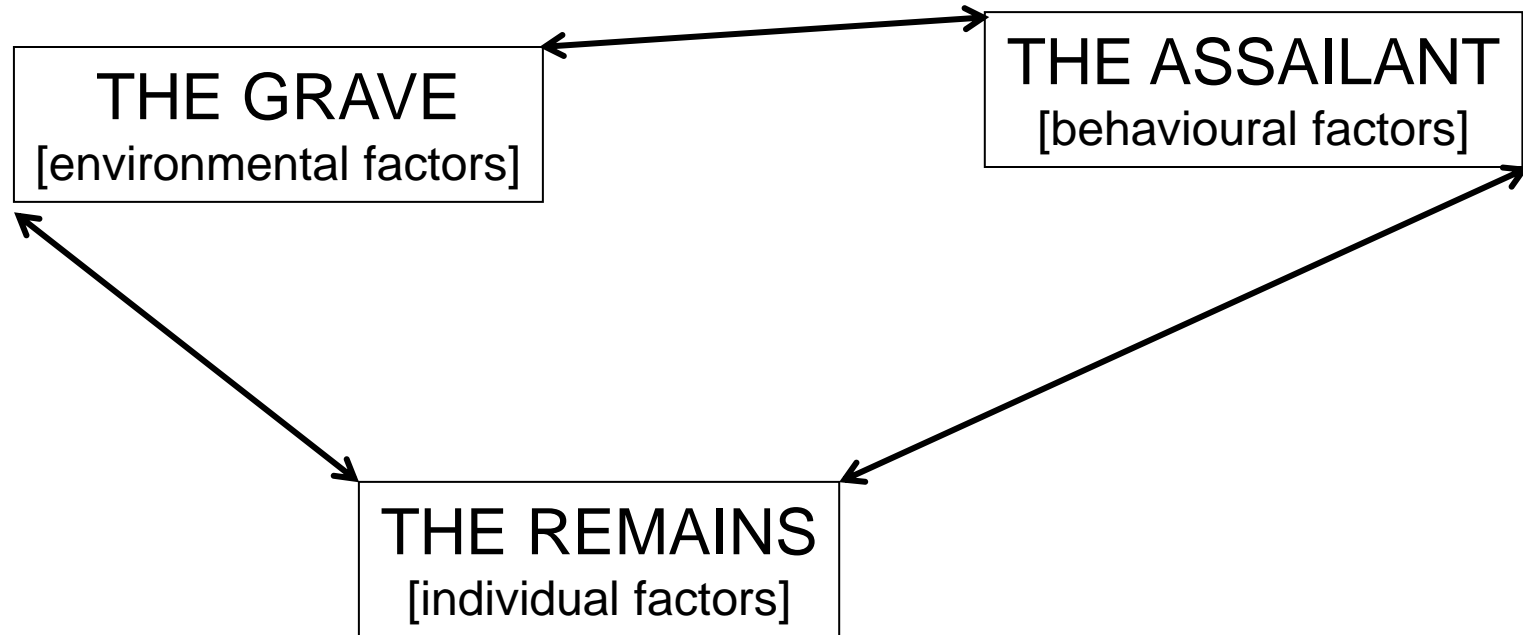
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SOFT TISSUE DECOMPOSITION

Phase	Comments
Hypostasis	Appears within ½ an hour to several hours collapse of blood vessels. Pooling of blood due to gravity; pressure areas; regurgitation of gastric contents; sometimes emission of semen.
Algor Mortis	Most useful indicator for estimating time of death in first 24 hours. Newtons Law of Cooling States – rate of cooling proportional to the difference in temperature between the body surface and surrounding environment.
Rigor Mortis	Flaccid and warm <3 hours Stiff and warm 3-8 hours Stiff and cold 8-36 hours Flaccid and cold >36 hours
Putrefaction	Destruction of soft body tissues by bacterial and enzymatic action; 2/3 weeks after death. 1 st visible sign - discolouration of anterior abdominal wall skin 2 nd visible sign - superficial veins of skin visible; slippage of epidermis; putrid gas formation resulting in distended abdomen 3 rd visible sign - purge of putrid bloodstained fluid from body orifices.
Adipocere	Can be seen at 3-4 weeks 3 months more typical; often mixed with other forms of decomp (inhibits putrefaction); occurs in cold, wet environments. Fat tissue begins to saponify, the result of hydrolysis of fat – release of fatty acids. Allows body form and injuries to be retained Injuries can also be preserved.
Mummification	Occurs in dry environments. Dehydration of body and dessication/brittleness of the skin; internal organs are dried or putrified.

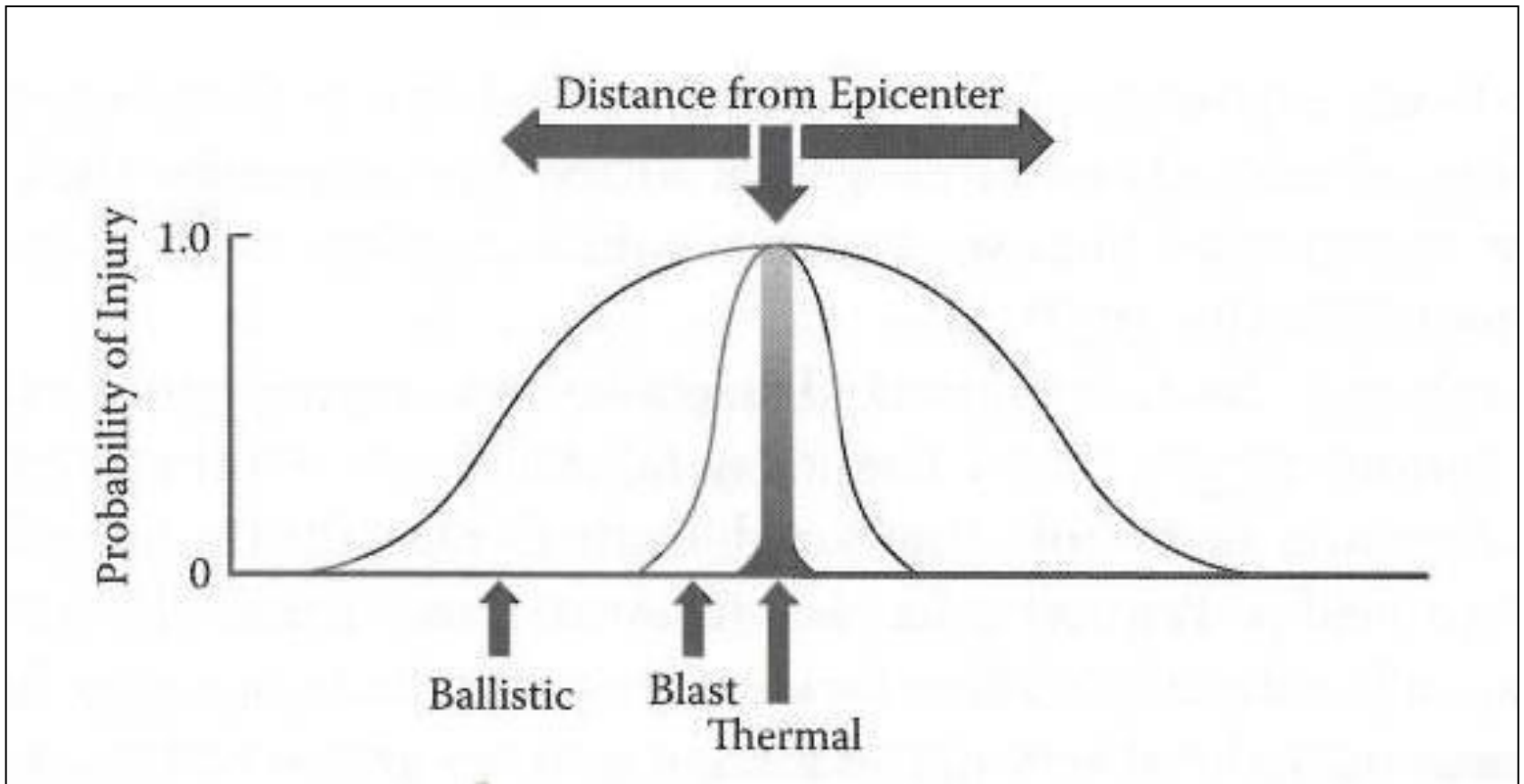
INTERACTION MODEL OF TAPHONOMIC FACTORS



TAPHONOMIC FACTORS

Primary	Secondary
Explosion fragmentation	Burning
G-force impact fragmentation	Temperature and humidity effects
Burning	Water effects (warm, cold, salt, fresh)
Crushing (structure collapse)	Decomposition effects
Dismemberment (eg: from flying debris)	Crushing (eg: building collapse)
	Carnivore/rodent actions
	Freefall injuries
	Ground impact injuries

BLAST INJURIES



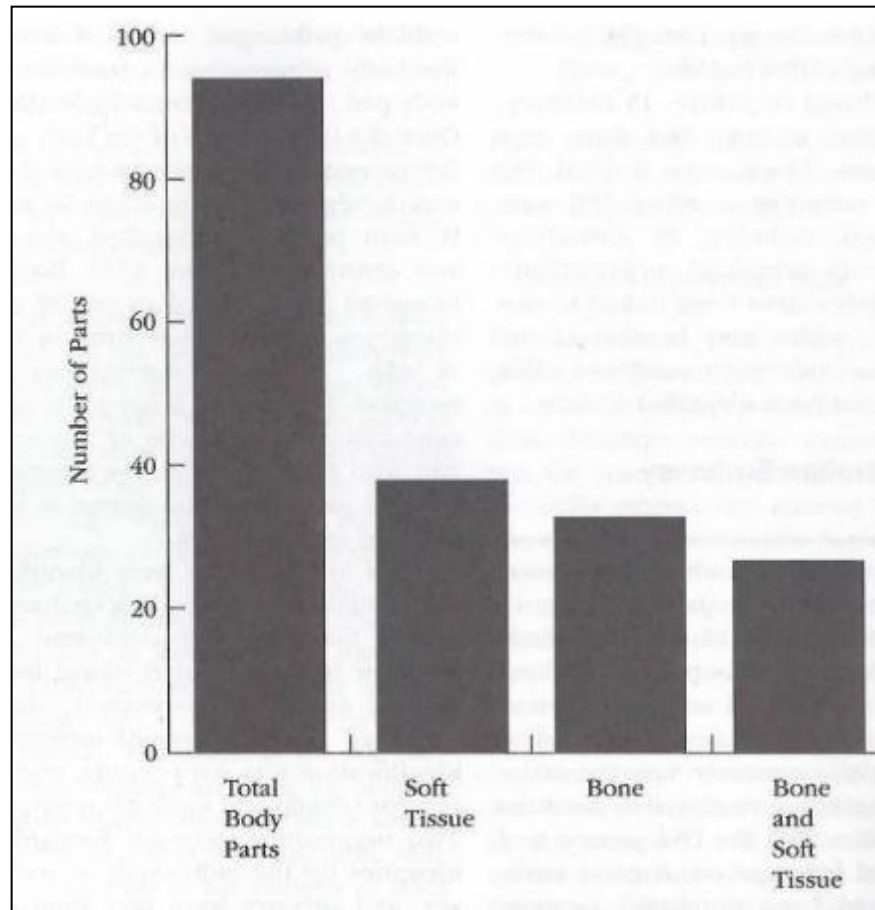
BLAST INJURIES

- The type of explosive used
- The type and amount of materials used to construct the weapon and amount of shrapnel
- The location of the explosion—within or outside a structure
- The composition of the structure
- The location of the victim relative to the blast
- The presence of an intermediate target between the victim and the blast
- The age, health, and weight of the victim

BLAST INJURIES

Explosive and Injury Mechanisms	Injury Patterns	Skeletal Wound Characteristics
Primary	Skeletal fractures from supersonic blast wave	<ul style="list-style-type: none">• Traumatic amputation, decapitation, skeletal fractures
Secondary	Shrapnel or container fragmentation, projectile trauma	<ul style="list-style-type: none">• Projectile defects, radiating, concentric, or comminuted fractures• Distribution of injuries has a narrow or wide focus depending on location of victim to the blast
Tertiary	Blunt force trauma, acceleration/ deceleration injury, crushing injury	<ul style="list-style-type: none">• Depressed or linear fractures, contracoup skull fractures
Quaternary	Flash burns	<ul style="list-style-type: none">• Skeletal burn marks such as discoloration and cracks or fractures

AUSTRALIAN EMBASSY BOMBING, JAKARTA, 2004



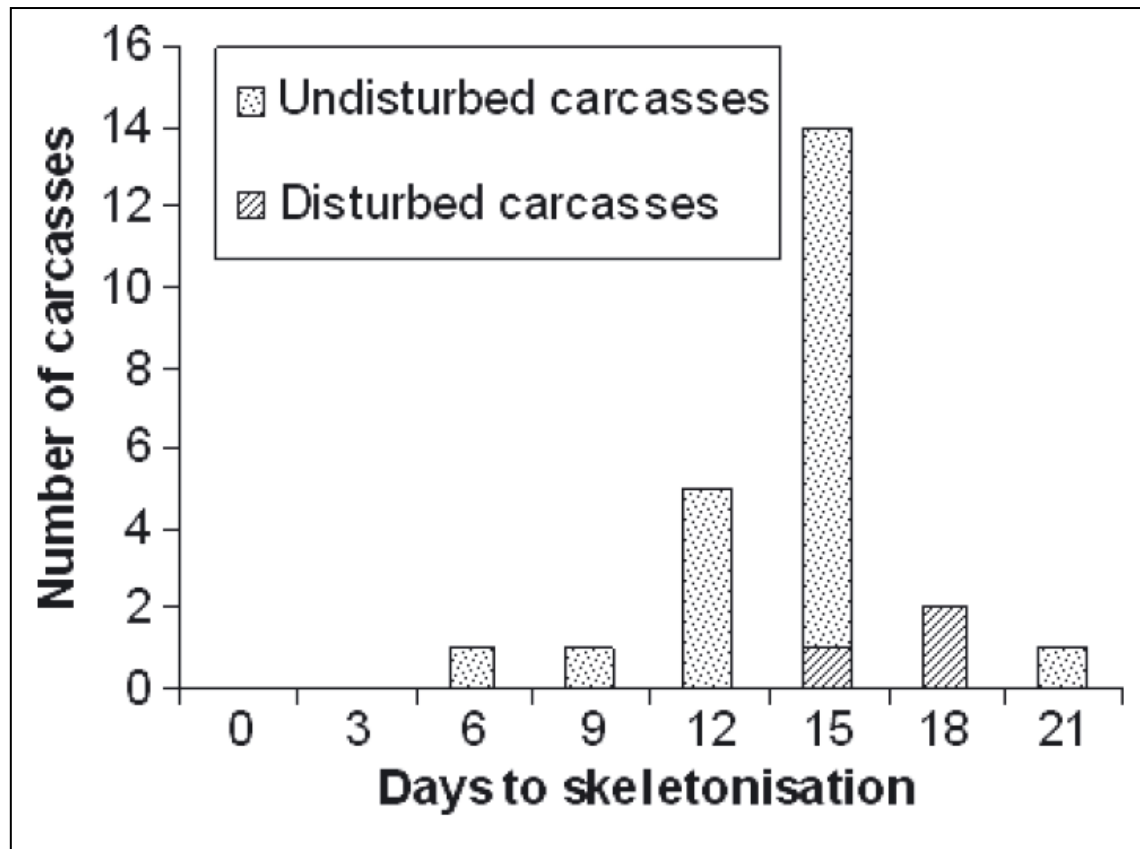
STUDYING POPULATION- LEVEL INTERPERSONAL VIOLENCE

- Court cases at the International Criminal Tribunal for the Former Yugoslavia (ICTY) have seen questions raised about the recognition and causes of blast-related trauma.
- During trials, defence teams argued that trauma was combat related and not related to executions.
- A sample of 81 cases (males between 18 and 75) from 4 Bosnian mass graves linked to the Kravica warehouse killings (1995) compared to published combat-related blast injury data from World War One, Vietnam, Northern Ireland, the first Gulf War, Operation Iraqi Freedom and Afghanistan.

STUDYING POPULATION-LEVEL INTERPERSONAL VIOLENCE

- Statistically significant differences in the prevalence and distribution of blast-related fractures in the Bosnian assemblages compared to various combat contexts, including the First World War, Vietnam, the first and second Gulf wars, Lebanon and Afghanistan. Most comparisons between contexts revealed a higher prevalence of blast injuries in multiple body regions in the Bosnian sample.
- They noted a statistically significantly higher prevalence of trauma to the torso, particularly the pelvis and the vertebral column.
- The diffuse pattern of injuries in the Bosnian sample are similar to those seen in the explosions in buildings. Blast fracture injury patterns caused by explosions in buildings are consistent with fragmenting munitions, a reflective blast wave and a lack of body armour.

TAPHONOMY RESEARCH CONTEXTS



BAPTISM OF FIRE

MASS FATALITIES INCIDENTS

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DISASTERS

A disaster:

A process/event combining a potentially destructive agent/force from the natural, modified, or built environment and a population in a socially and economically produced condition of vulnerability, resulting in a perceived disruption of the customary relative satisfactions of individual and social needs for physical survival, social order, and meaning.

DISASTERS

- Due to their 'randomness', disasters felt to be status levellers.
- But disasters do not indiscriminately distribute risk and vulnerability.
- Vulnerability in this context, is a "person's or group's capacity to anticipate, cope with, resist and recover from the impact of a natural hazard".

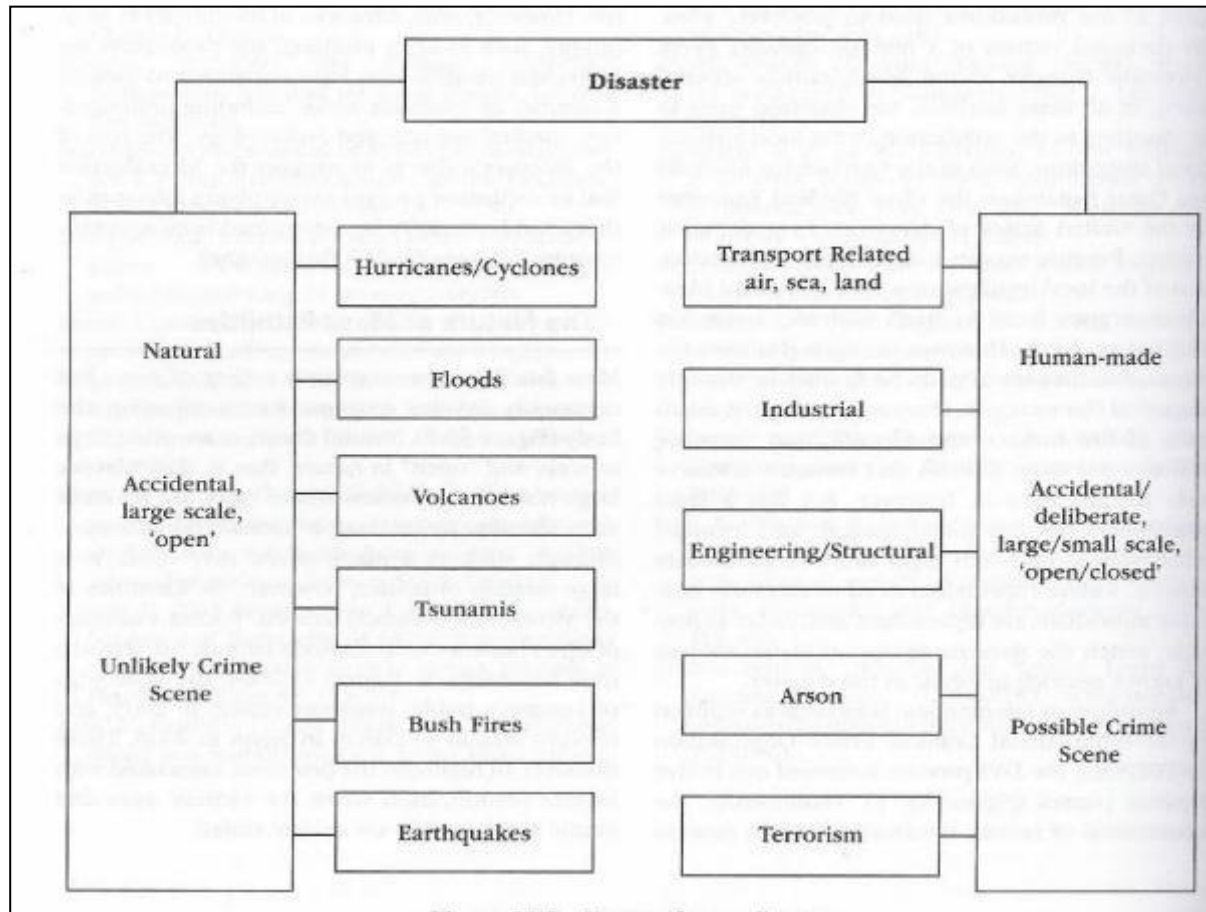
DISASTERS

Socioeconomic status is a key predictor of impacts:

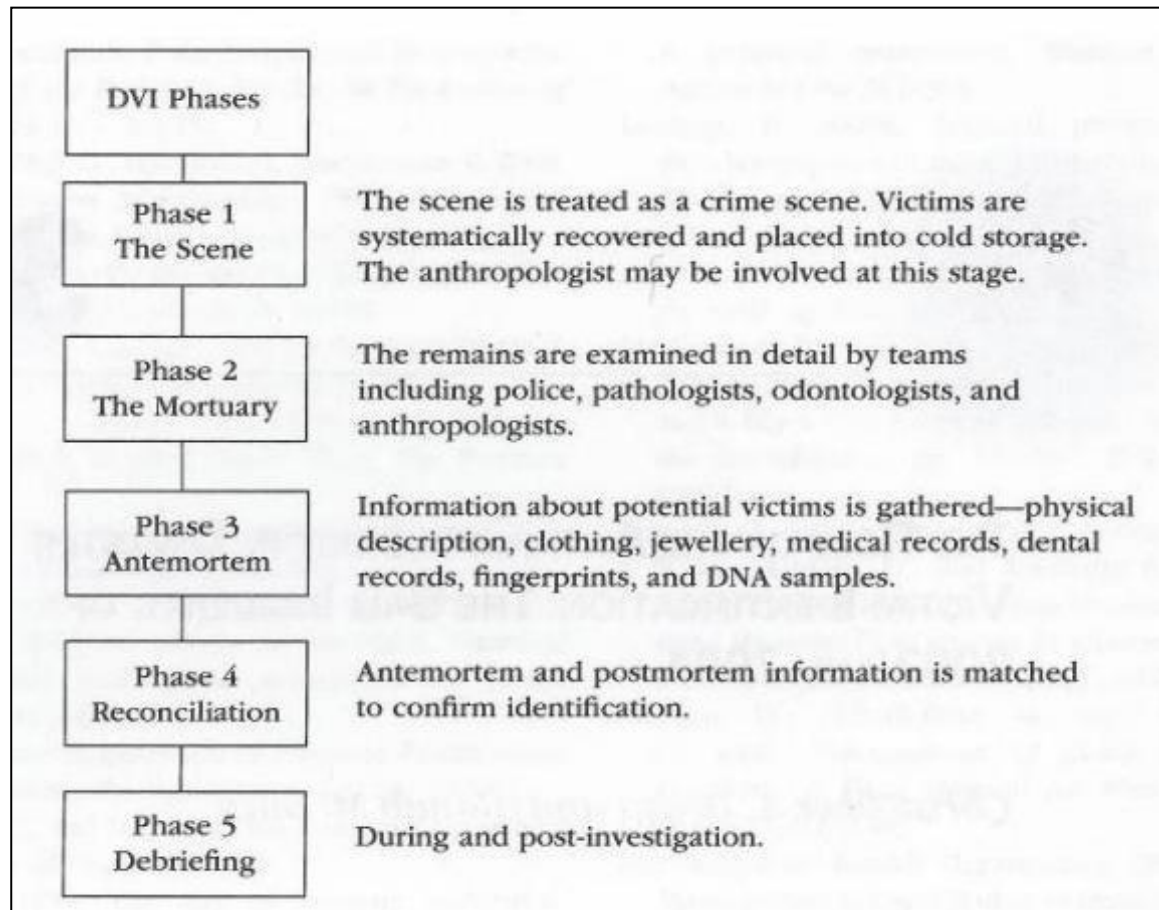
The poor are...

- More likely to perceive hazards as risky
- Less likely to prepare for hazards or buy insurance
- Less likely to respond to warnings
- More likely to die, suffer injuries and have proportionately higher material losses
- Have more psychological trauma
- Face more obstacles during phases of response, recovery and reconstruction.

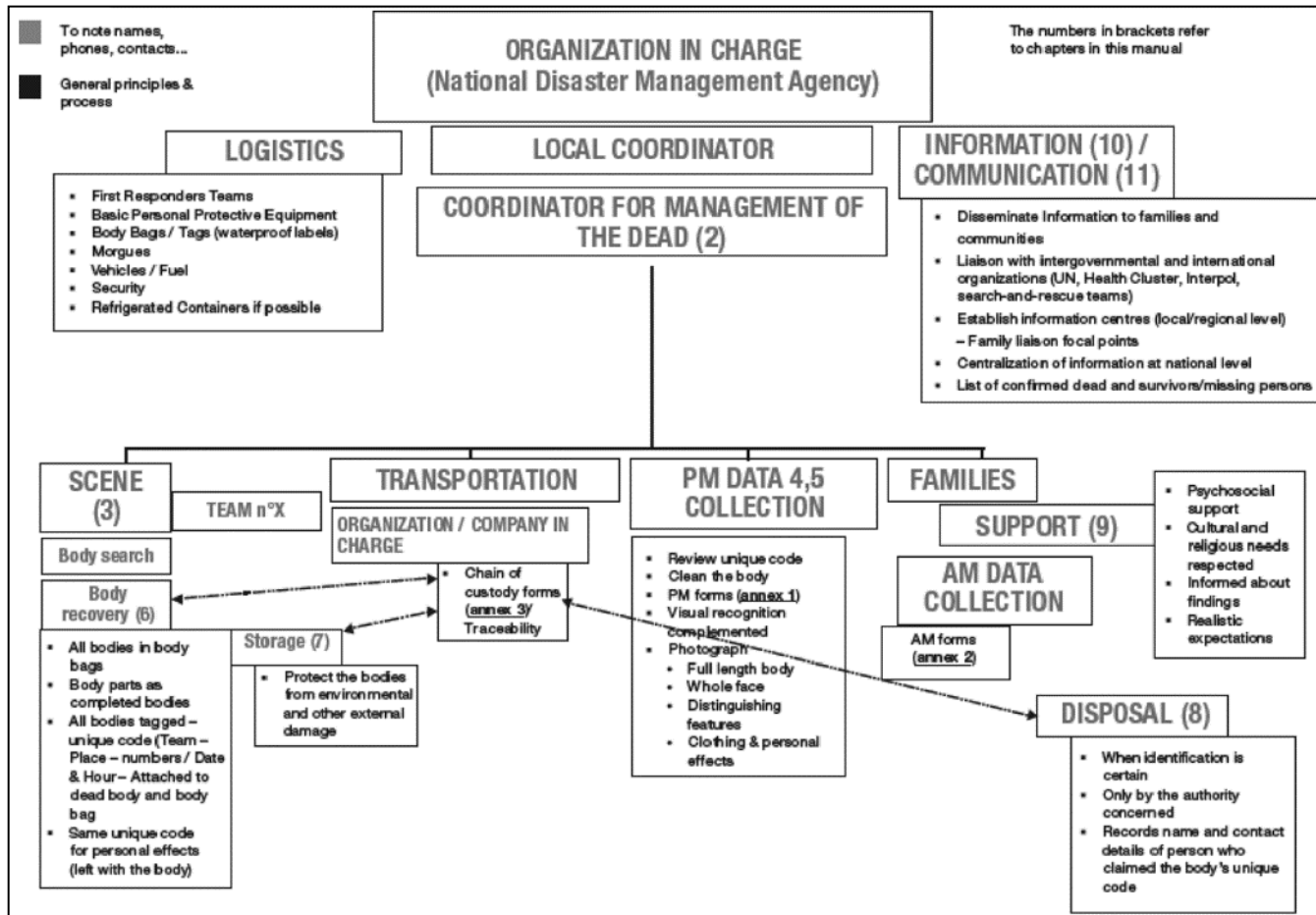
THE NATURE OF MASS DISASTERS



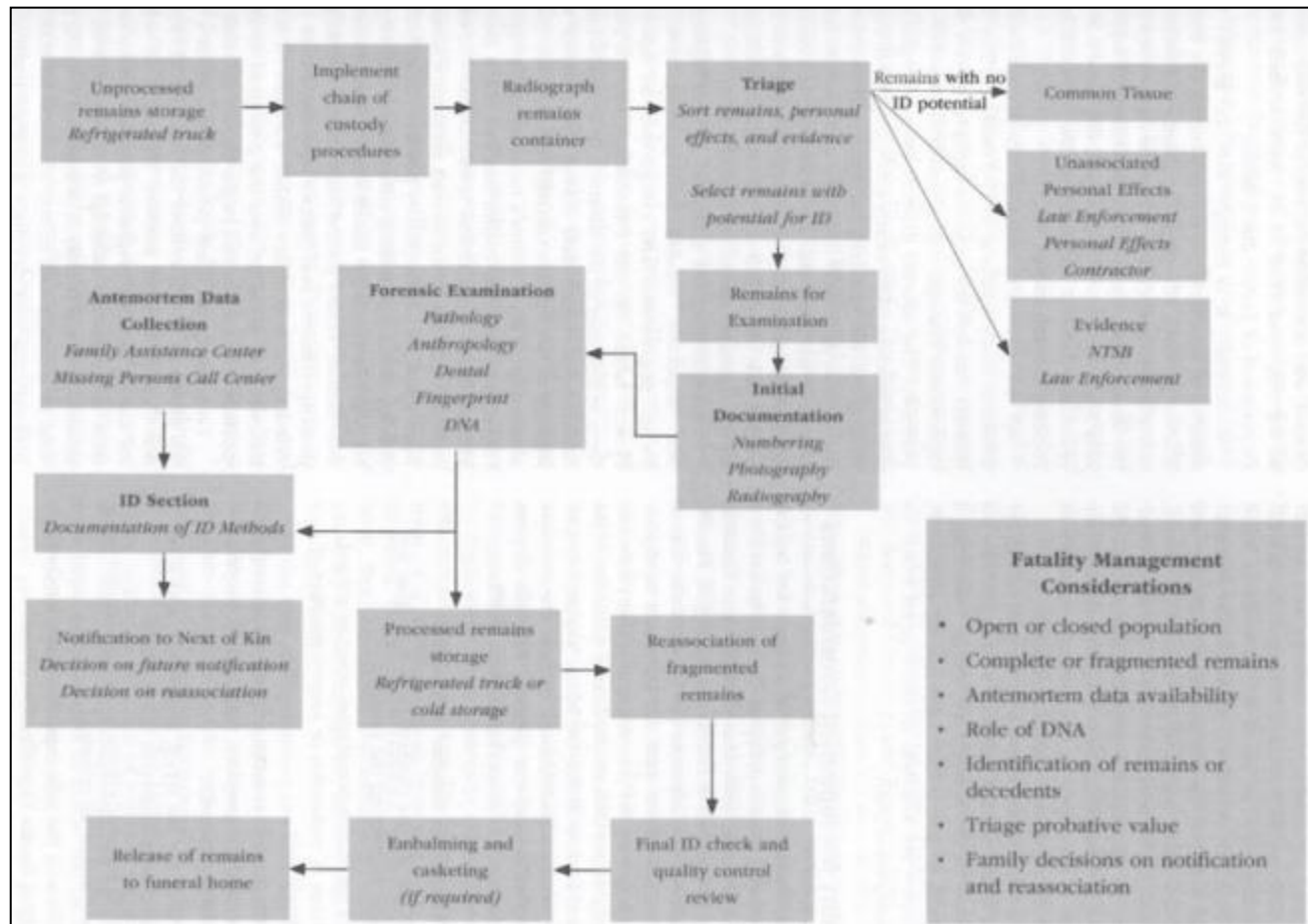
INTERPOL PHASES OF DVI



DISASTER VICTIM IDENTIFICATION



MASS FATALITY MORTUARY OPERATION PLAN



BAPTISM OF FIRE



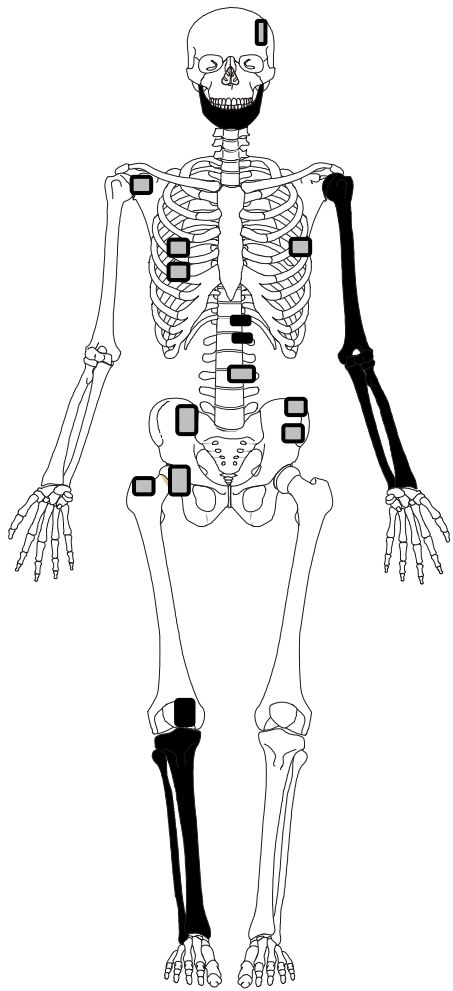
FORENSIC CASE EXAMPLES

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CHILE



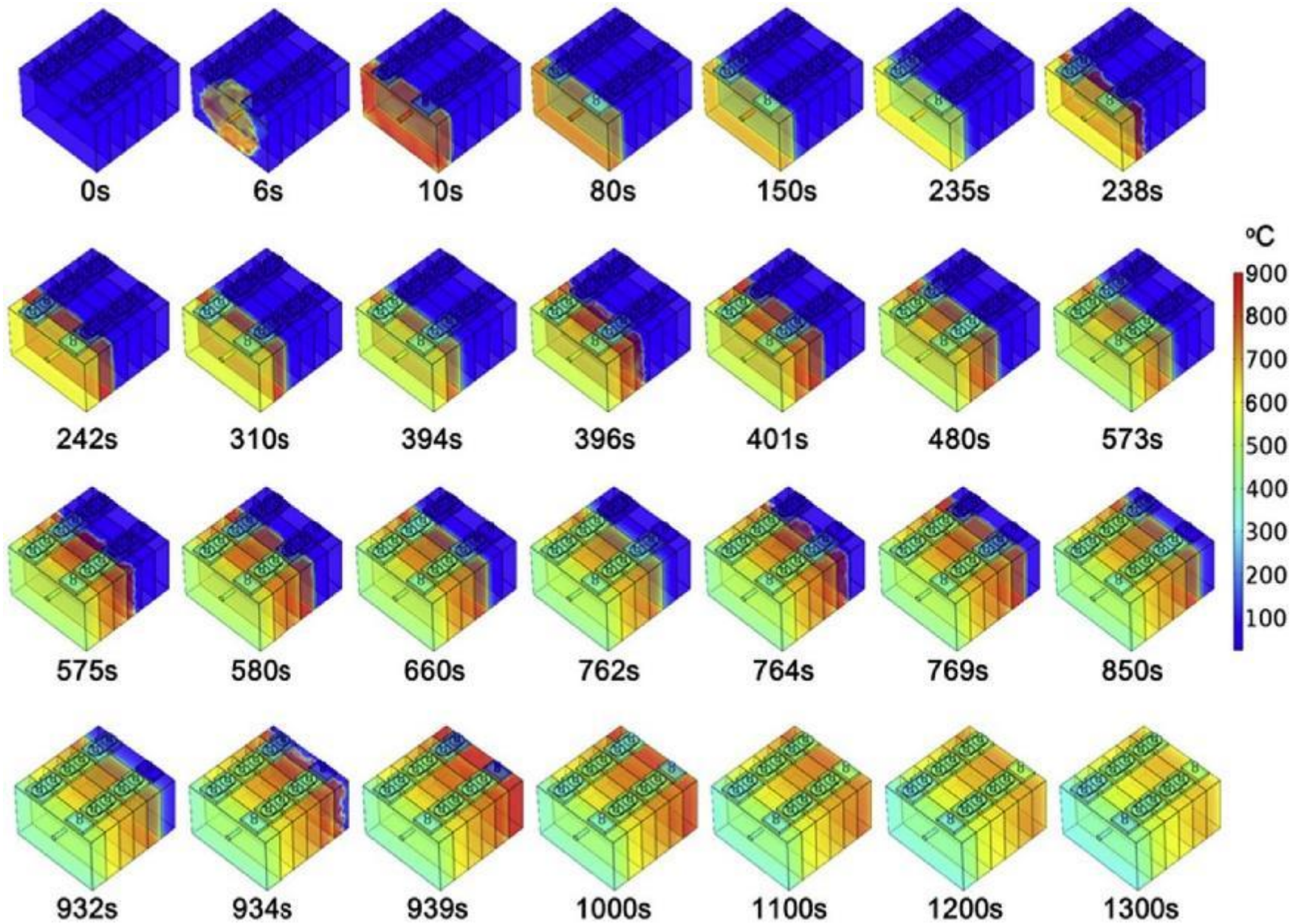
A dramatic scene of a wildfire. In the foreground, a large, bright fire burns on a charred log. The ground is covered in ash and charred debris. In the background, a thick, orange-red smoke plume rises into the sky, obscuring the trees. The overall atmosphere is one of intense heat and destruction.

WILDFIRES



ELECTROMOBILITY







A vibrant, colorful nebula background with the word "SPACE" in large white letters. The nebula features a mix of blue, purple, and red hues, with numerous bright stars scattered throughout. The word "SPACE" is centered horizontally and rendered in a bold, sans-serif font. The letters are white with a slight glow, making them stand out against the dark, colorful background.

SPACE

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