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Theme 1: Legislative and Regulatory Framework

Robust legislative and regulatory frameworks are foundational for the safe and secure transport of nuclear and radioactive materials.

They govern international conventions, national laws, and regulatory bodies overseeing transport.

Challenges include harmonization across countries, enforcement consistency, and balancing safety, security, and trade facilitation.

Recommendations include coherent international policies, capacity building for regulatory authorities, and adaptation to emerging threats and technologies.

Theme 2: Regulatory and Industry Perspective on Safety and Security by Design

Integrating safety and security principles at the design stage ensures robust protection throughout the lifecycle of transport systems.

Key elements include early risk assessment, incorporation of passive and active safety features, and industry-regulator collaboration.

Benefits include reduced vulnerabilities, streamlined compliance, and enhanced resilience to threats.

Theme 3: Safety and Security During Transport Operations

With over 20 million shipments of radioactive materials annually worldwide, ensuring safe and secure transport is critical.

This insight emphasizes three pillars:

1. Integrated Transport Protocols – Harmonizing safety and security during transport including shielding, tamper detection, and emergency protocols.
2. Stakeholder Coordination – Effective incident prevention requires synchronized action among carriers, regulators, and responders.
3. Risk-Based Planning – Using IAEA categorization to allocate resources based on shipment risk.

Emerging security threats such as terrorism and criminal targeting necessitate:

Personnel vetting and access control

Tamper-proof packaging and sensors

Real-time tracking and rapid alerts

International intelligence sharing and cooperation

The paper highlights scalable solutions suitable for varied resource settings.

Theme 4: Computer Security and Emerging Technologies

As transport systems become digitalized, cybersecurity is a critical component of safety and security.

Key threats include hacking of tracking devices, communication disruptions, and insider threats.

Strategic responses involve layered cyber-physical defenses, adoption of blockchain and AI technologies, and continuous monitoring.