

# Nuclear terrorism

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## Forms of nuclear terrorism

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- 1. Detonation of a stolen intact weapon**
- 2. Detonation of an improvised nuclear device (IND)**
- 3. Attack on a nuclear power reactor**
- 4. Detonation of a radiological dispersal device (RDD) or 'dirty bomb'**

## Fissile material

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### Highly enriched uranium (HEU):

- 3-5%  $U^{235}$  = Low enriched uranium (LEU)
- >20%  $U^{235}$  = weapon-usable
- >90%  $U^{235}$  = weapon-grade

### Plutonium:

- >94%  $Pu^{239}$  = weapon-grade
- ~60%  $Pu^{239}$  = reactor-grade
- >80%  $Pu^{238}$  = unusable for weapon purposes

## Fissile material

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- **Ideal material = 100kg HEU metal**
- **50- 60kg weapon-grade HEU for ‘gun type’ weapon**
- **8kg weapon-grade Pu for ‘implosion’ type weapon (more for reactor-grade)**
- **25kg weapon-grade HEU for ‘implosion’ type**

## Evidence of a risk

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### **1) Terrorist groups**

- **Aum Shinrikyo**
- **Very well financed**
- **Recruited scientists for WMD**
- **Tried to purchase a Russian nuclear weapon**
- **Tried to mine uranium**

## Evidence of a risk

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### **1) Terrorist groups**

- Al-Qaida
- Tried to purchase uranium in Sudan
- May have tried to purchase a Russian weapon
- AQ leadership met with Pakistani nuclear scientists
- Documents found in Afghanistan on weapon design and properties

## Evidence of a risk

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### **2) Technically possible**

- **Studies suggest challenges are far from insurmountable**
- **Workable design achieved from publicly available information**
- **But putting a design into practice = very challenging**

## Evidence of a risk

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### **3) Black markets**

- **Trafficking in HEU and Pu at sub-state level**
- **Nuclear smuggling networks at state-state level**
- **AQ Khan → Libya, Iran, North Korea, Iraq: centrifuge technology, weapon design, uranium gas**
- **North Korea: missile technology, drugs, counterfeit money & goods**

## Evidence of a risk

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### 4) Unsecured fissile material

- **1,670+/- 300 metric tons (1,000kg) of HEU in the world in mid-2008.**
- **Russia, 2003: 600 tons outside weapons, some poorly secured**
- **10 tons in ~130 research reactors in 40 countries**
- **500 tons of separated Pu: half = civilian & growing**

## Evidence of a risk

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### **5) Soviet-era tactical nuclear weapons**

- **22,000 TNW produced**
- **1990s: poor security at weapon storage sites**
- **Concern about fate of 'suitcase' bombs**

# Network of prevention

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## Key objectives

1. Secure existing stockpiles of nuclear weapons
2. Secure existing stockpiles of HEU and Pu
3. Prevent emergence of more NWS
4. Limit spread of enrichment and reprocessing facilities

# Network of prevention

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## **US-Russia programmes**

- **Nuclear material protection, control and accounting**
- **Nuclear Weapons Storage Security programme**
- **Nuclear Weapons Transportation Security programme**
- **Mayak Fissile Materials Storage Facility**
- **HEU Purchase Agreement**
- **Plutonium disposition programme**

# Network of prevention

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## International programmes

- **G-8 Global Partnership Against the Spread of Weapons and Materials of Mass Destruction**
- **US Global Threat Reduction Initiative**
- **UN Security Council Resolution 1540**
- **Amendment of Convention on the Physical Protection of Nuclear Materials**
- **UN International Convention on the Suppression of Acts of Nuclear Terrorism**
- **Development of international nuclear fuel centres**

## Looking to the future

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The risk of nuclear terrorism will increase if:

- Fissile material and nuclear know-how grows with expanding of civil and military nuclear power programmes
- Nuclear programmes are subject to poor security, material control and accounting
- A state's nuclear cadre is populated by people who have an ideological affinity to extremist groups
- More intrusive controls on civil nuclear programmes are not agreed