



# **Overview of WMD Proliferation Challenges**

## **KHNP Training Program Nonproliferation, Safeguards, and Physical Protection Module**

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# Outline

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- **Definitions**
- **Proliferation Status**
- **Nonproliferation Objectives**
- **Approaches to Achieving Nonproliferation Objectives**
  - **The Nuclear “Nonproliferation Regime”**
- **Challenges to the Nonproliferation Regime**
  - **Focus on the Expansion of Nuclear Energy**
- **Issues for the future**



# Weapons of Mass Destruction (WMD)

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- What do we mean by WMD?
  - Mass?
  - Destruction?
- Is there something inherently different (worse) about WMD?
- Are all WMD equal?
- Is WMD a useful category of weapons?
- Is WMD a “closed” category?

- Nuclear Weapons
    - A device with explosive energy derived from nuclear fission or fusion
    - Damage results from ground shocks, high temperatures and residual radiation
  - Chemical Weapons
    - Weapons which exploit the toxic properties of chemical substance
    - Physical and/or psychological damage
  - Biological Weapons
    - Weapons which disseminate infectious disease
    - Physical and/or psychological damage
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- Radiological Weapons (??)
    - Weapons which use conventional explosives to disseminate radiological material
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- Means of delivery (???)
    - WMD neutral?



# Nonproliferation

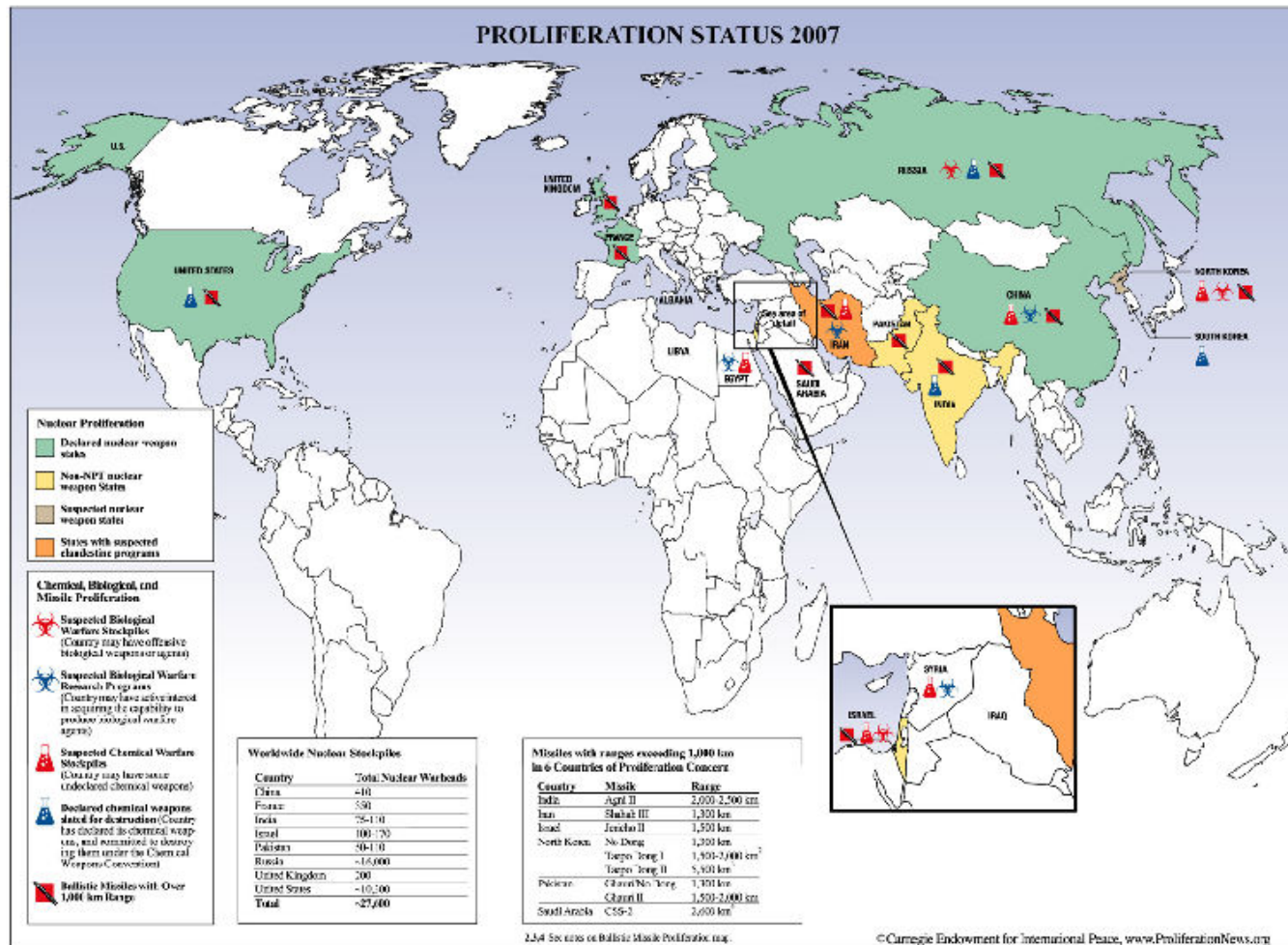
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- What constitutes proliferation?
    - Numbers?
    - Identity of those possessing?
  - Does it apply only to WMD?
  - Can non-state actors proliferate?
  - How is “nonproliferation” different from “counter-proliferation”
  - What is the relationship between nonproliferation and “arms control”?
- Types of proliferation risks:
    - States acquiring WMD
    - States using WMD
    - States providing (intentionally or unintentionally) WMD
    - Sub-national (terrorist) groups acquiring WMD
    - Sub-national (terrorist) groups using WMD

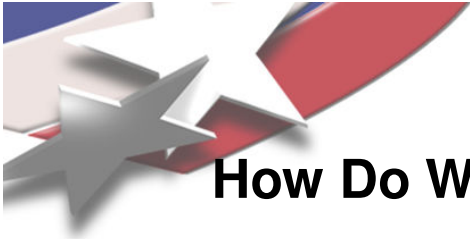
**Why does proliferation matter?**  
**What is our nonproliferation goal?**



# Who Has What?



Deadly Arsenals:  
Nuclear, Biological,  
and Chemical Threats  
(Carnegie  
Endowment, 2005),  
and updated June  
2007.



## **How Do WMD Affect Broader International Security Issues?**

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- **What role do WMD play in current and potential conflicts?**
- **How would proliferation affect these conflicts?**
  
- **Great Power Relations**
  - U.S.-Russia
  - U.S.-China
  - Role of India in the world
- **Middle East**
  - Palestinian-Israeli Conflict
  - Iraq
  - Iran
  - Struggle for regional leadership
- **South Asia**
  - India-Pakistan tensions
- **East Asia**
  - North Korea (DPRK)
  - Regional tensions
  - China-Taiwan
- **Terrorism**
- **Africa**
  - Ethnic and religious conflicts
  - Struggle for regional leadership
- **Energy and resource conflicts**
- **South America**



## **Nonproliferation Objectives**

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- **What's the problem we are trying to address?**
- **What is our objective?**
  - **Stop more countries from getting WMD?**
  - **Stop sub-national groups from getting WMD?**
  - **Stop anyone from using WMD?**
  - **Mitigate the consequences of WMD?**
  - **Eliminate WMD?**



# Nonproliferation Motivations

- **Moral Imperative**

- Nuclear weapons (and bio and chem ) are inherently worse than conventional weapons because of their ability to cause mass destruction. Therefore, preventing their spread and eliminating those which exist is of highest priority.

- **Preserve Status Quo**

- By preventing the spread of nuclear weapons we maintain the status quo international order. We are accustomed to a world in which only 5 countries legitimately possess nuclear weapons.

- **International Security**

- The world is more secure (not just for the status quo powers, but for all) if nuclear weapons (and bio and chem) are limited or even eliminated.





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# Nonproliferation Approaches



# Identify Elements of a WMD Program

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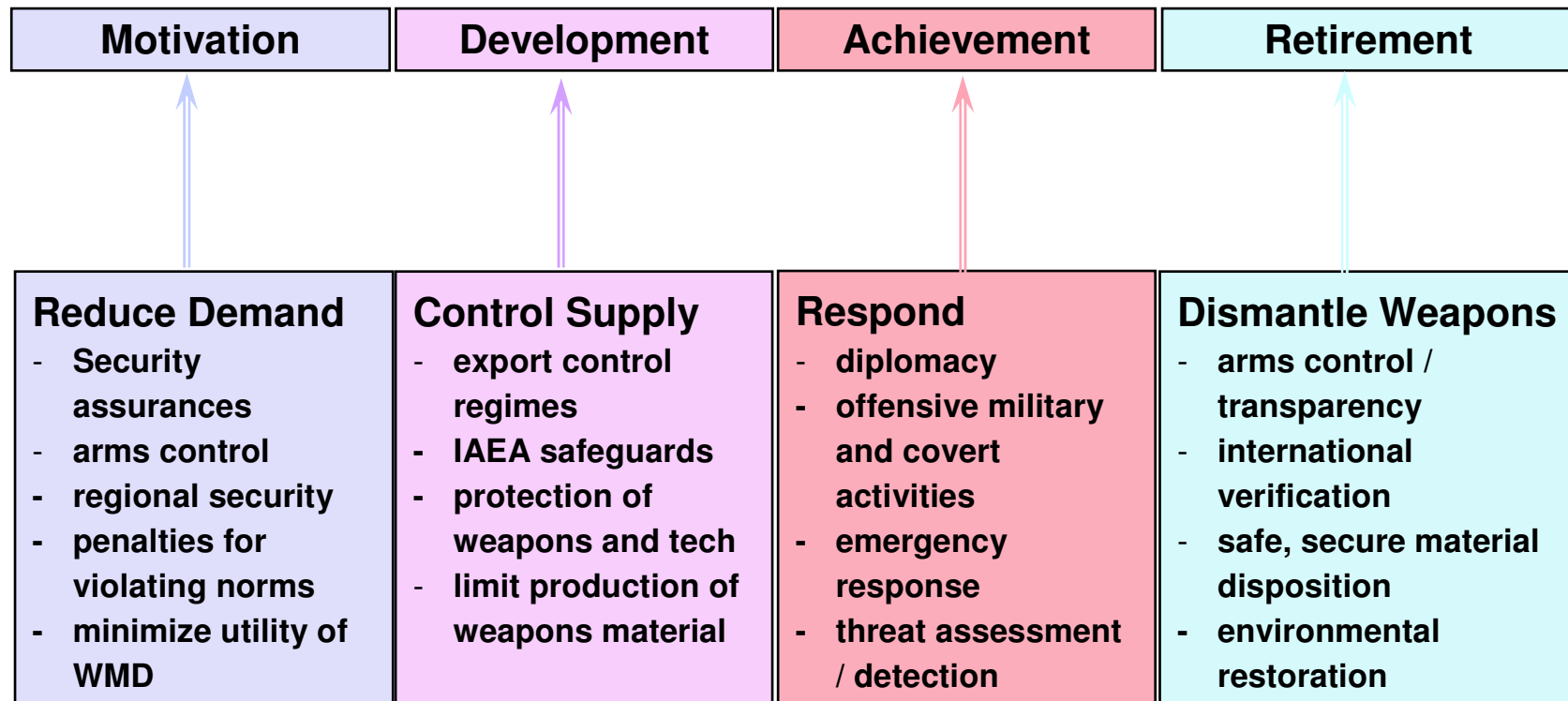
- **Motive**
  - Threat?
  - Status/Influence?
- **Expertise**
  - The weapon
  - Means of delivery
- **Money**
  - One bomb or a full program?
- **Material**
  - Nuclear: fissile material

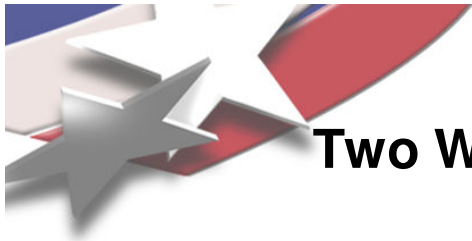


## Two Ways to Think About Addressing Proliferation: I. Proliferation Stages

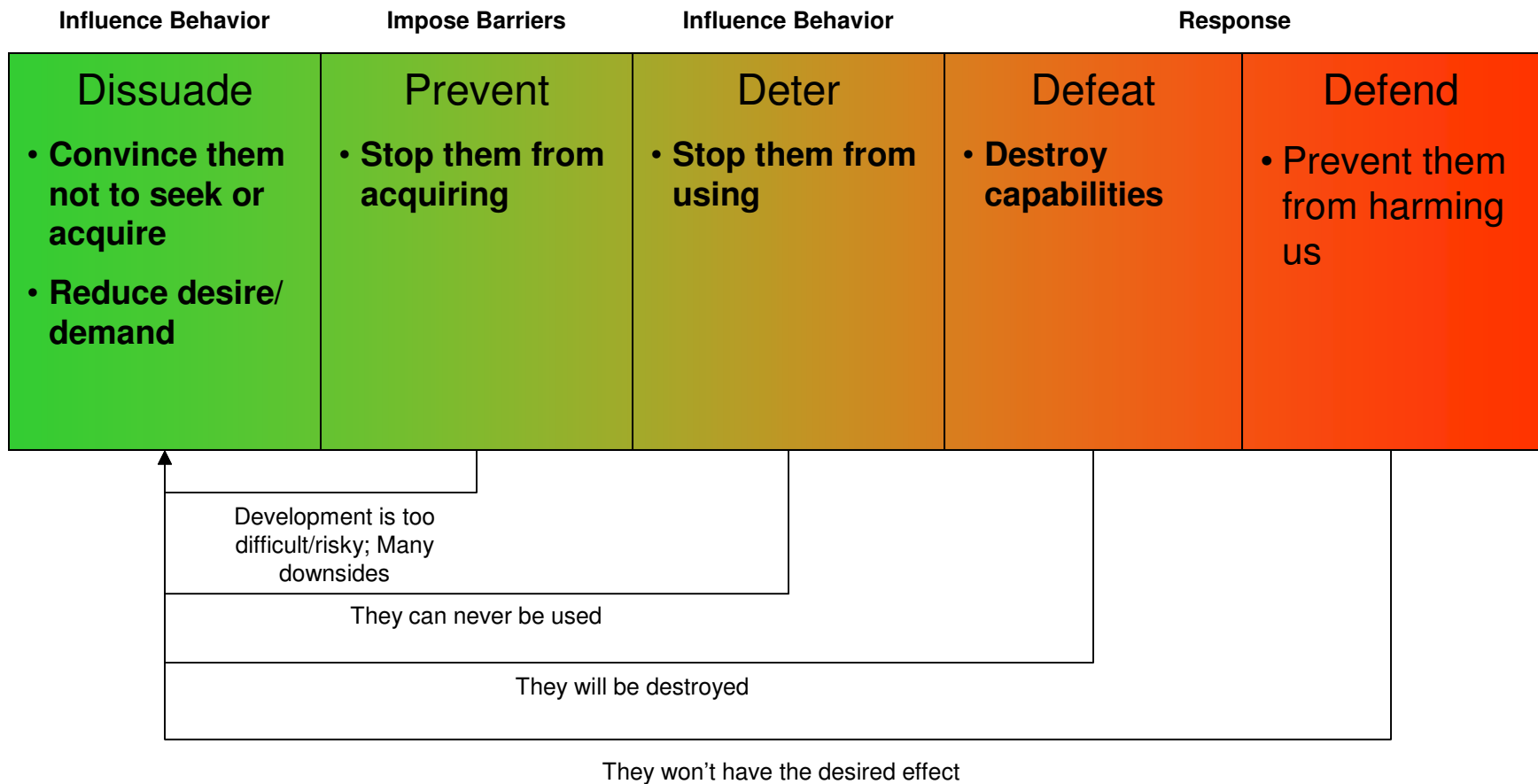
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### Stages in Proliferation





## Two Ways to Think About Addressing Proliferation: II. Response Strategies





## Nonproliferation Treaties and Agreements

Nuclear Weapons	<p><u>Provisions of the NPT (Limit spread of weapons)</u></p> <ul style="list-style-type: none"><li>• Non-nuclear weapon states (NNWS) commit not to develop or acquire nuclear weapons and to verify this commitment</li><li>• Nuclear weapon states (NWS) agree not to assist NNWS in obtaining nuclear weapons</li><li>• All countries agree not to export nuclear equipment or material to NNWS except under safeguards</li><li>• All countries agree to facilitate exchange of peaceful nuclear technology</li><li>• All countries agree to work towards future nuclear disarmament</li></ul>
Biological Weapons	<p><u>BTWC Provisions (Ban class of weapons)</u></p> <ul style="list-style-type: none"><li>• Bans development, production, stockpiling, acquisition, or transfer of biological agents or toxins in quantities that have no justifiable peaceful purpose.</li><li>• Bans weapons, equipment or means of delivery designed to use such agents for hostile purposes</li></ul>
Chemical Weapons	<p><u>CWC Provisions (Ban class of weapons)</u></p> <ul style="list-style-type: none"><li>• Bans development, production, stockpiling, acquisition, or transfer of chemical weapons</li><li>• Requires verified destruction of all chemical weapons and production facilities</li></ul>



# Elements of Nuclear Nonproliferation Regime

## Mandatory Measures

- No weapon material / technology transfers (Art I and II)
- IAEA Safeguards
- Nuclear Technology Assistance (Art IV)
- Disarmament (Art VI)

## Non-Proliferation Treaty

- Non weapon states agree to not develop or acquire nuclear weapons
- Nuclear weapon states agree to:
  - Not export weapons or weapon useable materials / technologies
  - Provide technical assistance in peaceful nuclear technology
  - Work towards nuclear disarmament

## Voluntary Measures

- Bilateral Assistance
- IAEA Additional Protocol
- Physical Security Convention
- Regional Safeguards implementation (Euratom, ABACC)

## Bilateral or Country-Specific Activities

- MPC&A (Russia +)
- Global Material Security Initiative

- IAEA training and assistance (physical security)
- Coop. Agreements

- Reactor Fuel Returns
- HEU/LEU conversion
- RERTR

## Multilateral Activities

- Nuclear Suppliers Group
- Zangar Committee

- MTCR
- UNSCR 1540

- Proliferation Security Initiative
- GICNT

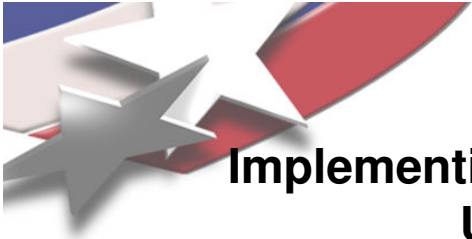




## **Challenges to the Nuclear Nonproliferation Regime**

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- **Non-state actors seek nuclear material and expertise**
- **Wider availability of sensitive nuclear technology, material and expertise**
- **More potential de facto nuclear weapon states in the future**
- **Increasing world-wide demand for nuclear energy**
- **Growing number of NWS outside the NPT**
- **Dissatisfaction with the NPT**



## **Implementing Nonproliferation: Example of Specific Goals for the U.S. National Nuclear Security Administration**

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- **Reduce weapons stockpiles, materials and infrastructure**
- **Secure WMD materials, technology and expertise**
- **Detect and/or prevent undeclared weapons development, acquisition programs, or use of nuclear weapons by rogue states or terrorists**
- **Strengthen commitment to nonproliferation norms**
- **Secure and/or dispose of high-risk nuclear materials and equipment**
- **Reduce the proliferation risk of the global expansion of nuclear energy**





# **Nuclear energy and nuclear nonproliferation**

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- **Global energy demand expected to at least double by middle of next century.**
- **Much of the demand will come from rapidly expanding economies in China and India**
- **Other developing countries planning nuclear energy programs**
  - **Indonesia**
  - **Vietnam**
  - **Thailand**
- **How to expand the use of nuclear energy without risking additional proliferation?**



## **Approaches to reducing the proliferation risk of the nuclear fuel cycle**

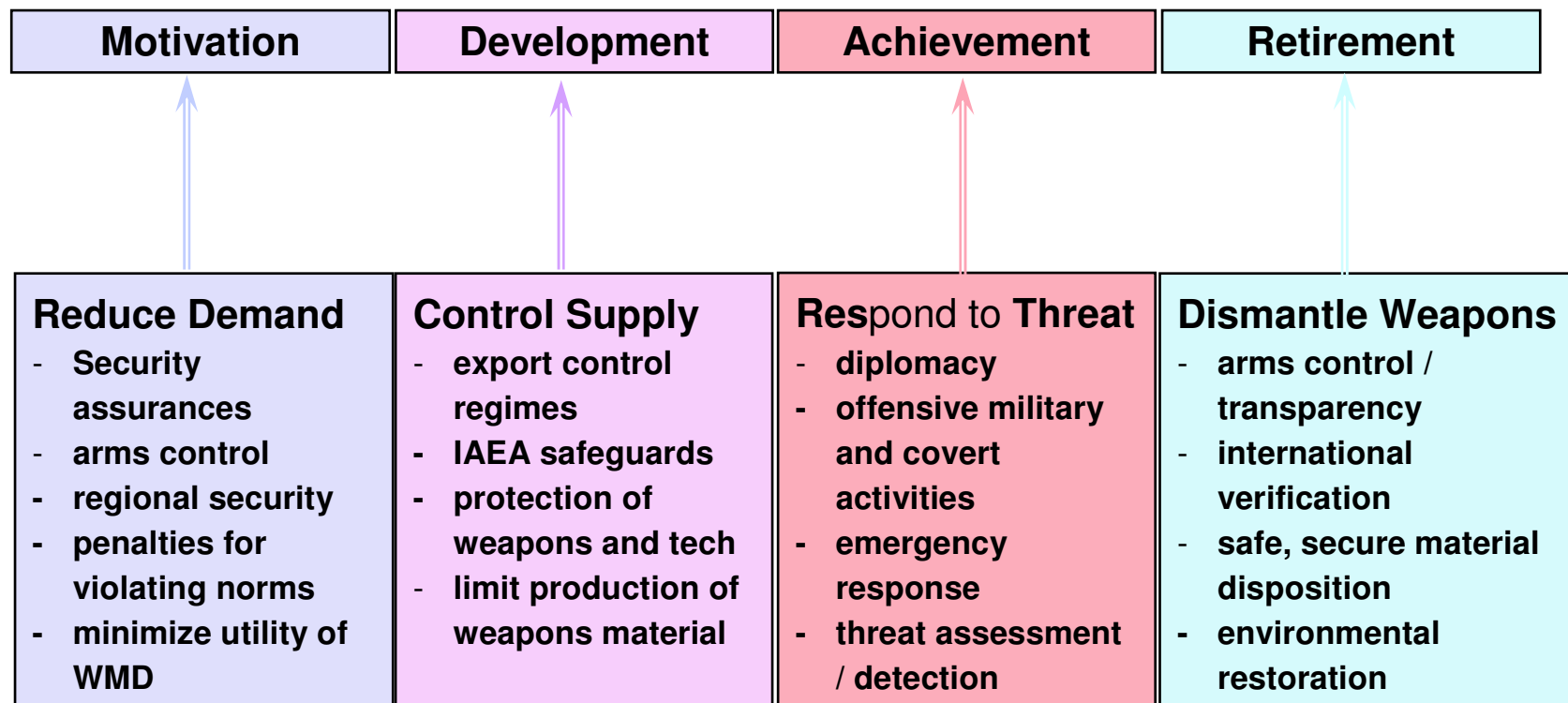
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- **Changing the existing nonproliferation regime**
  - **Denial strategies**
    - Prevent countries from acquiring enrichment and reprocessing technology (either selectively or across the board)
    - Moratorium on development of additional enriching and reprocessing capacity
  - **Multilateral cooperation strategies**
    - Multinational approaches to fuel cycle services (fuel supplies, waste and spent fuel disposition services)
    - Voluntary or mandatory
- **Strengthening the existing regime**
  - Require implementation of the IAEA additional protocol
  - Enhance nonproliferation culture within industry
  - Develop advanced “proliferation resistant” fuel cycles
  - New approaches to monitoring



Which strategies will be most effective in the future? Has “controlling supply” achieved its limits?

### Stages in Proliferation



Strategies to **prevent**, **rollback**, or **mitigate** consequences of proliferation



## **Should “reducing demand” take more precedence as a strategy against proliferation?**

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- **Resolve regional security concerns**
  - territorial disputes
  - natural resources
  - legitimate concerns of sub-state actors
- **Enhance partnerships with countries in vulnerable regions**
  - Build capacity to design and implement cooperative agreements
  - Seek to integrate into international community
- **Reward countries that set good examples**
  - Increase international prestige
  - Economic incentives
- **What about the “hard” cases? Iran and DPRK?**

***Should nonproliferation be an implicit (rather than explicit) goal?***



## Can military means effectively “respond to threat?”

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- Iran (development stage)
  - Conventional or nuclear strikes against nuclear facilities and government?
  - Chances for success?
  - What would be overwhelming force?
  - Unintended consequences?
- DPRK (achievement stage)
  - Same questions as above with complications:
    - demonstrated nuclear weapon capability
    - proximity to Seoul

***Should “counter-terrorism” take center stage in “hard” cases?  
What impact would this have on “reducing demand?”***