VISION
Ensure DOD operations are unconstrained by chemical and biological effects.

MISSION
Provide chemical and biological defense capabilities in support of the National Military Strategies.
Chemical Biological Defense Program
Strategic Environment

• Defense of the Homeland
• Global War on Terror
• Proliferation of Weapons of Mass Destruction
• Challenge of Non-Traditional CB agents
• Increased Interagency Roles

“The greatest threat before humanity today is the possibility of a secret and sudden attack with chemical, or biological, or nuclear weapons.”

President George W. Bush
Remarks at the National Defense University
11 February 2004
The CBDP Provides Key Capabilities Supporting Multiple National Strategies

**National Security**

- The National Security Strategy of the United States of America
- The National Military Strategy of the United States of America

**Combating Terrorism**

- National Strategy for Combating Terrorism

**Combating WMD**

- National Strategy to Combat Weapons of Mass Destruction

**Homeland Security/Defense**

- National Strategy for Homeland Security
- Strategy for Homeland Defense and Civil Support

• The future force will be organized, trained, equipped, and resourced to deal with all aspects of the threat posed by weapons of mass destruction. It will have capabilities to:
  – Detect WMD, including fissile material at stand-off ranges;
  – Locate and characterize threats;
  – Interdict WMD and related shipments whether on land, at sea, or in the air;
  – Sustain operations under WMD attack; and
  – Render safe or otherwise eliminate WMD before, during or after a conflict.

• The Department will develop new defensive capabilities in anticipation of the continued evolution of WMD threats. Such threats include genetically engineered biological pathogens, and next generation chemical agents. The Department will be prepared to respond to and help other agencies to mitigate the consequences of WMD attacks.

Reallocate funding within the CBDP to invest more than $1.5 billion over the next five years to develop broad-spectrum medical countermeasures against advanced bio-terror threats, including genetically engineered intracellular bacterial pathogens and hemorrhagic fevers.
DOD CBDP Background

• Established by Congress

• Consolidates all DOD CB defense efforts into defense-wide funding accounts overseen by a single office within the Office of the Secretary of Defense
  – Provides visibility for many, relatively low-cost items
  – Eliminates redundancy

• Integrates
  – All research, development, acquisition funds
  – Medical and non-medical funds

• …but
  – Operations & Maintenance funds (retained in Service POMs)
  – DARPA programs and funding appear in DARPA POM

• Closely coordinate with DARPA CB Defense Efforts
  – Eliminate redundancy and duplication, and support technology transition

• Program Re-organized on April 22, 2003
  – Under Secretary of Defense for Acquisition, Technology, & Logistics (USD(AT&L)) established as single Milestone Decision Authority (MDA)
  – Established the Joint Program Executive Office for Chemical and Biological Defense (JPEO-CBD) (MDA responsibility delegated for most programs)
  – Defense Threat Reduction Agency (DTRA) established as Joint Science & Technology Office for CBD
  – JRO-CBRND established as focal point within Joint Staff
  – Scope expanded to specifically include radiological defense

ATSD(NCB) Provides Oversight of the Program
CBDP Process

ATSD(NCB) Oversight

- Joint Requirements Office (JRO)
- Required Capabilities
- Joint Combat Developer
- Joint Science & Technology Office for CB Defense
- Test & Evaluation Executive
- Joint Program Executive Office (JPEO)
- Capabilities to the Warfighter for All Missions

- Competent Commanders
- Services

Process based on managing total program risk
Joint CBRN Defense Functional Concept – Operational Attributes

- **SHAPE** – Provides the ability to characterize the CBRN hazard to the force commander - develop a clear understanding of the current and predicted CBRN situation; collect, query, and assimilate info from sensors, intelligence, medical, etc., in near real time to inform personnel, provide actual and potential impacts of CBRN hazards; envision critical SENSE, SHIELD and SUSTAIN end states (preparation for operations); visualize the sequence of events that moves the force from its current state to those end states.

- **SHIELD** – The capability to shield the force from harm caused by CBRN hazards by preventing or reducing individual and collective exposures, applying prophylaxis to prevent or mitigate negative physiological effects, and protecting critical equipment.

- **SENSE** – The capability to continually provide the information about the CBRN situation at a time and place by detecting, identifying, and quantifying CBRN hazards in air, water, on land, on personnel, equipment or facilities. This capability includes detecting, identifying, and quantifying those CBRN hazards in all physical states (solid, liquid, gas).

- **SUSTAIN** – The ability to conduct decontamination and medical actions that enable the quick restoration of combat power, maintain/recover essential functions that are free from the effects of CBRN hazards, and facilitate the return to pre-incident operational capability as soon as possible.
Selected CB Defense Systems

**SENSE**
- Joint Bio Point Detection System (JBPDS)
- Joint Bio Standoff Detection System (JBSDS)
- NBCRV
- JCAD

**SHAPE**
- Joint Warning and Reporting Network
- Joint Effects Model (JEM)
- Joint Operations Effects Federation (JOEF)

**SHIELD**
- Joint Vaccine Acquisition Program
- JSLIST
- JSGPM
- CB Protected Shelter

**SUSTAIN**
- Joint Bio Agent Identification & Diagnostic System (JBAIDS)
- Antidote Treatment, Nerve Agent Autoinjector (ATNAA)
- Joint Service Transportable Decon System
FY2008 President’s Budget
Capability Areas

Total Funding FY08: $1.57B
FY2008 Chemical Biological Defense Program Summary

Procurement (34.9%) $548.8

Basic Research (4.6%) $72.0

Science & Tech Base (38.8%) $609.6

Applied Research (19.4%) $305.3

Adv Tech Dev (14.8%) $232.3

Operational Sys Dev (0.5%) $7.7

Mgmt Support (6.3%) $99.1

SDD (15.8%) $247.9

ACD&P (3.6%) $57.2

Advanced Development (26.2%) $411.9

RDT&E = $1,021.5
Procurement = $548.8
Total = $1,570.2

NOTE: Numbers may not add to the total values due to rounding values to the nearest tenth.
New Technologies for New Threats

• Traditional technologies may not defeat advanced threats
  – Currently licensed vaccines are not substantially more effective than those developed by Edward Jenner in the 18th century.

• Research and Development efforts must evolve with the threat
  – Develop hardware/platforms for both military and civilian use
  – Variants are distinguishable by platform, and software modifications: *Common technologies – different platforms.*
  – Establishment of Standards are crucial but the traditional physical model may not provide the best solution
    • For detection, approach needs to be sliding scale that optimizes sensitivity, probability of detection, false positive rate, and response time, known as ROC (Receiver Operating Characteristic) Curves

• Leverage private sector to transform WMD protection and defeat capabilities to leapfrog WMD threat generations
CBDP Science & Technology (S&T) Initiatives

• Identify and Exploit Revolutionary Technologies
  – Transformational Medical Technologies Initiative (TMTI)
  – Transformational Countermeasures Technology Initiative (TCTI)
  – Nanotechnology Initiative

• Recapitalization of S&T Infrastructure
  – Test & Evaluation Facilities
  – NTA Test Chamber
  – U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) Recapitalization

Initiatives will enhance CBD S&T capabilities.
Transformational Medical Technologies Initiative is a Major Medical Innovation

Thrust Areas for Research

- Genomic Identification
- Small Molecule Drugs
- Protein Based Therapeutics/Biologics
- Host Immune Enhancement
- Nucleotide Therapeutics

Overarching Research Approach

- Microarray Technology
- Bioinformatics
- Proteomics
- Metabolomics
- Genomics
- siRNA

Product Goals

- Broad Spectrum Countermeasures
- Genetic Sequencing of Pertinent Threat Agents
- Platform Technologies

An Innovative Approach Using Revolutionary Technologies To Expedite The Development Of Products To Counter Emerging Biological Threats
Transformational Countermeasure Technologies Initiative (TCTI)

Basic Science Advances
- Nano-catalytic self-decon material
- Bio-engineered Countermeasures
- Meta-data information interface
- Nano-scale protective coatings and fabrics

Integrated Cross-Cutting Technologies
- Multi-threat defense
- Integral design concept
- Interactive digital multi-faceted data architecture

Future Combat Systems
- Hierarchical systems of systems
- Non-intrusive; minimal logistics

Consequence Management
- Converging Technologies for Improving Human Performance

Nanotechnology, Biotechnology, Information Technology, and Cognitive Sciences (NBIC)

Develops revolutionary technologies that provide the warfighter with a fully integrated protective ensemble.
Nanotechnology Initiative

Joint Science & Technology Office (JSTO) nanotechnology initiative is a two-phased effort.

**Phase I**
- **Objective:** Conduct a survey of nanotechnologies with application to CBD needs.
- Team from MIT-LL and Natick Soldier Center will conduct the survey.
- Recommendations will be provided to JSTO on applicable nanotechnologies.

<table>
<thead>
<tr>
<th>National Nanotechnology Activities</th>
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<tr>
<td>Materials</td>
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<tr>
<td>Sensors</td>
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<tr>
<td>Quantum dots</td>
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<td>Fabrics</td>
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<td>Nanostructures</td>
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<td>Therapeutics</td>
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<td>Catalysts</td>
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**Phase II**
- **Objective:** Develop a solid S&T base of nanotechnology applied to all aspects of CBD needs.
- Multidisciplinary team will advise nanotechnology program Principal Investigators (PIs).
- Nanotechnology developments will continue to be monitored.

- **Natick Soldier Center**
- **MIT Lincoln Lab**
- **JSTO**

Leverages significant interagency investments for potential CBD applications.
Leveraging Interagency Activities are Key to Achieving National Strategies

**CBDP Coordinates With:**

- Counterproliferation Program Review Committee (CPRC)
- Technical Support Working Group (TSWG)
- U.S. Coast Guard
- National Institute of Allergies and Infectious Diseases (NIAID)
- Department of Homeland Security (DHS), S&T Directorate

**Various Levels of Coordination/Cooperation Exist With:**

- U.S. Department of Agriculture (USDA)
- Office of Science & Technology Policy
- National Security Council (NSC)
- Department of Health and Human Services (DHHS)
- Department of Justice
International Partnerships are Leveraged to Support All of Phases of CB Defense

- Foreign Comparative Testing
- MOUs & MOAs
- Cooperative Research and Development
- Foreign Military Sales
- Exchange of Personnel
- Cooperative Production
- Loans
- Exchange of Information
CBDP: The Way Ahead

• Need to build on current strengths…
  – Integrated portfolio of capabilities supporting critical operational missions
  – Multi-disciplinary approaches
  – Well developed doctrine and concepts for the military in operational environments

• …while recognizing a changing environment
  – Laboratory and other infrastructure may need overhaul
  – Operational environment must consider homeland
    ➢ DOD now a key player, but no longer the biggest investment
  – Emerging and non-traditional threats may be critical
  – Congress will continue to play an active role
  – Industry is increasingly important, though DoD-unique assets need to be identified and maintained
CBDP: The Way Ahead

...and Planning for the Future

- Need to balance investment between
  - Current risks (operational and procurement needs)
  - Future risks (S&T and infrastructure)
- Coordination with other agencies (DHHS, DHS, and others) for an effective national effort
  - DoD may play key role in transitioning technologies from laboratory concepts to field-ready systems, especially medical systems
- Broad-spectrum, dual-benefit approaches will need to be evaluated in all areas
Questions

http://www.acq.osd.mil/cp/
BACK-UP
CB Defense Program Structure: FY2008 PB

FY08 Highlights
- Near-Term Emphasis to Address Future Challenges (NTAs, Emerging Threats, Transformational Medical Technologies) and Improve the T&E Infrastructure
- Long term trend to Provide Advanced Capabilities to the Warfighter
Recapitalization of S&T Infrastructure

- Initiative underway to recapitalize and revitalize CBD S&T infrastructure, which is required to:
  - Counter expanding threats from novel and emerging threats.
  - Exploit advances in technology.
  - Speed the technology transition into systems acquisition programs.
Quadrennial Defense Review:  
Implementing the Combating WMD Vision

To achieve the characteristics of the future joint force the Department will:

– Designate the Defense Threat Reduction Agency to be the primary Combat Support Agency for U.S. Strategic Command in its role as lead combatant commander for integrating and synchronizing combating WMD efforts.

– Expand the Army's 20th Support Command (CBRNE) capabilities to enable it to serve as a Joint Task Force capable of rapid deployment to command and control WMD elimination and site exploitation missions by 2007.

– Expand the number of U.S. forces with advanced technical render-safe skills and increase their speed of response.

– Improve and expand U.S. forces' capabilities to locate, track, and tag shipments of WMD, missiles, and related materials, including the transportation means used to move such items.

– Reallocate funding within the CBDP to **invest more than $1.5 billion** over the next five years to **develop broad-spectrum medical countermeasures** against advanced bio-terror threats, including genetically engineered intracellular bacterial pathogens and hemorrhagic fevers.
Medical Countermeasures Against Advanced Bio Threats

**Today’s Threats**
- Anthrax
- Smallpox
- Botulinum
- Plague
- Tularemia
- Ebola/Filo
- Hemorrhagic Fever
- Encephalitis
- SARS
- Influenza
- Ricin/SEB, others

**Bioengineered**

**Modes of Action**
- Receptor Binding
- Signal Transduction
- Decoys
- Immune Avoidance
- Translation/Transcription
- Immune Deregulation
- Replication
- Virulence Expression

**Parallel Systems Approach**

**Solutions**
- Target Agent Commonalities
  - Block Key Receptors
  - Inhibition by Small Molecules
  - Modulate Immunity
  - Change Gene Expression
  - Block Protein Actions
  - Modulate Physiologic Impacts

**One PIECE at a time**

**Process Analysis**

**Broad Spectrum**
Chemical Biological Defense Program
Based on FY08 President’s Budget Request (February 2007)
$1.570 Billion

Procurement

1. Procurement, 548,753
2. Basic Research, 72,003
3. Advanced Development
4. Operatioonal Sys Dev, 7,716
5. Mngmt Support, 99,053
6. Applied Research, 305,327
7. Sys Dev Dem, 247,935
8. Adv Comp Dev & Prot, 57,160

Advanced Development

Science & Technology Base
Nanotechnology Initiative

Federal NNI: $1 Billion in Federally Sponsored Research

CB-related Basic & Applied Research

Leverages significant interagency investments for potential CBD applications.