BARDA Today & Tomorrow: Goals, Priorities, Successes & Challenges

BARDA Industry Day
October 15, 2014

Dr. Robin Robinson
BARDA Director
ASPR Deputy Assistant Secretary
Man-Made & Natural Threats Have Become Annual Realities Since 9/11

Amerithrax

H5N1

SARS

H1N1

MERS-CoV

H7N9
Ebola 2014:
Worst Ebola Epidemic in History
Drug Development is Still Expensive, Long, & Risky

**PHASES**
- Discovery
- Preclinical Development
- Phase I
- Phase II
- Phase III
- Licensure
- Production & Delivery

**TIME**
- 3-7 yr
- 0.5-2 yr
- 1-2 yr
- 2-3.5 yr
- 2.5-4 yr
- 1-2 yrs

**PRODUCT PIPELINE**
- NIH
- BARDA ARD
- Project BioShield ($5.6B)

**PROBABILITY OF SUCCESS TO LICENSURE**
- 1-3%
- 5-17%
- 10-25%
- 18-35%
- 45-70%
- 90%

**PIPELINE PHASE COST**
- $100M - 130M
- $60M - 70M
- $70M - 100M
- $130M - 160M
- $190M - 220M
- $18M - 20M

BARDA’s Commitment to Medical Countermeasures

BARDA Mission: Support advanced development of and make available countermeasures for CBRN threats, pandemic influenza, and emerging infectious diseases through product development, innovation, and acquisition, stockpiling, building manufacturing infrastructure, & core service assistance

O’Neil Building

Barda has built a formidable & robust MCM development pipeline

- 150+ MCM candidates in development through 2013
  - Using better business practices (e.g. OTA, IPR)
  - 12 new CBRN MCM candidates and 5 new H7N9 vaccine candidates in FY2013
- 12 MCMs provided under Project BioShield since 2004 with 12 more by 2019
- National stockpiles of H5N1 & H7N9 pre-pandemic vaccines & adjuvants
- 7 FDA-approved MCMs in 2012-13 with more expected by the end of 2015
  - Simplexa® influenza & RSV diagnostic POC device (Jun. 2012) – 3M/Focus [510K clearance]
  - Flucelvax cell-based influenza vaccine (Nov. 2012) – Novartis [licensure]
  - Raxibacumab anthrax antitoxin (Dec. 2012) – GlaxoSmithKline/Human Genome Sciences [approval]
  - Aura portable ventilator (Dec. 2012) – Covidien [510k cleared for adults]
  - FluBlØk recombinant-based influenza vaccine (Jan. 2013) – Protein Sciences
  - HBAT botulinum antitoxin (Mar. 2013) – Cangene [licensure]
  - Q-PAN H5N1 pandemic influenza vaccine (Nov. 2013) – GlaxoSmithKline [licensure]
BARDA Has Established Robust CBRN MCM Development Pipeline

• **BARDA CBRN MCM development pipeline has supported 85+ candidates since 2004 ($2.6 B)**

• **Biothreats**
  - Anthrax vaccines (7) and antitoxins (7)
  - Smallpox vaccine (3) and antiviral drugs (2)
  - Botulinum antitoxin (1)
  - Other biothreat antimicrobial drugs (9)
  - Viral hemorrhagic fever (2)

• **Rad/Nuc threats**
  - Acute Radiation Syndrome drugs (36)
  - Decorporation agents (6)
  - Thermal burn therapies (9)
  - Biodosimetry devices (11)

• **Chem threats** — antidotes & decon (4)
BARDA MCMs Developed & Purchased under Project BioShield

Smallpox

Pentetate calcium trisodium injection
1000 mg
For intravenous or intramuscular use only.
See package insert for use information.
Store in a cool, dark place. Do not freeze.
Rx only.

Pentetate zinc trisodium injection
1000 mg
For intravenous or intramuscular use only.
See package insert for use information.
Store in a cool, dark place. Do not freeze.
Rx only.

Anthrax

BioThrax®

Radiation

Chemical

Botulism

BARDA Influenza Vaccine Development Programs Have Delivered More Vaccine Sooner But What About Better

Cell-based Vaccines
- Q-Pan H5N1
  Licensed 11/20/13
- FluBløk
  Licensed 01/16/13

Egg-based Vaccines
- H5N1 Vaccine
  Licensed 04/17/07
- Flucelvax
  Licensed 11/20/12

Recombinant Vaccines

“Universal” Vaccines
- Advanced Development
  Start FY15
FDA-Approved BARDA Influenza MCMs

Q-PAN H5N1 Vaccine

GlaxoSmithKline

Cell-based Influenza Vaccine

Novartis

Next-Gen Portable Ventilators

Covidien

Recombinant-based Influenza Vaccine

Protein Sciences

Flu/RSV POC Diagnostic

3M/Focus
BARDA MCM Public-Private Partnerships

• BARDA has established multiple solid public-private partnerships with industry and academia to expand domestic & international manufacturing response capabilities
• Retrofitted manufacturing facilities
  — Sanofi – PA
  — MedImmune – CA and PA
• New manufacturing facilities (Novartis – NC)
• Centers for Innovation in Advanced Development & Manufacturing
  — TAMUS – TX
  — Emergent – MD
  — Novartis - NC
• WHO and PATH with NC State & Utah State for pan flu vaccine manufacturing in developing countries
• OTA agreement with GSK for antimicrobial drug development
BARDA Uses Public-Private Partnerships to Build Domestic MCM Manufacturing Capacity

• Expanding Existing Capacity by Retrofitting Vaccine Manufacturing Infrastructure

sanofi pasteur – Swiftwater, PA

Novartis – Holly Springs, NC

• Changing Flu Vaccine Industry
USG pandemic influenza vaccine policy is two doses for everyone (~ 600 M doses) within 4 months of pandemic onset.

Chiron Shut down

H1N1 pandemic

New flu vaccines licensed

More new flu vaccines

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BARDA Expands Flu Vaccine Manufacturing Capacity in Developing Countries

- Mexico Birmex
- Brazil Instituto Butantan
- Romania Cantacuzino Institute
- Serbia Torlak Institute
- Kazakhstan RIBSP
- Egypt VASERA
- India Serum Institute
- Thailand GPO
- South Africa Biovac
- South Korea Green Cross
- Vietnam IVAC VABIOTECH PATH
- South Africa Biovac
- Indonesia Bio Farma

BARDA Training Sites
- Utah State
- N.C. State
- Mexico Birmex
- Brazil Instituto Butantan
- Kazakhstan RIBSP
- Egypt VASERA
- India Serum Institute
- Thailand GPO
- South Africa Biovac
- Vietnam IVAC VABIOTECH PATH

Licensed/Active Influenza Vaccine Producers
- BARDA/WHO Cooperative Agreement Grantees
- BARDA/WHO Licensed Pandemic Vaccine for Human Use as of 2013

• BARDA leadership succession

• BARDA CBRN MCM programs continued support for existing projects as warranted and funds are available & began support for new projects
  — Broad spectrum antimicrobial drugs & immunomodulatory drug
  — Immunomodulatory candidate
  — Viral hemorrhagic fever vaccine & therapeutic programs – NEW

• BARDA supported the purchase of MCMs under Project BioShield:
  — Smallpox vaccines
  — Botulinum antitoxins (FDA–mandated studies)

• BARDA Influenza MCM program continued support for existing/new projects
  — Vaccine – cell, recombinant, Ag-sparing, universal (with NIAID)
  — Antivirals (host-targeted) – Nitazoxanide Phase 3 study continued
  — Flu Diagnostics – new POC diagnostics

• BARDA added new All–Hazards next generation ventilator
BARDA Provides Critical Core Service Assistance to MCM Developers

Centers for Innovation in Advanced Development & Manufacturing

Regulatory & Technical Expertise

Modeling Hub

CARB Strategic Incubator

Animal Studies Network

Fill Finish Mfg. Network

Clinical Studies Network

BARDA Core Service Assistance Programs Became an Everyday & Emergency Response Infrastructure

• BARDA has established critical core service assistance programs to help MCM developers and provide national response capabilities to public health emergencies
  • Animal Studies Network (17 CRO labs) - 2010
  • Centers for Innovation in Advanced Development & Manufacturing (3 consortia) - 2012
  • Fill Finish Manufacturing Network (4 CMOs) – 2013
  • Clinical Studies Network (5 CROs) – 2014 NEW

• BARDA’s Nonclinical Studies Network has provided assistance on 20+ projects & presented smallpox animal model to FDA for qualification.
• BARDA-supported projects entering CIADMs for assistance in 2014.
• BARDA FFMN engaged influenza vaccine manufacturers to facilitate tech transfers and work with FDA, drug companies to address drug shortages for several products as pilot project, & assisted Ebola vaccines & therapeutics.
• BARDA Clinical Study Network established internal infrastructure in 2014 to conduct clinical studies next year.
BARDA 2015 Maintains MCM Development Pipeline, Transitions MCM Candidates from ARD into PBS, & Launches New Initiatives

• CBRN MCM Program: (new BAA 2015)
  – Continue existing projects incl. enhanced vaccines & therapeutics for smallpox and anthrax
  – Expand Viral Hemorrhagic Fever Vaccine & Therapeutic Programs
  – Launch CARB initiative to expand BSA Program to combat antimicrobial drug resistance using OTAs New

• Project BioShield: New MCMs from BARDA ARD (RFPs in 2015)
  – Artificial skin replacement & debridement for thermal & radiation burns New
  – Biodosimetry device for measuring radiation exposure New
  – Chemical antidotes for cyanide poisoning
  – Ebola MCMs New
  – Replenishing anthrax antitoxins & smallpox vaccines,

• Influenza MCM Program: (new BAA & RFPs in 2015)
  – Continue existing projects incl. modern vaccines & antiviral drug candidates
  – Launch New Universal Influenza Vaccine Development Program
  – Launch New Influenza Immunotherapy Program for Critically Ill

• Other New Initiatives - Emerging Infectious Disease Program & Continuous Manufacturing Innovation Program

BARDA is Always Open

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BARDA - URL: http://www.phe.gov
BARDA e-mail: BARDA@hhs.gov
• Upcoming Events
• PHEMCE Strategy and Implementation Plan
• CBRN and Pan Flu Programs
• Business Toolkit - www.phe.gov/amcg

MedicalCountermeasures.gov
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• Resources core service programs
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• Federal strategies and reports