One Health Approach to AMR and Use: A Dialogue for Common Purpose

NIAA Symposium
Columbus, Ohio
November 13, 2012

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Objectives

- Provide background and offer questions to stimulate the dialogue
- Provide a One Health framework to help structure the dialogue
- Discuss barriers to a productive dialogue and consensual solutions and key elements to overcome them
- Offer some ideas about defining and building common ground
- Define success for this symposium
Introduction

- Acknowledgments
- Humanity waging war against microbes
- Planetary environment of excesses
- Cardinal sins: abandonment of preventive practices and selecting strategies causing imbalance in nature
- Microbial capability: evolve with simple genomes, exchange genetic material across species encoding resistance and short generation time
- New strategies and processes needed
- Unique forum and opportunity – a way forward
Background

- Connexity – complex, multifaceted and profound
- Consider AMR as part of EID complex
- Why are EID continuing and accelerating?
- AMR is an example of a “wicked problem”
- AMR has societal effects not just physiological
- Concept of ecologies of resistance with selective pressures
- The need for a new perspective – One Health
- AMR will occur without antibiotic use, with judicious use, but especially with misuse and/or overuse
- AMR is not surprising but the speed, scope and impact are
- Unfortunately, the 1960s-70s, suggested that the era of infectious diseases was over – premature
- Disease control, prevention and sanitation were de-emphasized
- Dictum of clinical findings; rejection of causality in favor of association
- A 40-50 year gap with minimal discovery and approval of new drugs
- A time of remarkable science and research with new possibilities for breakthrough and innovative discoveries and findings
- “It’s our wits vs. their genes” – are we winning or losing the battle?
“It’s our Wits vs. Their Genes”

Dr. Joshua Lederberg – Science 2000
Major classes of antimicrobials and the year of their discovery


SALVARSAN (arsenical)
RIFAMYCIN (ansamycin)
LINEZOLID (oxazolidinone)

GRAMICIDIN (Peptide)
PENICILLIN (β-lactam)
STREPTOMYCIN (aminoglycoside)
CEPHALOSPORIN (β-lactam)

PRONTOSIL (sulfonamide)
NALIDIXIC ACID (quinolone)
DAPTOMYCIN (lipopeptide)

THE GOLDEN AGE
CHLORAMPHENICOL
CHLORTETRACYCLINE
POLYMIXIN (lipopeptide)
ERYTHROMYCIN (macrolide)
VANCOMYCIN (glycopeptide)
VIRGINIAMYCIN (streptogramin)
Three connected antimicrobial ecosystems

Adapted from Martinez (2009)
Convergence Model

- Genetic and Biological Factors
- Social, Political, and Economic Factors
- Physical and Environmental Factors
- Ecological Factors

EID

- Animals
- Humans
- Wildlife
Global Trends in Emerging Infection Diseases (EID)

- 335 EID events: 1940-2004
- Steady increase with peak decade in 1980
- 20.9% drug-resistant microbes
- 22.8% vector-borne (28.8% in the last decade)
Global Trends in Emerging Infection Diseases

A: zoonotic pathogens from wildlife
B: zoonotic pathogens from non-wildlife
C: drug-resistant pathogens
D: vector-borne pathogens

Surveillance bias and wrong focus

Why Diseases Emerge

Genetic and biological factors
• Microbial adaptation and change
• Human susceptibility to Infection

Physical environmental factors
• Climate and weather
• Economic development and land use

Ecological factors
• Changing ecosystems
• Human demographics and behavior

Social, political, and economic factors
• International Travel and commerce
• Poverty and Social inequity
• War and Famine
• Lack of political will
• Intent to harm
TRIPLE THREAT

Changing Environment

Vulnerable Humans

Carrier Animals
The Convergence: A New Public Health Kaleidoscope Emphasizing One Health

Human Health

Animal Health

Environmental Health
The scale and complexity of animal and human medical problems embedded in a changing environment, demand that scientists move beyond the confines of their own disciplines and explore new organizational models for team science.
One Health is the collaborative effort of multiple disciplines – working locally, nationally and globally - to attain optimal health of humans, animals and our environment.
ONE HEALTH

Not a new concept; greater acceptance prior to the specialization of medicine

Contemporary societal problems are mostly “Wicked Problems” and demand new thinking and solutions

Triple threat to health: people, animals and our environment

Our world is exquisitely and uniquely interconnected

Acceleration and intensification of H-A interface

Global phenomenon

Counter to current medical training and education

Emphasis on prevention and moving “up stream”
Wicked issues often crop up as organizations face constant change and unparalleled challenges; they often occur in a social context with diverse opinions from numerous stakeholders.
Wicked Issues / Dilemmas

Wickedness is not about difficulty but rather represents issues that traditional processes cannot resolve.
Characteristics of a Wicked Problem or Dilemma:

- Complex and tangled
- Unprecedented
- Difficult to define and enigmatic
- Solution is not binary; many choices
- Often generate unexpected consequences
- Unique and past experiences not helpful
- Threatening
- Often a symptom of another issue/problem
- This is descriptive of the AMR issue
Questions

1. Where do we find ourselves today and how did we get here?
2. What are the consequences of not acting or resolving the AMR issue?
3. What needs to be done to create and implement effective action and define a common ground?
4. What are the barriers to effective action and how might we overcome them?
5. What are your challenges over the next 2 days and what would determine a successful symposium?
Where Do We Find Ourselves Today and How Did We Get To this point?

- AMR has become a significant and growing threat to health
- AMR is adding profound costs to healthcare
- We face a big problem that is rapidly getting bigger
- AMR can be a polarizing issue that is adding to our difficulty in finding resolution
- Society seems to be at an major impasse and the costs and impacts of inaction are unacceptable
- AMR is now a huge global problem
Where Do We Find Ourselves Today and How Did We Get Here? (Cont)

- The need for new drugs has greatly outpaced the development and approval of such products
- Some believe that AMR is an example of a “Tragedy of the Commons”
- Others believe that AMR is analogous to our energy situation
- There is consensus of a problem but not a consensus on solutions or even accountability
- Use of antimicrobials has resulted in real benefits
- Stalemates multiply threats and compound the difficulty of meaningful solutions
Tragedy of the Commons

- Metaphor to understand environmental catastrophes; intertwined challenges spawned by the accelerating scale of human activity

- A serious dilemma where individual rational behavior, acting without restraint to maximize personal short-term gain, can cause long-term harm to the environment, others and ultimately to oneself. Has AMR been catalyzed by rational behavior, at the time, to focus on short-term gain without realizing or appreciating the longer term consequence of that behavior?

- If so, when is it no longer rational?
Policy View at the Commons

Should we view antimicrobials and their usage like we view energy – a limited, valuable resource to be conserved and for which new sources need to be identified and exploited?
What Are the Consequences of Inaction on AMR?

- Enormous costs to society and healthcare continue to escalate
- There are both ST and LT impacts to relationships
- There will be a greater focus on winning and losing rather than inventing an all-gains strategy
- There is more likely to be a shift to 3rd parties or to more regulatory and legislative action; the longer the inaction, the less likely to find satisfactory outcomes – rights and power over interests
- A reduction in improving health in all domains
- Agriculture has the greatest vulnerability/downside
What Needs To Be Done to Create Effective Action and Define Common Ground?

- Reframe the problem and options for resolution
- Think in larger dimensions
- Focus on creating mutually satisfying outcomes and interests; mutual gains not a victory; Gaussian analysis of where interests emerge
- Concept of the “Burning Platform” – urgency
- More studies or take action?
- Scientists and researchers are natural skeptics
- Trust must be earned but action can’t wait
- Shift to common ground in midst of other issues
Burning Platform
Gaussian or “normal” distribution
- Separate people from problems; be hard on the problem but soft on people
- Focus on interests and not positions
- Initiate options for mutual gain; inventing before deciding
- Use objective criteria; principled but not pressured
- Know your BATNA

- Roger Fisher/William Ury
**BATNA**

- BATNA is the *Best Alternative To a Negotiated Agreement*
- Exploration of options if no agreement
- Strong BATNAs make for better agreements
- Know BATNAs of others
- Define your unilateral option
Consensual solutions are only better, and will only be accepted, if stakeholders are confident that they will achieve more in a negotiated agreement than a unilateral action; you most achieve more than your BATNA.
Interests

- Needs
- Desires
- Concerns
- Fears
- Aspirations
- Must be prioritized
Resolving Disputes

**Interests** – what we truly care about and want

**Rights** – Who is right (and wrong); arbitrate or adjudicate to determine

**Power** – coercing others to do something that they would not otherwise do; threatening

What is the best approach?

- Transaction costs – time, energy, money
- Satisfaction of outcome – fair and interests met
- Effect on relationships – better/worse; ST/LT
- Recurrence – does the resolution stick?
It is less costly and more rewarding to focus on interests than to focus on rights which, in turn, is less costly and more rewarding than focusing on power.

What would be the outcome for animal agriculture in a rights or power dispute based on public sentiment today?
Compromise vs. Interests

Compromise connotes that everyone give up something and further suggests an outcome focusing on meeting everyone’s minimal result. This often leads to dissatisfaction for all; therefore, it is better to strive for an agreement that comes as close as possible to everyone’s interests and highest aspirations.
What Are the Barriers To Effective Action and How Can They Be Overcome?

- Complex problems often have complex answers
- It is more than science and evidence; politics (big and little "P"), behavior, economics and conflict
- Change the game; getting to yes; change BATNA
- Facts vs. perceived facts; we often prefer to believe what we prefer to be true; escalation
- AMR is caught up in a network of other societal issues evoking emotions and anger – disentangle
- Compromise is not the same as mutual interests
- Common Ground – ideas to break the impasse
Common Ground

- A basis agreed to by all participants for reaching a mutual understanding. A foundation of common interests.

- Something people can agreed to when they disagree on other issues.
Creating Common Ground

- Consider specific classes of antibiotics reserved for animals
- Determine incentives for pharmaceutical companies – discovery and products to market
- Develop, implement and adopt international standards for usage
- Improve data collections and sharing to ensure early detection of resistance in order to make adjustments – integrated surveillance strategies
- Incorporate use and plans for new vaccines – leverage the “decade of vaccines”
Creating Common Ground (Cont)

- Stimulate and emphasize disease control, prevention and sanitation to reduce need for usage
- Mandate training for all health professionals in the judicious use of antimicrobials and all health science students (accreditation standard?)
- Adopt strategies and drugs for targeted use (seen today in oncology treatments); Dx and duration
- Adopt a One Health mindset and construct from across all domains and interests and involve their interests and concerns
Creating Common Ground (Cont)

- Place agreements and solutions clearly in front of decision-makers, national organizations and agencies; a political will is essential
- Create and implement a new education campaign
- Develop a new economic model – sponsor and hold a national forum on the topic
- Decide on leadership and followership roles
Finding Common Ground

- It is never personal
- Aim for mutual satisfaction not victory
- Suspend reactions, emotions and distrust
- It is never about your position but your interests
- There are facts and perceived facts – we often prefer to believe what we prefer to be true
- Be clear on the implications of not agreeing
- The greatest power is to “change the game”; turning adversaries into partners; shift from intractable issue to new perspectives and options
Conflict

Conflict is normal in any relationship or within organizations. Thus, while conflict will always occur, the critical issue is how to resolve them with minimal costs and the greatest benefit. Successful resolutions can produce mutual benefit and also allow for growth and change.
“Diplomacy is the art of letting someone have your way.”

- Daniele Vare
What Are Your Challenges Over the Next 2 Days and What Does Success Look Like?

- Begin with the end in mind – improving health
- Use a One Health mindset and perspective
- Think in bigger and broader dimensions
- Participate fully – this is a unique symposium results depend on you not the presenters
- Define the common ground and interests for all
- Recommend concrete and actionable outcomes
- You may not obtain your position but can satisfy your interests
- Invent a portfolio of options for mutual gains
What Are Your Challenges Over the Next 2 days and What Does Success Look Like?(Cont)

- Everyone should leave with a better understanding of the depth and serious nature of AMR and a new mindset to help address the issue.
- Everyone should leave with the knowledge that even though this is a wicked problem, it can be successfully ameliorated although not necessarily completed resolved.
- This symposium can serve as a critical link from the earlier NIAA white paper and definitive action.
ONE HEALTH