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Audiology & Multidisciplinary Analysis Partnerships

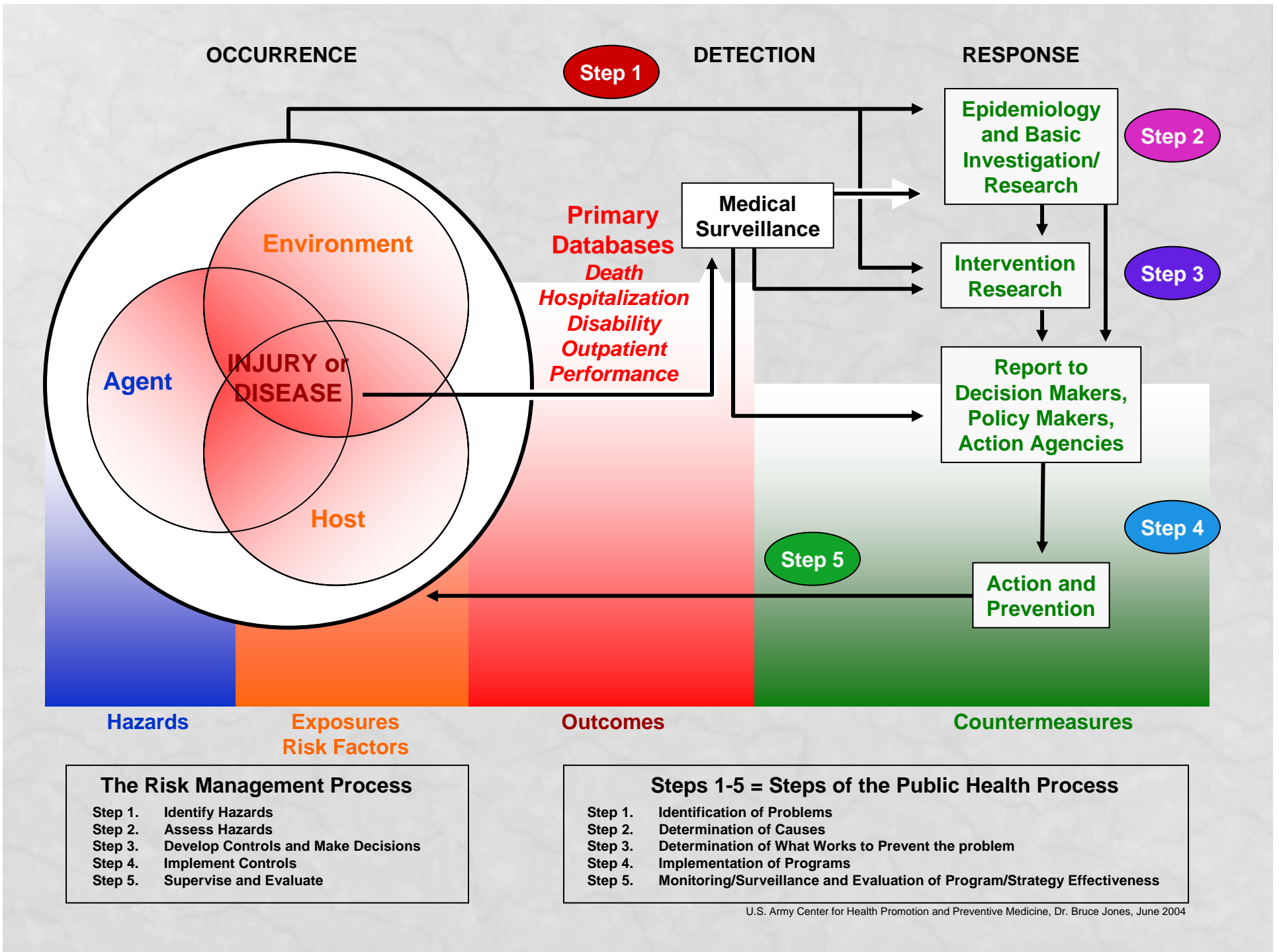
Academic-Researcher Town Meeting
ASHA Convention
Boston MA, 14 Nov 2007

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Preventive Medicine**

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USACHPPM Mission Statement

- **To enhance military public health support to the Warfighter & family members**
- **To promote military public health to support Army transformation**



Public Health Study vs. "Research"

- **Disease outbreak**
 - **Short timelines**
 - **Multidisciplinary subject matter experts**
- **Environmental Health Surveillance**
 - **Longer latency – multiple causation**
 - **Multidisciplinary subject matter experts**
- **Injury Surveillance**
 - **Longer passive surveillance timelines**
 - **Multiple clinical specialty SME's**

From NIHL to TBI & Sequelae

- **Postdeployment Noise-Induced Hearing Injury**
 - **Initially considered only sensory hearing loss**
 - **Plus eardrum perforation from blast trauma**
 - **Added dizziness/imbalance problems (blast trauma)**
- **TBI (aka polytrauma) (blast trauma)**
 - **Audiology: CAPD**
 - **But added CNS comorbidities & different clinical specialties for assessments & differential diagnosis**
- **Current plans**
 - **Look at appropriate clinical paths for different cohorts**
 - **Find “gaps” in the data and recommend corrections toward best practices**

Conclusions

- **Evidence-based public health seen as inherently multidisciplinary (IOM reports 1997-1999)**
- **Public health sees fewer barriers to multidisciplinary scientific collaboration**
- **Current collaboration to generate “practice based evidence” of best clinical care integration for blast trauma**

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Comments by Ray D. Kent

University of Wisconsin-Madison

Performance Measures for Science and for Scientists

- **Productivity**
 - **Number of publications and/or patents**
- **Importance**
 - **Number of citations**
- **Creativity**
 - **Inferred from above**
 - **Awards or distinctions**

Team Science Eclipses Solo Science

- **Wuchty, Jones, & Uzzi (2007).** The increasing dominance of teams in production of knowledge. *Science*, 316, 1036-1039.
- Reviewed 19.9 M papers over 5 decades and 2.1 M patents.
- Analyzed data for patents and 3 main areas:
 - **Science & Engineering (171 subfields)**
 - **Social Sciences (54 subfields)**
 - **Arts & Humanities (27 subfields)**

Superiority of Team Science

- **Teams increasingly dominate solo authors in knowledge production.**
- **Strong shift toward collective research in Science & Engineering, Social Sciences, and Patents; smaller shift in Arts & Humanities.**
- **Teams generated more highly cited work in each broad area.**
- **Teams now dominate the top of the citation distribution in all 4 research domains.**

Caveats and Questions

- **Teams may do better than solo scientists, but what do we know about *interdisciplinary* teams?**
- **The dynamics of team formation and function are poorly known.**
- **Do the really big, important questions necessarily require a collective intelligence?**

Team Research as a Goal of PhD Education

- **Co-mentoring from different disciplines**
- **Models of team research**
 - **Research apprenticeship in team environments**
 - **Virtual teams**
- **Career guidance**
 - **Funding and lab development**
 - **Tenure and promotion**

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Team Science

A Users Perspective

Elena Plante, Ph.D.

The University of Arizona



Teams in CSD

- **Adaptations of Advanced Technology**
 - **Physicists**
 - **Biomedical engineers**
 - **Computer programmers**
 - **Mathematical modelers**
 - **Neuroscientists**
 - **Behavioral scientists (i.e., us)**
- **Exploration of Disorder Causality**
 - **Geneticists**
 - **Physiologists**
 - **Biochemists**
 - **Audiologists/Speech-language pathologists**

Impediments to Team Research

- **Being the new guy in a team environment**
- **Institutionally-created teams**
 - **From scratch**
 - **From old parts**
- **Grass-roots teams**
 - **Tend to be problem oriented**
 - **Start with a shared vision**
 - **May grow or disintegrate over time**

Administrative Issues

(from an administrator's perspective)

- **Strategic Hiring**
- **Positioning the Department**
- **The Tenure Clock**
 - **New team tend to have slow rise times**
 - **Bottlenecks**
- **The Tenure Criteria**
 - **Old criteria applied to modern models**
 - First or solo-authored papers
 - The pathway to funding

The Increasing Dominance of Teams in Production of Knowledge

Stefan Wuchty, Benjamin Jones, and Brian Uzzi

We have used 19.9 million papers over 5 decades and 2.1 million patents to demonstrate that teams increasingly dominate solo authors in the production of knowledge. Research is increasingly done in teams across virtually all fields. Teams typically produce more highly cited research than individuals do, and this advantage is increasing over time. Teams now also produce the exceptionally high impact research, even where that distinction was once the domain of solo authors. These results are detailed for the sciences and engineering, social sciences, arts and humanities, and patents, suggesting that the process of knowledge creation has fundamentally changed.

Promotion and Tenure

- **Refocus on the goal of the evaluation**
 - **What does it mean to be a productive researcher?**
 - **What should the CV of a team member look like?**
- **Departments guide the College- and Provost-level reviews**

Advice to young investigators

- **Look for a collaborative and interdisciplinary job environment**
- **Be visible**
- **Be interactive**
- **Be an attractive target for others looking for your expertise**
- **Be realistic about your time and capabilities**
- **Be cautious about accepting all offers**
- **Acknowledge cultural differences**
- **Know when to cut bait**

Cultural Differences

- **Institutional cultures**

- **Organizational structures**

- Institutes/IDPs vs. Departments

- **Professional cultures**

- Medical schools vs. Social and Behavioral Sciences

- **Foreign cultures**

- **Communication styles**

- **Management styles**

- **Differences in the scientific process**

- **IRB issues**

Know When to Cut Bait (from Parker, 1990)

- **You cannot easily describe the team's mission**
- **Meetings are formal, stuffy, or tense**
- **There is a great deal of participation but little accomplishment**
- **There is talk but not much communication**
- **Disagreements are aired in private conversations after the meeting**
- **Members are not open with each other because trust is low**
- **Confusion or disagreement about roles or work assignments**
- **Team has been in existence for over three months and has never assessed its functioning**
- **Decisions are made by team leader with little involvement from other members**

Why Do It?

- **Short-term intellectual payoff**
 - **Long-term productivity payoff**
 - **Social payoff**
 - **Fun**
-
- **<http://www.asha.org/members/phd-faculty-research/interdis-collab/>**

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Scientific Teams in CS & D

Bruce Tomblin

University of Iowa

Key Points

- **Many current scientific problems require multiple disciplines to collaborate**
- **Teamwork is important to the success of this collaboration**
- **Large scale collaborations involving multiple disciplines require working with a common shared vision.**
- **Evolution of a team**
 - **Begin with a hierarchical structure with higher level management tiers and subordinate cross discipline research staff.**
 - **Move to a flat heterarchical structure with transdisciplinary teams.**

Teams and Collaborations

- **Disciplines**

- **CSD colleagues (21)**

- **Psychology (7)**

- **Genetics (6)**

- **Medicine (5)**

- **Statistics (3)**

- **Epidemiology (1)**

- **Project Sizes**

- **Usually two to three collaborators**

- **Largest 7-8 investigators plus research staff**

Types of Collaborations

- **Intradisciplinary collaborations of investigators and students with similar views and skills**
 - **Example: Faculty from with shared background agree work together on a common problem due to shared interest and background.**
 - **Value**
 - Increase total available resources
 - Can be done with little additional funding.
 - Provides social and professional support
 - **Weaknesses**
 - May result in self reinforcing narrowness
 - Encapsulates the important questions to our discipline

Types of Collaborations in CS&D

- **Interdisciplinary consultative collaborations across a small group of investigators from different disciplines.**

- **Example:**

- Investigators from two or three different disciplines join to work on a problem identified by one of the team.
- The problem is largely “owned” by one investigator and the remaining members bring their skills to aid in the solution.

- **Value**

- Skills from the consultant collaborators can be infused into the research of the primary collaborator.

- **Weaknesses**

- The collaborating members have little deep involvement in the project and thus it is a service involvement
- If these are faculty, the work does not enhance their own professional development because it rarely requires “cutting edge” scholarship.

Barriers to Large Scale Transdisciplinary Teams in CS & D

- **Funds for large project and center type research are very limited.**
- **Research is largely conducted by faculty as a part of scholarly research expectations.**
 - **Time for collaboration is limited**
 - **Faculty research needs to show personal professional direction and identity**
- **Faculty are difficult to direct within a hierarchical management structure.**
 - **We often start with an heterarchy comprising a loose amalgam and it is rare to see it blend into a consolidated transdisciplinary team.**
 - **Faculty don't want to be told what to do.**

Things I have learned

- **Many disciplines need real world problems to attack and we have real problems.**
- **Our problems are often inherently interesting to others outside our discipline.**
- **Learning other disciplines' theories, methods and culture always enriches you and our discipline**
- **Collaboration requires that you move out of a comfort zone and requires that you acknowledge your limits.**
- **Egos and personal ambition are often barriers to getting a collaboration off the ground.**
- **Good collaborators are often collaborating too much.**

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