Reshaping the System of Survival for SCA

Friday June 13, 2008
5:15 pm
Bally’s Room Platinum/Gold/Silver
Reshaping the System of Survival for SCA

Presentation by

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Agenda

1. Background and History
   - Our Questions
2. How We Think … About Sudden Cardiac Emergencies
3. Another Way to Think
4. Next Steps
1. Background and History

Special Task Force
Benjamin Abella, Allan Braslow,
Robert Brennan, Raina Merchant,
Vinay M. Nadkarni, Frank Poliafico,
John Pourdehnad, and Larry M. Starr
1. Background and History
University of Pennsylvania

- Problem solving and decision making (emergency-related)
- Systems planning, research, design, and change
- Large, complex organizational problems
Our Questions

We Are Very Concerned

Why after 40 years of enormous energy and resources is the Sudden Cardiac Arrest (SCA) survival rate low, very low — too low?

Are we doing the “right” things?
I am Stepping Out-of-the-Box: It May Cause Discomfort

And while you’re thinking outside the box, have the box cleaned out by the end of the day. You’re fired.
My Approach

I will be discussing **Sudden Cardiac Arrest** as a problem of management and organization science.
People Think in Models and Metaphors
Thinking Models/Metaphors:
There’s a Lot of Politics Where I Work
Thinking Models/Metaphors:
I Feel Like I’m in a Game of **Dodge Ball**
Common Models/Metaphors: Mechanical and Biological

We use “analysis” which means we believe “the whole is equal to the sum of the parts.”
Whole = Sum of the Parts

If there is a problem with the whole, we search for the cause in the parts which when added together create the whole.
Analysis: Think in Steps

► Define a problem then reduce it into small parts

► Repair, replace, improve or “optimize” one or more parts

► Reassemble the parts and expect the whole problem to be solved
Analysis: Small Parts
Example 1. Mechanical

If there is a mechanical problem:
Focus on Parts
Example 2. Biological Problem

If there is a biological problem:
Focus on parts
Example 3. CPR Problem: Focus on Parts

CPR Training Devices

CPR Performance
Example 3. **CPR Training Device**

Problem: Focus on Parts
Example 4: CPR Performance
Problem: Focus on Parts

AHA Science Advisory

Hands-Only (Compression-Only) Cardiopulmonary Resuscitation: A Call to Action for Bystander Response to Adults Who Experience Out-of-Hospital Sudden Cardiac Arrest

A Science Advisory for the Public From the American Heart Association Emergency Cardiovascular Care Committee

Michael R. Sayre, MD; Robert A. Berg, MD, FAHA; Diana M. Cave, RN, MSN; Richard L. Page, MD, FAHA; Jerald Potts, PhD, FAHA; Roger D. White, MD
Example 5: SCA Survival Problem: Focus on Parts
Why after 40 years of enormous energy and resources is the Sudden Cardiac Arrest (SCA) survival rate low, very low —too low? Are we doing the “right” things?

Consider the following:
Example 6: Car Crash Problem

In the 1970s there were many head-on car crashes resulting in injuries and deaths on the George Washington Bridge (NY-NJ)
George Washington Bridge
Head-on Car Crash Problem: Reduce into Parts

Port Authority

Columbia-Presbyterian Medical Center

Police and EMS
Port Authority

Focused on the road markings so they regularly repainted the solid yellow lines. They measured their effectiveness by the degree of visibility of the lines by the drivers.

But, there was little overall improvement.
Police

Focused on driving behavior so they attentively issued fines to drivers who crossed the solid yellow lines or drove over the speed limit. They measured their effectiveness by the number of fines levied.

But, there was little overall improvement.
Focused on responding to emergencies so they kept themselves and their resources up to date. They measured their effectiveness by response time to the scene, quality of care, and response time to the medical center. But, there was little overall improvement.
Columbia-Presbyterian Medical Center

Focused on advanced medical care so they improved emergency facilities and treatment. They measured their effectiveness by quality of care feedback and survival rate.

But, there was little overall improvement.
3. Until...A Different Model Was Applied

OH WOW! PARADIGM SHIFT!

Frank and Ernest
3. Thinking Models/Metaphors: Social Systems

Think Systemically
Social System Thinking Model

The performance of the whole is **NOT** the sum of the performances of its parts.
Social System Thinking

In a system problem, the performance of the whole is derived from the **interactions** of the parts.

A system problem **cannot be solved** by focusing on independent parts.
Parts are Inter-Connected

I’m sure glad the hole isn’t in our end...
Social System Thinking Model

The parts do **NOT** always perform in ways that are expected.
Social System Thinking

In a social system the “parts” include

► people and groups

► who are purposeful, have their own interests, intentions, and generate their own goals

Goals are not always shared
Social System Thinking

Different methods are required to diagnose, describe, and understand a systemic problem.
Head-on Car Crash Problem: System Diagnosis

When these methods were applied a different question emerged:

On the George Washington Bridge, under what conditions would a head-on collision be impossible?
Head-on Car Crash Problem: System Diagnosis

And THIS produced a Systemic Solution:

Replace the solid yellow painted lines with a solid concrete barrier
George Washington Bridge

3. Systemic Thinking is Not New

“Systemic thinking has permeated virtually every functional area of business, and is taught, in one form or another, at most of the top-ranked schools.”

Are We Doing the “Right” Things?

We propose approaching the problem of SCA low survival rate from a systemic perspective.
4. Next Steps

Step 1. **System Diagnosis**  
*(Full Systems Understanding)*

Step 2. **System Change**  
*(Design Science)*
Global Problem
Pilot Project in US
System Diagnosis Will Answer

How and why does the SCA survival system including all stakeholders engaging in all interactions currently operate as it does?
System Diagnosis Will Answer

What are the systemic obstructions, conflicts, and barriers to SCA survival? How, why, and where do they occur?
System Diagnosis Will Answer

What systemic characteristics improve SCA survival?

How, why and where do they occur?
Most successful system changes rely heavily on the participation of persons who are likely to be involved with or are current users of whatever is changed. Design is with and by the users.
System Change: Example

System Change: Example

Using a Design Approach to Change the National Health Service in England

“This article is about a very large public sector organization – or rather system – that is said to be undertaking the most ambitious, comprehensive and intentionally funded national initiative to improve healthcare quality in the world… the transformation of the English National Health Service (NHS).”
System Change: Example

Using a Design Approach to Change the National Health Service in England

“Design Science (was selected because it) is about the broader creative approach to defining the problem itself then developing a process to solve it...At a practical level, design offers a range of proven tools and techniques for transformation that connect organizations with their users, encourages collective participation and reveals insights in a variety of contexts.”
What Can **YOU** Do?
Community Dialogue

“Reshaping the System of Survival for Sudden Cardiac Arrest”
Website
and
Community Message Board
Reshaping the System of Survival for Sudden Cardiac Arrest

Special Task Force
- Benjamin Abella
- Allan Braslow
- Robert T. Brennan
- Raina Merchant
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ECCU 2008
Invitation: Link to Invitation
Slides: Link to slides

Message Board
Post your questions, comments, observations here

Academic Resources
- Penn Organizational Dynamics Graduate Studies
- Penn Center for Resuscitation Science
- Children's Hospital of Philadelphia Center for Simulation, Advanced Education and Innovation

http://www.sas.upenn.edu/scasurvival
Message Board
http://forum2.aimoo.com/RSSforSCA
To Discuss Funding and Governance

Project Funding
Allan Braslow, Vinay M. Nadkarni, Frank Poliafico, and Larry M. Starr

Project Coordination
John Pourdehnad and Russell Ackoff
Panel Discussion

Sign Me Up
Smoking

Heart

Anxiety

(+)
Reduces

(-)
Hardens

(-)
Desire to Repeat

(+)
Short-term

Good for

Arteries

Defensive Action/Increases

Nausea

Blood Pressure

Negatively Affects

(-)
Increases

(+/-)
Maintain

Weight

(+)
Good for

Blood Pressure

Negatively Affects

(+) Increases

Genetic Predisposition

Oxygen

(-)
Limits

Defensive Action/Increases

(-) Produces

Blood Pressure

Negatively Affects

(-) Increases

(-) Increases

Blockage

Gradually Destroys/Harms

Genetic Predisposition

Other Risks or Experiences

Genetic Predisposition

Smoking

(+)
Reduces

(-)
Desire to Repeat

(-) Negatively Affects/Reduces

Oxidation

(-)
Negatively Affects

Exercise

(-) Negatively Affects

Lungs

(-) Limits

Systemic Relationship Between Smoking and the Heart
SCA Survival as a Non-Linear Model

Figure 5. System of Survival From SCA

Purpose (Why)

Process (How)

Early ALS
Early Access
Early CPR/AED

SCA Vulnerability

Function (What)

Design/Plan/Prepare
First Responders
EMS Responders
Community Medical Responders

Structure (Parts)