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Quality and Competency in Neonatal Resuscitation: What Is It? How Do We Achieve It?

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Disclosure

- Lou Halamek is the Co-chair of the Neonatal Resuscitation Program of the American Academy of Pediatrics (volunteer) and an Associate Professor of Pediatrics at Stanford University (paid, but not enough). In the past 12 months he has had the following financial relationships with manufacturers of commercial products and/or providers of commercial services:
  - Laerdal Medical: Consultant
  - Advanced Medical Simulation: Consultant
  - Laerdal Foundation: Grant Recipient

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Quality

- Latin, *qualitas*, *qualis*: of what kind
- superiority of kind; degree or grade of excellence

American Heritage Dictionary

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Competency

- **Latin, *competens*: to be suitable**
- **the state or quality of being properly or well qualified or capable**

American Heritage Dictionary

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Quality and Competency

- **implication: value judgment**
  - **quality *of what*?**
  - **competency *in what*?**

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What does this mean in terms of neonatal resuscitation?

- improved human performance leading to
  - better care for all newborns
    - decreased morbidity and mortality for most
    - less suffering in the dying process for others

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Quality and Competency in Neonatal Resuscitation: Overview

- U.S infant mortality rate: 7/1000 births
  - but that figure is influenced by many factors other than performance of resuscitation teams

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Quality and Competency in Neonatal Resuscitation: Phase I

- need for resuscitation-specific markers of performance…
  - on an individual and team level

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What should be assessed?

- content knowledge
  - what we know in our heads
- technical procedures
  - what we do with our hands
- behavioral skills
  - how we apply what we know and do
    - while working with colleagues
    - under time pressure

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What sets the standard for quality and competency?

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Neonatal Resuscitation Program (NRP)

- an American Academy of Pediatrics program
  - founded in 1987
  - textbook, lectures, skill stations
  - de facto national standard of care for newborns in the delivery room

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Evolution of the NRP

- can we do better?
  - strategic retreat 2002
    - limitations of traditional model clear
      - can these be overcome?
      - if so, how to implement on a national level?

Halamek LP. NeoReviews. 2008;9(4):e142-e149.

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Simulation-based Learning

- a methodology for learning in which trainees
  - are immersed in an environment filled with realistic visual, auditory and tactile cues
  - must integrate cognitive, technical and behavioral skills under often intense time pressure
  - provided the opportunity to reflect on their performance

Halamek LP, et al. http://www.pediatrics.org/cgi/content/full/106/4/e45

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Expectations of Learners

- learners will
  - think, talk and ***DO***
  - be willing to be challenged and forced out of their comfort zone
  - make mistakes
    - and learn from them…

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Expectations of Instructors

- instructors will
  - facilitate rather than dominate
  - utilize technology to optimize not overwhelm the learning process
  - provide relevant, challenging, scale-able immersive experiences
  - react, occasionally guide, even rescue but do not prescibe

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Center for Advanced Pediatric and Perinatal Education (CAPE)

at Lucile Packard Children's Hospital at Stanford (LPCH)

- world's first and foremost center dedicated to fetal, neonatal, pediatric and obstetric simulation
  - work began in 1995
    - medical simulator
    - human performance, patient safety laboratory
    - technology incubator

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But can it be done?

- Simulation in an academic setting in a dedicated medical simulation center is one thing, but…
  - how do you make it happen
    - on a national level
    - in all types of settings
    - starting from scratch?

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Define the Evidence Base

- define the evidence supporting simulation
  - International Liaison Committee on Resuscitation (ILCOR)
    - review the science
    - craft practice guidelines in collaboration with national resuscitation councils
    - worksheets on simulation, debriefng, etc. vetted in Osaka in March, 2009
    - results to be incorporated into NRP 2010

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Change the Instructor Culture

- 27,000 U.S. instructors
  - long-time lecturers who must evolve into skilled facilitators with solid debriefing skills
- Instructor Development Task Force
  - extensively revise
    - instructor manual
    - instructor DVD
      - video shoot at CAPE: February, 2009

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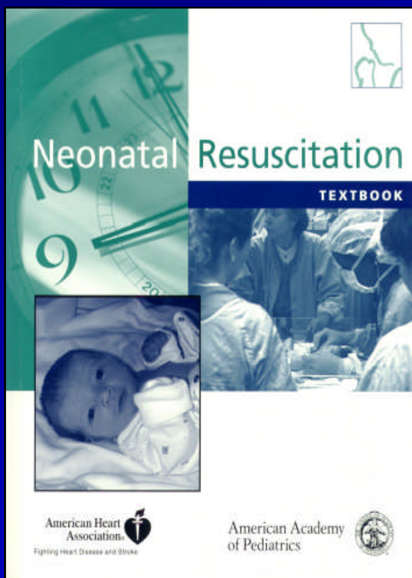
Change the Trainee Culture

- 2,200,000 U.S. trainees
  - used to passive roles
    - must be taught to
      - take responsibility for their own learning
      - be willing to make mistakes and learn from them



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Change the Trainee Culture

- new simulation-based curriculum
  - Step 1: content knowledge evaluation
    - secure online examination
  - Step 2: familiarization, technical skills
    - objective assessment
  - Step 3: active participation in realistic scenarios incorporating practice of cognitive, technical and behavioral skills
    - followed by facilitated debriefings

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Develop New Learning Tools

- "Desired Features for Industry for the Development of a Realistic Neonatal Human Patient Simulator"
  - RFP issued by AAP to formally collaborate with industry in the development of a sophisticated patient simulator
    - features align with NRP's learning objectives

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How to Build a Patient Simulator… The Right Way

- determine the learning objectives
- define “necessary” and “nice” features
- translate features into product specifications
- build it, test it, tweak it

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Develop New Assessment Tools

- need for objective assessments of cognitive, technical and behavioral skill sets
  - written/online examinations
  - skill stations
  - simulated clinical scenarios
  - real-life resuscitations

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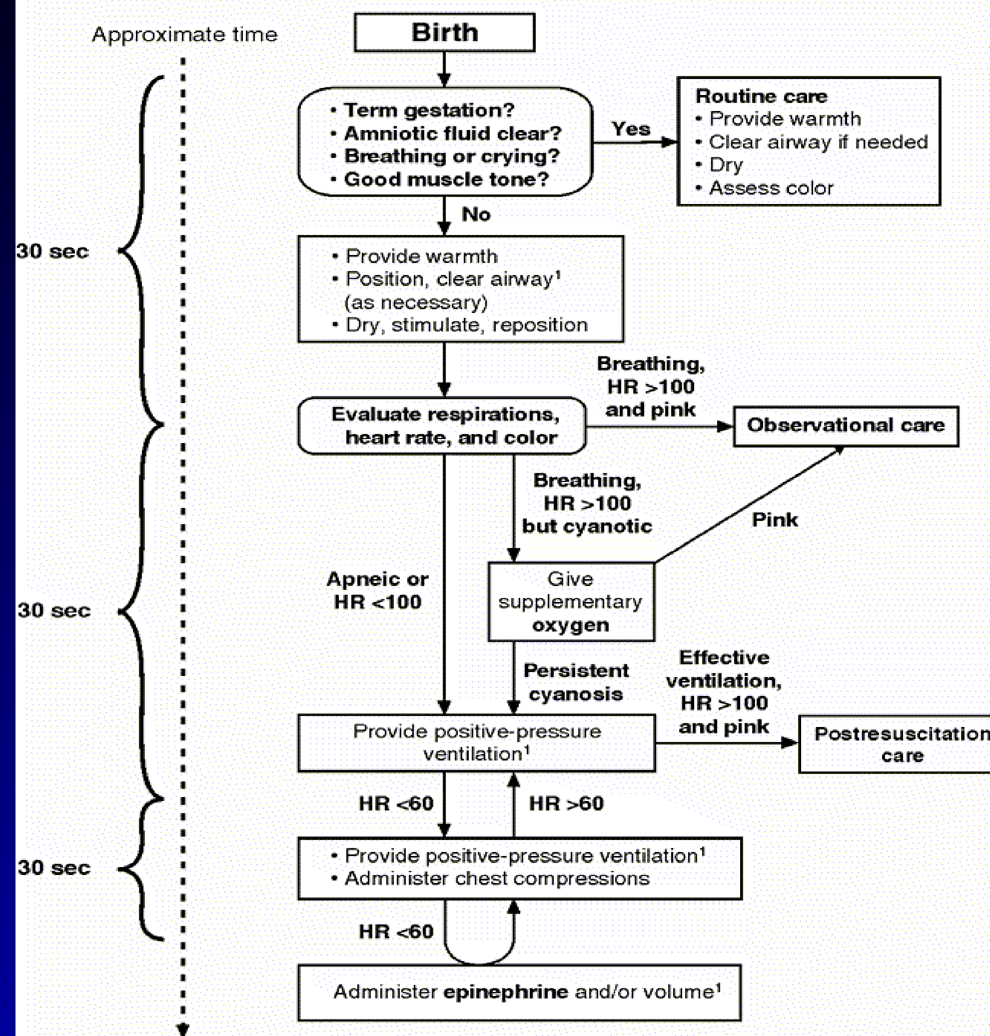

Objective Assessment of Content Knowledge

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Objective Assessment of Technical Skills

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NEONATAL RESUSCITATION
TECHNICAL PERFORMANCE EVALUATION
TEAM SCORING

RESUSCITATION CODE

EVALUATOR ID 1 ○ 2 ○ 3 ○ 4 ○ 5 ○

N.B. These markers are to be scored based on the 2000 (not 2006) NRP Guidelines.
Technical markers of individual and team performance during neonatal resuscitation are identified below. For each marker fill in the bubble corresponding to the response that best describes the level of performance displayed. **PLEASE CHOOSE A SINGLE RESPONSE!** All questions must be answered unless you are directed to skip certain questions. If the specified marker is not observable in the resuscitation (and therefore cannot be rated), please circle ***"CAN'T TELL"***.

	Yes	No	Can't Tell
1) Displays universal precautions	○	○	○
2) Prepares bedside as time allows:	○	○	○
a) turns on radiant warmer	○	○	○
b) places warm blankets on bed	○	○	○
c) confirms plastic wrap available (preterm birth only)	○	○	○
d) confirms chemical blanket available (preterm birth only)	○	○	○
e) activates chemical blanket and places under blankets (preterm birth only)	○	○	○
f) confirms baby cap available	○	○	○
g) confirms presence of resuscitation bag/T-piece resuscitator	○	○	○
h) checks function of resuscitation bag/T-piece resuscitator	○	○	○
i) confirms presence of appropriately-sized mask	○	○	○
j) checks function of mask	○	○	○
k) confirms presence of laryngoscope	○	○	○
l) checks function of laryngoscope	○	○	○
m) confirms presence of appropriately-sized endotracheal tube(s)	○	○	○
3) Positions neonate appropriately (head at foot of bed, neck in neutral position)	○	○	○

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NEONATAL RESUSCITATION
BEHAVIORAL PERFORMANCE EVALUATION

RESUSCITATION CODE

EVALUATOR ID 1 O 2 O 3 O 4 O 5 O

POSITION EVALUATED: O Position 1 O Position 2 O Team Evaluation

Ten behavioral markers of individual and team performance during neonatal resuscitation are identified below. For each marker circle the number that best describes the level of performance displayed. **PLEASE MARK A SINGLE RESPONSE FOR EACH QUESTION!** All questions must be answered. If the specified marker is not observable in the resuscitation (and therefore cannot be rated), please check ***"NOT OBSERVABLE IN THIS RESUSCITATION"***.

1 = poor **3 = acceptable** **5 = excellent**

1. Knowledge of the Environment

O MARK HERE IF NOT OBSERVABLE IN THIS RESUSCITATION:

1 O 2 O 3 O 4 O 5 O

Appears disoriented; is uncertain as to layout of delivery room and location of equipment; fails to insure working condition of all equipment; fails to ask questions of others in the environment.	Appears comfortable with environment; knows where equipment/supplies reside; checks the equipment as time allows; if unable to locate equipment/supplies; asks questions of others in the environment as needed.	Knows all aspects of environment; thoroughly checks all equipment to insure that it is present and in working order prior to delivery; confirms readiness of environment with members of team; does not hesitate to ask questions of others in the environment when the need arises.

Comments:

05/16/2007 11:42:46 AM Neonatal Behavioral Performance Evaluation v2 Page 1 of 7

Objective Assessment of Behavioral Skills

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Key Behavioral Skills

- know your environment
- anticipate and plan
- assume the leadership role
- communicate effectively
- distribute work load optimally

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Key Behavioral Skills

- allocate attention wisely
- utilize all available information
- utilize all available resources
- call for help early enough
- maintain professional behavior

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Objective Assessment

- serve as basis for
  - documentation of
    - acquisition of core competencies for trainees (ACGME)
    - maintenance of certification (ABP)
    - hospital privileges, state licensure, etc.
    - other high-stakes assessments

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Foster Investigation

- NRP Research Grant Program
  - 2008's "Top Initiative"
    - "What are the optimal methods of evaluating the cognitive, technical and behavioral skills necessary for successful resuscitation of the newborn?"
  - >50% of submissions focused on assessment of human performance or simulation-based methodologies

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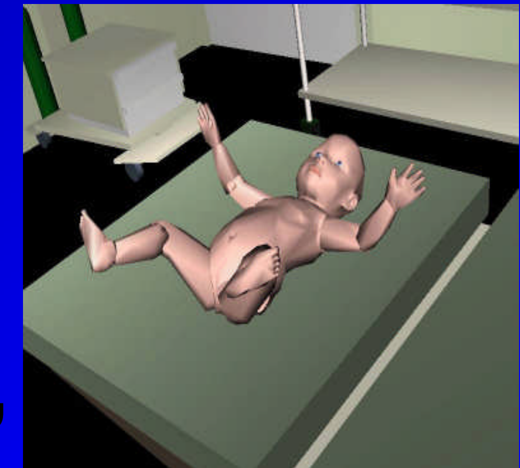
Foster Innovation

- integration with obstetric teams
- production of "hybrid" devices
  - physical and virtual elements
- "career-long" learning model
  - a continuum of robust online, center-based opportunities
    - tailored to individual learner's needs
      - challenging even for the expert



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Quality and Competency in Neonatal Resuscitation: Phase II

- need for resuscitation-specific markers of performance…
  - on an institutional and systems level

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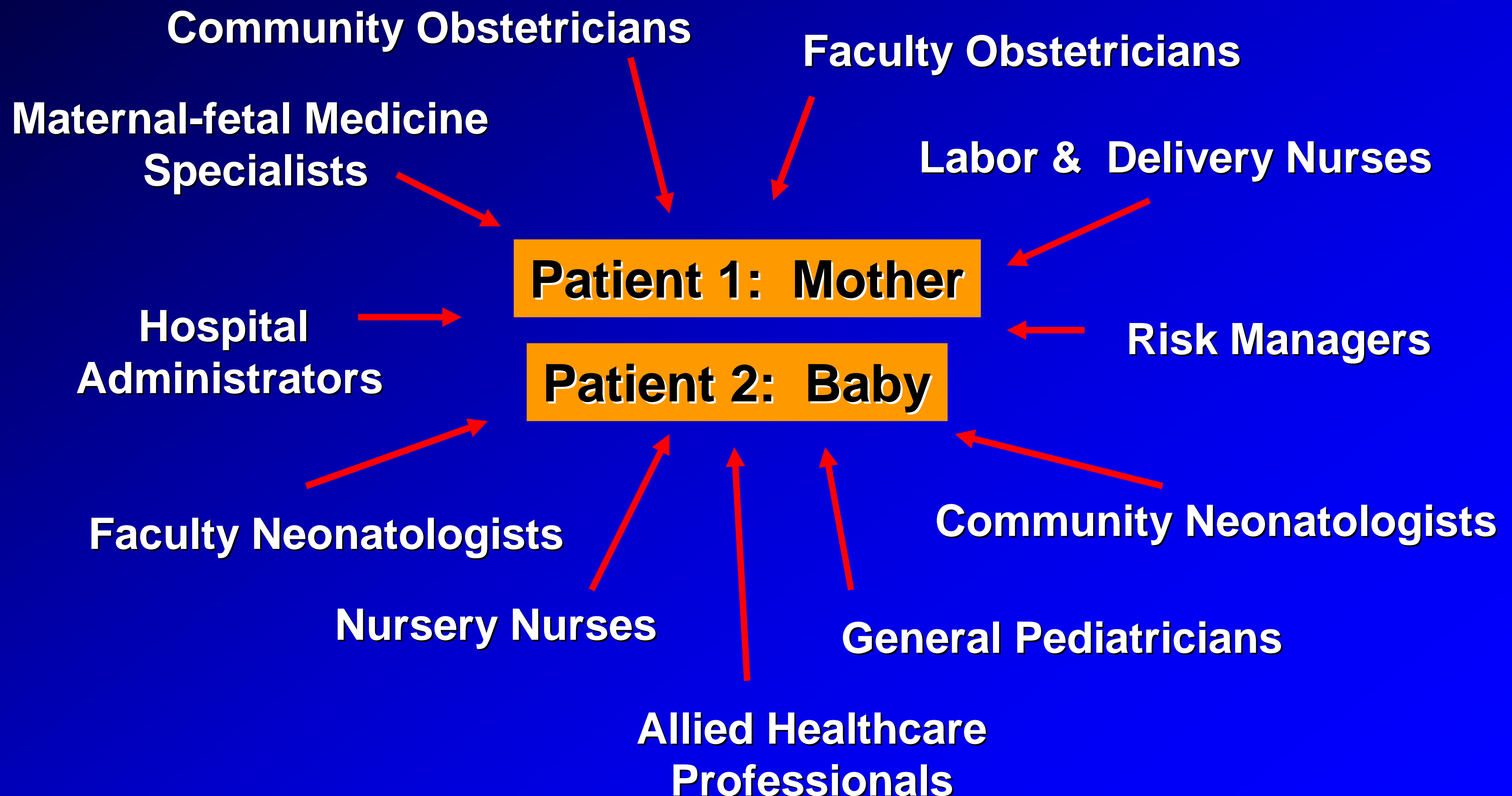
An Institutional/Systems View: St. Entropy



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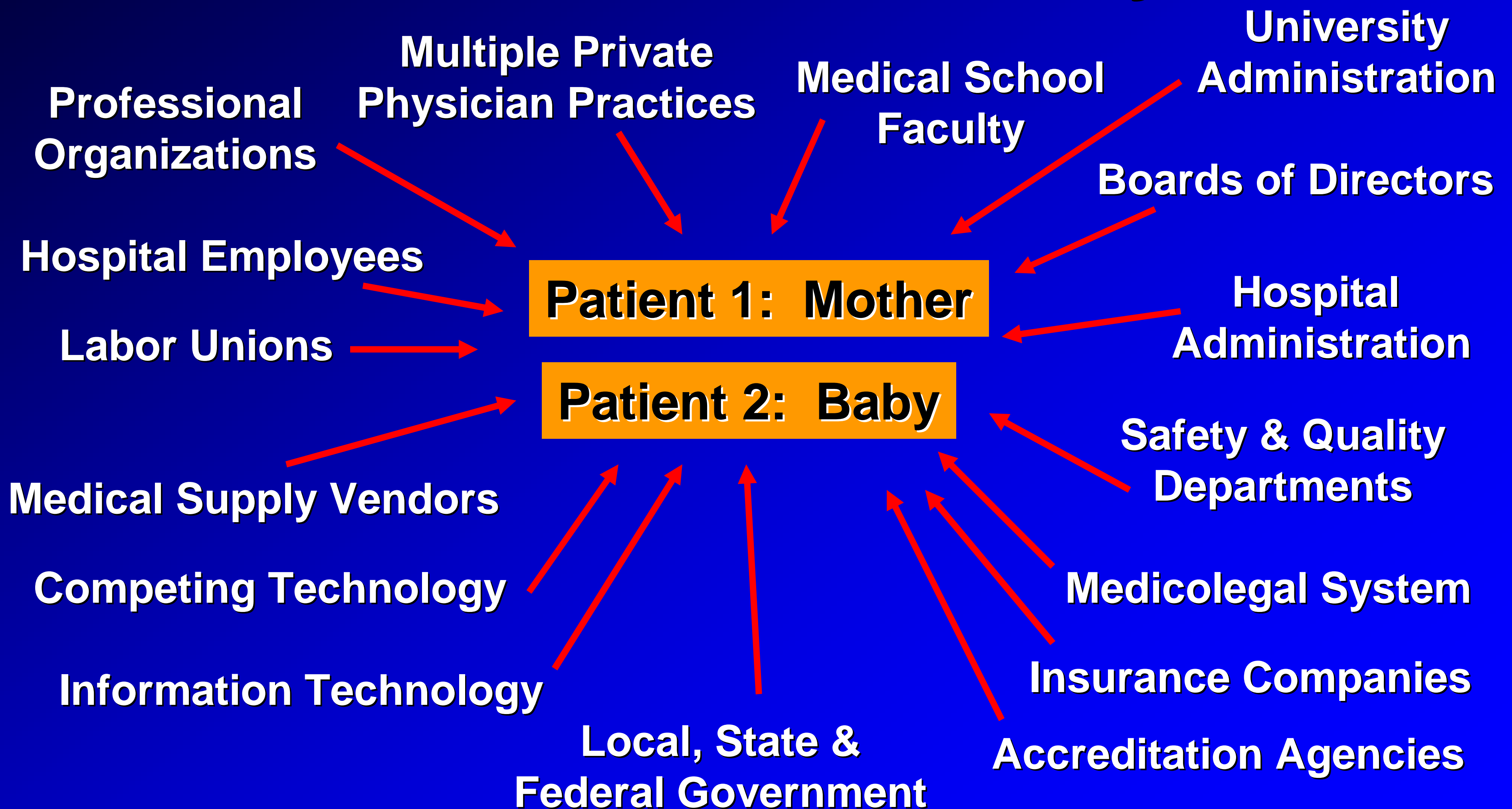
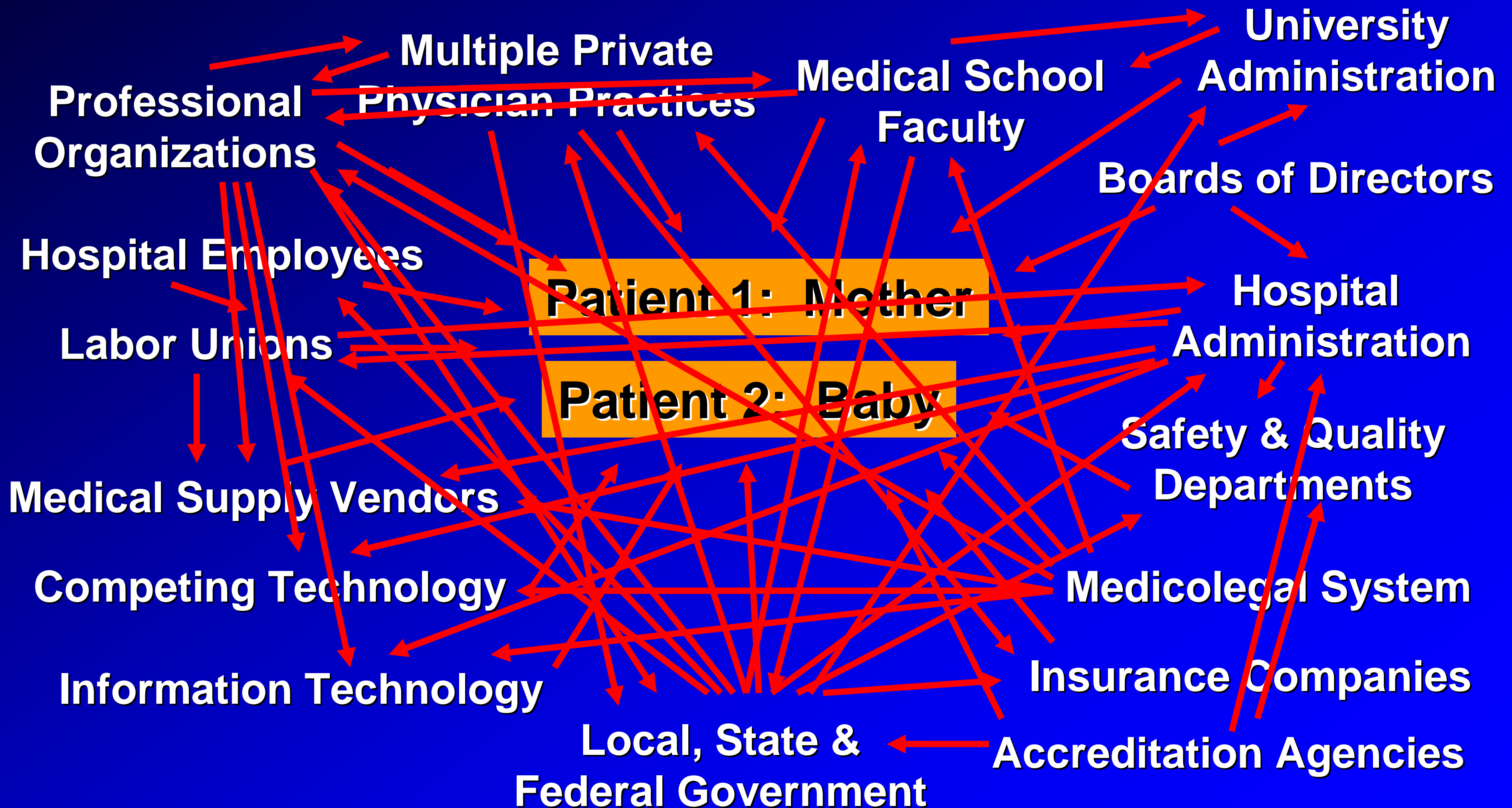
An Institutional/Systems View: The Chaos Healthcare System

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An Institutional/Systems View:
The Chaos Healthcare System
Multiple Private Physician Practices
Medical School Faculty
University Administration
Professional Organizations
Boards of Directors
Hospital Employees
Patient 1: Mother
Patient 2: Baby
Hospital Administration
Labor Unions
Safety & Quality Departments
Medical Supply Vendors
Competing Technology
Medicolegal System
Information Technology
Insurance Companies
Local, State & Federal Government
Accreditation Agencies

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Joint Commission 2004

- Sentinel Event Alert
  - root cause analysis of 109 sentinel events (93 deaths, 16 survivors with severe morbidities)
    - communication (72%)
    - safety culture (55%)
    - staff competency (47%)
    - orientation and training (40%)

http:www.jcaho.org/about+us/news+letters/sentinel+event+alert/print/sea_30.htm

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Joint Commission 2004

- organizations should conduct:
  - team training in perinatal areas to teach staff to work together and communicate more effectively
  - clinical drills to help staff prepare for high-risk events
  - debriefings to evaluate team performance

http:www.jcaho.org/about+us/news+letters/sentinel+event+alert/print/sea_30.htm

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Meeting Institutional Mandates

- strategies for moving beyond the individual and making it work for hospitals and hospital systems

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Committee for the Utilization of Simulation at Packard (CUSP)

- The ***C***ommittee for the ***U***tilization of ***S***imulation at ***P***ackard
  - identify and prioritize targets for simulation
  - develop and implement strategies for embedding simulation into the daily operations of the hospital

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CUSP

Co-chairs:
Director, Patient Safety + Director, CAPE

Members:
Risk Management, Nursing Education, LPCH Administration, SU School of Medicine

Pilot Project: Labor and Delivery
Rationale: highest risk, highest reward

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Evolution of CUSP

Co-chairs + Expanded Membership

Implementation Sub-committee

Unit-based Task Forces

OR/PACU
Obstetric Services
Crit Care Transport
Outpatient Services
ER
General Pediatric Services
Family Centered Care
CVICU
PICU
Hem/Onc BMT
Newborn Services
Radiology

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Toward High Reliability at Packard

- LPCH to double in size by 2014
  - Can simulation help?