Tracy Thompson's Notes from HRO Conference

SATURDAY
Future Research Needs

Q: How do you get HRO information across industries? (Fire, medicine, nuclear safety, education, aviation)?

A: In medicine, they think they can fix it themselves, so how do you get them to listen?

Q: How do you change to HRO? How do you get the operational people to buy this, self efficacy, etc.?

A: You need to answer why they would do this. You have to identify the benefit to practitioners. HRO has to be translated into their operations so that they can see the economic benefit.

Another approach to get change is to use the logic of avoiding negative consequences ("unless we do this, we won't have an organization").

Maybe it's not either or but both – negative is motivating, but you need something deeper if you are to sustain change.

Karl Weick: Paul Schulman's work says that strategy people focus on "This is what we value, what we're going for." But HROs focus on "This is what we DON'T want to mis-specify, the mistakes we don't want to make." So, in order to convince strategy people, say, "Here's what you want to do, but in order to do that, then look at the mistakes you don't want to make and use that to generate action."

HRO organizations are those that have self-identified as wanting to get to a better standard. Thus, when competing for contracts, they can use this as a competitive strategy. Once the leading organizations embrace this strategy, then the others will follow. If the leaders of these exemplar organizations have made this decision, then how can we make it easier for them to do this? (Answer: You need to answer what's in it for me.)

Example of Home Depot – had specific change management tools.

Weick: Often organizations in the HRO world are already doing some things HRO-like. You can build on that. You're putting what they do in different relief. This is just in time learning.

HRO isn't always the first thing in someone's mind (in medicine). Personnel self-select and act. This isn't one-trial learning. You need a booster shot with some unknown frequency. Need to re-inoculate with some frequency.

The kinds of people you have at the sharp-end of the stick and at the leadership level tend to be self-reliant and not want to consult. People need to watch out for each others' mistakes in an HRO. In the aviation world, pilots have learned this. Why not in medicine?

Answer: Team dynamics – certain people who have the propensity to be directive and not listen or seek information. This can be self-destructive. Over time, they learn to stop and ask for input, or they self-destruct. If you have someone who cannot learn to ask for insights, then they fail.

Perhaps, an individual difference variable related to "seeking advice" might be important.

Sometimes the organizational rewards don't encourage the seeking of another voice, don't encourage it.

We want to fully understand the contextual processes. The interstices between organizations in a system are critical. How do you achieve the contextual competency across all of these cultures?

This relates to silos – how to get people to talk across silos? New Orleans revealed how these silos kicked in – people didn't communicate the way they were supposed to. Example of how during hurricane Isaac, they didn't open up the other side of the freeway to let people get out. There were no bridges across the agencies that enabled this to occur.

Silos are relevant in NASA and oil companies too. In NASA each unit never has dropped all their traditions, and they're geographically dispersed which makes the silos worse. Shell hasn't moved HRO out of chemicals, and BP hasn't moved it out of refining.

Even in a 40 person organization, you can't get each various groups to talk (and they're small groups). How do you break down these chimneys and create a common HRO culture?

Relevant quote: "Knowledge and error flow form same mental processes. Only success can tell one from the other."

Here's an example from NASA (JPL robotic space exploration) and how they were able to learn lessons after the fact. JPL had 2 bad mishaps. After them, they put together a good panel of engineers and non-engineers. They had people with a good overview of all operations. This group developed corrective action notices, then involved all project manager to discover what went wrong, and developed a guideline, ("flight project practices"). They tried to take lessons learned and ingrain it in their project manager procedures. JPL has had a pretty successful track record since that. This story also reveals the importance of humility which is necessary to change. You have to be humble about what you're doing.

Crew Resource Management vs. Cockpit Resource Management: You don't really want or need airplanes interacting, but with fire crews it's different. You do need crews to talk with one another.

Back to the question: How do you implement HRO? How can we identify research questions, and direct them towards implementation?

Silos, how to get people on the same page, is very important. It's probably not realistic to think that everyone can talk to everyone. That's too hard. But individuals can act as translators between different groups. Kathleen Sutcliff's research shows that TMTs with generalists were higher performing because they could share more information. Those generalists were able to translate the views of the more specialized people. You need people who can bridge the structural hole.

Break

Questions:

1. What were you talking about during break?
2. Why do you fail in implementing HRO?
3. If you have an HRO, what did you do to get there?

John Carroll story of his flight here: The luggage door wasn't closed properly, so the plane takeoff was aborted. This shows that the system was working… There were procedures in place to catch the error. But why wasn't the problem detected earlier (i.e., why did it get all the way to the point when the plane was about to take off?) Why did the light only go on when the pilot hit the throttle?

Working with military and DARPA, which perhaps have a different culture, can we apply HRO to the military? Other examples, e.g., "This is how you do decontamination." We study it to refine the science to do it better. Can we do this for HRO in the military? So much of what we do is tied to money and funding.

Its important that the operational group ties in with the upper echelon. You've got to make those connections and loops. In the fire service, we have a similar problem in connecting the ground forces to the uppers to develop the plan. The process of communicating the mismatch all the way back up the chain is difficult to achieve. Ideas happen on the ground, but how can we connect the bottom with the top, and the middle to both ends?

How can you better analyze what happened so that you can learn from it?

People on the ground don't always know what they need to tell the uppers.

Karl Weick describes a process for how to foster better communication (used in the fire service): STICC: (Things Stick). The idea is to get the commander to articulate all that he's thinking in a structured fashion and in a way that makes it easier for others to provide relevant information as things unfold.

STICC (Things Stick):
Situation: Describe the situation. "If I were a commander, here's what I think we face." Get the commander to engage in public sense-making. This gives people a framework so they can see what the commander is seeing.

Task: Articulate "Here's what I/we ought to do."

Intent: Articulate, "Here's why we think we should do this."

Concerns: Discuss your concerns. "Keep your eye on these things. If this or that changes, we're in a new situation."

(Take a deep breath)

Calibrate: Seek feedback from others. "Now talk to me. Are there things I've talked about that you can't do or don't understand? Did you see some things that I've missed?"

If this is laid out, then the person at the bottom can give feedback to the chief in the chief's own language. The person at the bottom now has some language / legitimacy to discuss changes orr bring up additional information or insights.

The reality is at first, crew chiefs don't always like this, especially the Calibrate part. "Why should I do that?" Essentially you're articulating your reasoning. You're making the tacit into explicit. This is very hard for folks to do. This is also hard for folks at the bottom to do as well. How can you train people to learn how to make what is tacit explicit?

We want to create shared mental models. In the nuclear world, standardized principals for decision-making are the same across the industry. That approach is grounded in the reality of understanding the boundary conditions surrounding our daily analysis. We try to help people figure out how to make sense of when they are approaching those boundaries where the system shouldn't go. This represents establishing more common mental models to tell us when we're getting in harm's way and when we're starting to approach uncertainty. Once we have an established technical system, then we can start doing this.

But I worry that you might miss the oddball occurrence if you focus too much on the shared mental model.

But if you have a good understanding what normal is, and our sensitivity is directed toward when is it not looking right, then that's what we're looking for, those indicators of deviation. I can then budget my attention for looking for deviation.

On top of this, we need to look at the factor of individual difference. Decision style: how much information people look at could be one important one. For the same type of display, some operators look at some pieces of information, whereas others look at totally different information, thus generating very different decisions. This is linked to their decision making style. What are the implications of this for executive decision making?

Individual differences also play big role in responses to uncertainty and stress.

In a cockpit or in a nuclear power plant, we shouldn't see these differences. Procedures and training should be minimizing variance. For the skill-based decision, yes, you can minimize individual differences. But for knowledge based decisions/situations, then individual differences play an important role. In dynamic situations people defer to the person in command or the one with the most experience. When accidents occur, people depend too much on person on top, and people at the bottom are afraid to speak up.

There are good data that under ambiguity and high-stress, people revert to first-learned behavior. Thus their style or individual difference at that point accounts for more of the variance.

This also comes back to the person being afraid to say something. If there is no reasoning behind it, then they don't want to speak up. Reasoning encourages speaking up. STICC helps with this.

As managers we forget who we are, and we've forgotten the power they see us as having. They're not comfortable coming in. It's so natural for us to give the answers. We have to create the environment where people can come to us.

How can I get them to talk to me at all? How can I help them to figure out what to talk about? We want more variability in the dynamic situation (constrained improvisation, don't want freelancing), and less in the non-dynamic.

STICC
Between CC, we tell people to take a deep breath, and then exhale. After STIC, then need to get away from the cerebral process (the cortisol), and then exhale before so that you can hear the feedback.

Doing STICC across 4 disciplines (paramedics, medicine, fire, EMT) can be problematic. What happens if EMT asks "what do you think?" to a physician?

There's a common pattern in all HROs. People get fearful and scared. We need to make a distinction between day to day work in dangerous environments vs what do we do when things go wrong. You give police or governors information about what to do in a terrible situation, but when they're under stress, they tend to stop thinking and start feeling. SWOT teams don't have a great track record. When things are tense, they resort to doing what saved them: more force. Force's appeal goes up when adrenalin goes up.

Lunch

Kathleen announces a study of leaders and subordinates behaviors surrounding voice and silence. In return for participating, each leader gets a tailored report on how their subordinates see them and how others see them and an overall report, a summary of overall communication.

David Van Stralen and Matt Gross talked about the PICU at Loma Linda
Reliability at PICU at Loma Linda

LL's Size: it's in the top 6% in the country

What to do when you think: "I don't know what to do, but I've got to do something"?
You want to overcome premature diagnosis: "I think he has X," and then the person collects information to support that (avoiding disconfirming evidence.)

There are unwritten rules: Paramedics decide and doctors evaluate

Observe orient decide act is one method for action under stress for paramedics.

One important issue is "How do you shift from obedience to initiative and creativity?"

Methods:
1. Encourage self-efficacy. I wanted them to problem solve. I encouraged them to make the decision (through conversation). I try to help them to trust their own decision making process.

2. Situation, intervention and objective: I ask them to figure out where they want to be, "What's the objective?" I get them to make a list of why the patient is in the ICU, and then group them into the most important things. Sometimes there are only 2 or 3 problems that manifest (root cause analysis).

3. I teach them to recognize their responses (and others' responses)to stress; it's either fight, flight or freeze. Sometimes you see unidentified stress emerge, for like post-traumatic stress disorder. This can come from organizational memory or the individual's memory. You need to look how caregivers responded to them to figure out what was going on with them and why they're responding. Where are the hot buttons?

It's important to identifying hot buttons, stress= when demands outpace your resources. Sometimes you can re-frame the demands so they're not so overwhelming. "Are you sure about your demands? Maybe some of them are expectations." You also can look at the resources you've got: external (money) vs. internal (education).

4. I help them to reframe things in a more positive light. If a kid dies, I ask them to think back to how many in the same time period would have died without them. You need to come back to the successes.

5. Learning how to stay self-contained is important, especially when working with non-HRO types or in stressful situations. "Don't ask for help, do your job, don't criticize." Over time, staff saw the HRO practicing paramedics as resources for emergencies.

6. Articulate, objective, succinct.

Our approach wasn't pure HRO, but it developed towards a model that helped guide us. It got them towards decision migration and all of the other HRO principles.

LL serves 1.2 million people. Cover a very large geographic area. 3 large ICUs. 120 staff nurses… 7 attending physicians

They have weekly meetings, try to come to common ground for how to handle staff, 7 of them run things 90% the same. This helps with the staff.

What else has changed since Dave started? We now have residency hour restrictions. There are 5 residents in ICU at any time. But they now are limited in the hours. However, the attending physicians aren't limited. The downside is that the residents have less involvement with patients. And now attending physicians do 24 hour shifts. There are 3 in house during the day.

One problem we ran into was how do you teach the nurses that work at 2AM? How do you educate them effectively and efficiently. Nurse educators have a core lecture series, respiratory and medical care lecture series. They come and get paid to attend lectures. They teach both about cardiac and medical trauma units.

We tell the residents, the nurses are right 99% of the time. Residents resist that. The same goes with the families, they know what's wrong often.

We lead by example. Code blue = most stressful. I try to remain calm for all parties, and help to make sure everyone does their job, etc. Everyone knows what they should do. If I the doctor can't maintain composure, then how can I expect anyone else to?

We also run mock Code Blues, but we make the resident do it without the attending physician. We have to do these simulations because during the real ones, the attending physicians are always there (so the residents don't' get the practice.). We continue to develop more advanced programs.

When on rounds, think out loud. What you're assessing… (STICC).

Is the patient better, the same or worse. Assess, Act, Reassess

We try to keep it lighthearted. I use humor. I try to keep it open in order to encourage the questions… I don't want to discourage them to ask the next question that could be critical. Everyone needs to be an active not a passive learner.

I broadly include anyone who wants to come along on rounds (rcps, cvns, lvns, rns, paramedics, etc.)

Teams function according status and role but they need to shift to running by shared objective. During an uncertain event, when do you shift over? If you can do what you do in everyday life, you can shift easier.

We practice bottom up leadership by entertaining all suggestions and following through on as many as you can. Stand away where they can't physically see you. They'll cone their attention towards the patient. Let them do their stuff and you should be able to stand back without them noticing or being distracted.

Authority migration: There are times when it should migrate up but for the most part, it needs to migrate out towards the care giver. Let them make as many decisions as possible.

Get the nurses to recommend care.

Teaching needs to be compelling. If they can't use it within the day or hour, it's lost.

Working with sub-specialists created problems. Are they really outsiders? Ultimately, we want to get to: "This is the unit's patient." "Our" is not the intensive care department or the nurse. The physicians are part of the team too. But they do things so utterly differently that this was hard to defend sometimes. For example the sub-specialist physician would say, "You're killing the patient," and this would cause the attending physician to lose credibility. How do you tell someone their wrong w/out damaging their credibility?

Labs are precise and reproducible. When you use them too much it represents too much focus on precision (vs. accuracy).

Communication: There's a huge reliance on notes for communication, but no one reads the notes. How do you develop verbal points that are effective? Verbal presentation is what is critical? (Maybe STICC can help?)

Knowledge lies between heads. There can be problems if you're too horizontal (they might not follow orders). But there can be problems, of course, when it's too vertical.

Dave thinks you're better off doing low reliability than a mix of high and low at the same time. (Thus they pulled out of thoracic surgery ICU b/c those physicians didn't buy into HRO.)

Overall, staff turnover dropped dramatically. Resident physicians said it was the hardest program in the hospital but the least stressful.

Now, HRO is working with the cardiac surgeons. Why it's working? What's different now? Now, they're operating most of the time, so the attending physicians are overseeing their patients. Thus they were able to get an inroad into HRO with the surgeons around as much and the staff began to buy into HRO. Daily communication was likely key here. Reduced mortality in Cardiac ICU by 30% and reduced re-intubation by 50%. Once the surgeons saw that, they began to buy into HRO.

What are the key traits you hire for in new attending physicians? Energetic, willing to teach, easy going, sense of humility, you get the feeling they believe they can learn from this place…the ones you want are the ones that try figure out how they can contribute.

Main Factors of Success in Implementing HRO:
- Administration buy-in – sell those above you on the idea (with one guy, then this lead to micro managing…)
- Attending physicians who are there a lot
- Training/teaching methodology
- Mechanisms to support the care giver
- Getting rid of obstacles / those who were resistant to change (e.g. surgeons)

HRO is a very different management approach.

Can we influence the spread of HRO through education in schools?

How might HRO help with retention? In the era of nursing shortage and low pay, you can sell the payoff of HRO as being greater autonomy. We started an internship for nurses. They get paid for 6 months while they are paired with an RN (who has a minimum 3 yrs of ICU exp.) this helps us attract good nurses who can see how things work differently here.

"Dave, can you tell us more about what you meant when you said that ½ HRO and ½ HRO is worse than non-HRO?" If you want to turn an organization around, that means perhaps parts of it start earlier. So what about your observation that it's worse to have ½ HRO and ½ not?

Answer: Perhaps it depends on grouping. Here's an example of ICU North vs. South. 1 HRO physician vs. 1 non-HRO physician led to confusion around staff… Also when HRO services that came into a low trust environment puts the HRO people in the position of how do you follow? Because the non-HRO folks were used to questioning, they weren't able to handle the physician effectively and so in one case, a kid died.

Now we've changed procedures and policies. Now all new admits to any department have to share care with the attending physician, NOT just the orders from the older doctor. In addiiont, now anyone in the hospital can call for an ICU rapid response team. We now don't see any code blues outside the ICU.

Break

1. What does HRO fail at?
2. How do we institutionalize HRO at the regulatory level?
3. How about operators?

What does HRO fail at?

- Changes to HRO / Transitions are problematic
  - You can't get everyone on board overnight so there are serious frictions that might decrease performance.
  - How can you develop systems, structures and training in order to mitigate the problems?
- If there are some pockets are acting more HRO-like than others, then maybe it's not such a big transition. Transitions might be more of a problem in some organizations than others.
- It's problematic to say you want to be an "HRO". HRO is more about a way of being or thinking.
- Lack of integration with the operation happens often. Key issue is how to operationalize it…

Is becoming HRO a function of selection vs. learned behavior? Can you learn it? Yes, you can learn from examples from other organizations. Show by doing.

High reliability organizing.

Say "this didn't work," say instead "this might work."

There is probably a distribution of people: Early adopters, champions, early majority, late majority, resistors. "Crossing the Chasm" is a book that speaks about this.

HRO is most fundamentally about a new way of thinking. This is important, particularly in engineering settings. We want to become an HRO, but that leads to a classic HRO plan. You can't do this. It's about emergence, story telling…

At BP, they're teaching engineers to tell stories…how they feel about it.

How much of non-HRO behavior is a fear response? People are rigid because they're afraid. We shouldn't label people as resistors and thus give up on them.

What about the strategy of starting with what's working already vs. what's wrong? (Appreciative inquiry as a change intervention is relevant here.)

You've got to get people to do things and see the results because that is the only way they learn.

Maxcomm: A consulting firm has developed a game to help people understand system dynamics and some HRO principles. Kaiser IT invested in a simulation. They bought warehouse in Oakland to simulate doctor's office, hospital, ICU room, etc. They divide the floor into 4 regions. They have workers for each region with a map of the building and TMT/ They tell workers to build a regional center from dominoes (of different sizes). Regional managers say, "We're sharing info. across 4 regions, " but are they? This reveals time pressure. No group has ever been able to successfully finish the game. It takes about 3 hours.

Stanford has an ICU simulation with 2 nurses, surgeon, physician, interns, medical student. We do this with new teams which are put together for a month or 6 weeks. When we go back to the ICU nurses on the floor, they can tell who's done the course and who hasn't.

Experiential learning vs. telling them about it seems to be a critical mechanism for learning.

Leahy Clinic: Also has a simulator of medical staff. The most powerful thing is for people to watch a video of themselves and do a self-assessment. They've never seen themselves.

Staff in a southern region of the DOD (nuclear power plant?) made a Star Trek tape which illustrates what to do if you're having a problem where you don't know what to do. It illustrates the importance of taking a time out. This is now used as a formal training tape in the DOD.

How does HRO fail?

- explaining it to people when people don't understand it

The hallmark of an "HRO" – they never think they are safe.

HRO fails on the efficiency issue. What's the business case for high reliability? Being reliable isn't very sexy or heroic. People being able to produce the outcome that nothing happened or spotting early warning signals is not very exciting and sounds more like a crazy, obsessive sort of behavior.

We're not very good about talking about HRO networks – HRO across systems. What does a whole fleet of cockpit management resource groups (CRM's) to fly as a group?

We tend to be focused on process industries rather than those that put out new products – example would be Microsoft or other high tech start-ups. They're producing a new product that has new features and they want to make it very reliable otherwise it won't sell.

HRO's aren't inherently sustainable. If people stop supporting it actively, they fall apart. Under efficiency pressures or competition pressures, they can fall back into old ways very easily.

Do you have to fall apart to come together again?

2. How do we institutionalize HRO at the regulatory level? What research can sell HRO to regulators?

TK had a recent incident: A regulator thought that a child was being handled too quickly, but the child prefers that kind of handling. Regulators don't stick around enough to know the organization and so they saw this as non-safe behavior.

The development of HRO is a development of osmosis – right now the diffusion pattern is slow, and diffusion is dependent upon direct exposure to one another. If you can't institutionalize this at the regulatory level, then you are not going to make it happen.

The regulatory level wants measure of performance, they wants something they can regulate, compare, etc. This encourages research that focuses on measurement – metrics. But the system will fail eventually…which leads to program evaluation… Rare events are a Poisson distribution.

One example of a regulatory system that is starting to do this effectively. Trauma center system in the US regulated by the American College of Surgeons does a verification process. Of all cases in the last 3 years that were potentially preventable, how does your organization respond in terms of learning from those events? Show us performance improvements relative to that event. If you don't show improvement, you're not certifiable. In this system, organizations need to monitor failures and potential failures.

This leads to self assessments around measures…

Where is HRO in FAA, FDA, NRC?

We all have seen a 10 year cycle (an S-curve): improvement (then they take away the program), declining performance (which leads to reinstallation of a program) and improvement again.

The DoD is trying to shift to a different unit of measurement. Let's look at events that either affect or have the potential to negatively affect the person, the environment or the public. Regulations should be directed here. The new paradigm is error – we want to find a lot of things happen in order to measure how error tolerant our system is… We should see lots of these, if not, then that's a problem. We try to look at error in a non-punitive way.

What is the appropriate role of the regulator in an HRO? What do they do? Do they monitor the process? Do they have metrics they apply? Do they hold management accountable?

Example of North Sea pipeline incident led to regulators saying that you must do systematic risk management.

Problem of regulators is that they use photographic method. They look at levels, but that doesn't get at the interactions in a system. They should be using a movie, not a photo. HRO is about interaction and processes.

What about creating an HRO certified process? If you could end up with this, you create a market for HRO. If a set of principles works across industries, you then can translate practices into norms and norms into labels and all of this into a market (HRO certified).

Big Question: are there some key principles that fit all different industries?

We seem to be talking about two different change mechanisms. Do you recognize and adopt change from within vs. having change imposed from above?

Back to efficiencies: TK's Los Angeles operation has been overstaffed by 60%, and TK has lost over $1 million. Loma Linda has amazing efficiencies b/c of the learning that has occurred. HRO pays.

Accreditation has created much better change than regulation. Witness JCAHO.

The problem with some regulatory systems has to do with reward and blame – if you self report, you get a huge fine!! Too bad we can't get to the point where HRO expense could be considered a capital expense, not an operating expense!

SUNDAY

Peter Angood, JCAHO
Influencing Health Care: Overlapping Strategies

Balancing healthcare:
Equity vs. efficiency of care

- doesn't work to balance these b/c cost and quality (efficiency) vs. access (quality)
- What's missing? Safety?

Big focus is on cost, risk minimization, lots of spending on mistakes

There is a huge convergence of environmental issues affecting healthcare. So finance winds up being a primary driver in our healthcare system.

The acute care hospital is a very complex organization to run.

We always compare aviation safety to healthcare, but don't forget we're 40 years into aviation safety. How can we jump start this into healthcare? We can't afford to wait that long.

Patient safety – where is it?
Swiss cheese model of adverse event causation, (J Reason). How to analyze a failure.
Normalization of deviance (Vaughan)

Loeb, et al. look at domain, prevention, cause, type, impact, prevention, mitigation based on analysis of events that lead up to an adverse event, the event itself and the resulting impact.

Very hard to get healthcare to look at this.

A core set of principles for patient safety from the experience of other industries and early adopters:

- standardize
- Simplify processes
- etc.

Focus on education and information does not work.

Safety principles:

- avoid memory
- others on the list (get overheads)

Want to make innovations occur – can't get urgency up enough to sell HRO

How does a Board evaluate their effectiveness? How are messages/info. treated?

- pathological culture
- bureaucratic culture
- generative culture (where you want to be)

The good performers are performing great….

Teamwork Climate and Annual Nurse Turnover

- need to pay attention at the staff levels vs. the board level
- people who are doing the work need to do it better
- comparing RN teamwork climate and staff physician teamwork climate
- nurses are more consistent in climate, but doc's are all over (much more variance)
- turnover goes down with a consistent, good climate

ICU physician and RN collaboration

- nurses like the nurses
- nurses don't like the docs
- team worker: 90% with RNs, 54% with docs

How we learn and remember: The silos of training and education prevail.

Changing demographics:

- more minorities, more over 65, more diverse
- paiek

- litteacy is no

Wachter, RM, Health Affairs, 2004 – 5 years after the IOM report

Grades on human error

Joint Commission on Accreditation of Healthcare Organizations: big stick in healthcare, regulation, accreditation controls whether or not government pays

Five pillars:
- Accreditation as a continuous process – evolution from a standard to a process
- Performance measurement
- Patient safety improvement
- Public policy initiatives
- Information products and dissemination

There's a (small) international subcomponent – high interest.

Accreditation: a voluntary process that grants recognition that meets standards….

Standards:
- hard to develop, but are key
- performance measurement
- adverse event reporting

Core measure identification process
- figure out what are the priority measures (heart failure, acute mi, pneumonia, pregnancy, infection prevention…
- can approve measure sets, but then need funding to push them through NQF process to ratify them. By the time you go through this the measures aren't useful as they have become standard.

Public policy issues:
- manpower resources
- education
- reimbursement
- pay for performance
- malpractice
- health information and how that impacts healthcare
- optimal design of hospitals in the future

Information products and dissemination
- how to get all of this out to the public and the consumer, but this isn't necessarily seen as a legitimate role
- is this an appropriate role for an accreditation agency?

Sentinel Event Policy
- 1996 founded, focus on root cause analysis of events
- Sentinel events subject to review under the policy – certain types of events… definitions of what they'll look at in more detail

Of 3343 events from 1/1995 to 9/2005: they think they're only getting 1 percent of all these types of events:

- suicides you can't hide
- operative/post op issues….

What are the root causes:

- communication
- orientation and training
- patient assessment
- staffing…

Sentinel Event Alerts are where these are discussed.

Anesthesia awareness, resisted at first, evidence for culture, hard to accept there's a problem

2005 National Patient Safety Goals

2006 goals… e.g., patient involvement in safety.
Communication among caregivers

Universal protocol is supposed to help with problems with communication (which is #1 root cause of problems) – this has had no impact. Surgeons think there is no problem. They think it's the system; fundamental attribution bias!!! (There are 87 events of cutting out the wrong body part annually).

International front:

- other countries are interested..
- got a joint commission for international safety
- website is the primary tool for dissemination
- mission is to continue improve patient safety in all health care settings
- lots of collaboration, e.g., WHO Collaborating Centre for Patient Safety Solutions
- They have a big safety research forum, literacy is big program now
- Patient safety legislation: federal protection of individual and institution to protect them to report violations (to decrease litigation)

Engagement of key audiences: adding patients and families, need to get practitioners esp. physicians. Can you tighten relationship, you might get there…

Collaborative networks:

- ahrq
- ecri
- ihi
- ismp
- joint commission icps
- leapfrog
- npf
- nqf
- usp
- va-ncps

Will have joint website across these organizations.

Trying to link networks nationally as well….

Processes of solutions, development and assessments is complex.

Solutions: how to help organizations help change
- want to select the ones with broad application

Solution template:
Problem, ….(this was on the overhead)

Solutions are Protocols
Large safety practices databank – they're sharing best practices out there…

Dr. Bruce Matthews
National Nuclear Security Administration, NNSA

- Applying HRO principles to preventing a high consequence, low probability event from happening.
- Very different application
- HRO isn't intuitive for nuclear engineers to apply HRO to organizations
- Cleaning up legacy of the nuclear weapons
- DOE self-regulates (vs. commercial nuclear regulatory world – power)
- NNSA founded 5 years ago, semi-autonomous w/in DOE
- NNSA owns the sites but they don't do the work, the work is done at the sites
- 2 types of sites:
  - Production sites (e.g., Pantex), taking ones apart
  - National laboratories (Los Alamos, Sandia), roots in science, productivity for profit in part
  - Leads to challenges b/c he culture is different across these sites, makes HRO implementation challenging
- NNSA doesn't regulate or enforce, just looks to see if they do what they say they're going to do

Three accidents that got his attention:

1. Columbia Shuttle Accident
   - poor organizational structure can be just as dangerous to a system as technical and operational failures
   - normalization of deviations, past successes lead to future failure, need to demand minority opinions, efforts s/b focused on prevention

2. Near-miss at the Davis-Besse (20020
   - football size hole in the pressure vessel
   - boric acid leakage was not considered safety-significant, even though there is a known history of boric acid leakage

- Neither the reactor operator self-assessments nor NRC oversight identified the corrosion as a safety issue
- Poor oversight, productivity drivers and weak technical understanding contributed to a near catastrophic accident

3. Tokai – Mura Criticality Accident (1999)
   - dissolving enriched uranium fuel in stainless steel buckets
   - uncontrolled criticality
   - two operators died
   - evacuated to 350m – sheltering 10 km
   - Poor oversight, program pressures, uncontrolled procedure changes and lack of criticality training and weak technical contributed to the accident.

Organizational Changes in DOE/NNSA (2003)

- encouraged efficiency with performance-based contracts
- removed impediments by streamlining requirements (effect on safety boundaries?)
- decentralized Federal oversight responsibilities to the field
  - compromises DOE's central regulatory role
  - will delay actions to correct complex-wide safety issues
  - the site offices do not have adequate resources or technical capabilities

When accident rates go down, government tries to reduce safety issues…. The S-curve that was discussed on Saturday!!! Success breeds failure at the regulatory level!!!! Can't apply lessons at the operator level at the regulatory level.

Close Calls:

- broken arrows (nuclear weapons with close calls)
- Fires in nuclear facilities
- Waste tanks
- Criticality incidents

How to keep the urgency up – the vigilance up???

The Social Scientist's View of Safety

- Normal accidents (Perrow)
  - The unexpected with defeat the best safety systems
  - System complexity and tight coupling cause system failures
- Human error (Reason, Dekker)
- Random events (Taleb)
- Performance measures (Krause)
- HRO (UC Berkeley)
  - Extraordinary technical competence
  - Flexible decision making
  - Reward the discovery of errors
  - Equal value is placed on production and safety
- Human Performance (INPO) (integrated nuclear power org)
  - People are fallible, even the best make mistakes
  - Error-likely situations are predictable, manageable and preventable
  - Reducing errors and managing defenses leads to zero error

The Problem with Experts

- Normal accident theory: assume failures, eliminate high risk activities, pessimistic and short on solutions
- Human error: denies random events and system errors
- HRO: ideas are values rather than engineered solutions
- Performance measures: not a good indicator of future performance, metrics can increase the likelihood of a system accident

HRO – assume the quality of the engineering side

The Engineering Approach to Safety:

- defense in depth
    - engineered controls certified to withstand predicted accidents
    - but complex systems fail in unpredictable ways
- Regulatory compliance
    - robust safety standards and independent oversight are essential for safety
    - but compliance can be expensive and burdensome
- Formality of operations
    - Rigorous adherence to formal procedures can control accidents
    - But workers develop "practical" approaches to work that are not appropriate for off-normal events
- Integrated safety management
    - Basically a common-sense, systems engineering approach to doing work safely
    - But ISM does not deal with uncertainties and random incidents

Basics of Nuclear Safety

1. Nuclear safety requires a fundamental understanding of nuclear technologies
2. Rigorous and inviolate technical safety standards and practices but just because the requirements say so is no guarantee that they will be followed.
3. programs to track and reduce latent and active human errors, but human safety can be compromised
4. centralized oversight of nuclear activities, including day-to-day operational awareness at the activity level

Recommendations:

Take steps to:

- empower a central and technically competent authority for oversight
- ensure the continued integration and support for research, analysis, and testing in nuclear safety technologies
- require that the principles of integrated safety management serve as the foundation of the implementing mechanisms at the sites

Response of DOE/NNSA:

- created a centralized technical authority
- formed Office of Nuclear Safety Research
- Re-vitalized Safety Management
    - Assigned Safety Management champions at all levels
    - Integrated high reliability and human performance attributes at ISM
    - Improved work control

Managing High-Hazard Operations

- defense in depth
- technical strength
- rigorous standards
- clear procedures
- independent oversight

Levees, Fires and Soft-Drinks: Robustness and Versatility of the HRO Framework
Gerard Koenig

The case study: the health scare in Belgium and the Ban of Coke in June 1999

- Kids got sick drinking Coke in bottles from a plant in Antwerp.
- Problems attributed to carbon dioxide from suppliers
- Problem kept happening from different plants
- Carbon dioxide explanation was insufficient
- Belgium health minister bans all Coke products
- General Manager cites two different defects in two different plants, but couldn't explain the precise nature of the carbon dioxide nor did he explain the second reason.
- The scare spreads world-wide
- June 23, ban is terminated, no new cases

HRO
* regard near misses as a kind of failure and try to learn from them

- there were earlier incidents (adults)
- consumers had complained and this number had been growing
- explanations were looked for but in a routine manner

Restrain propensity to simplify

- very complex context: school children, dioxin food crises had happened elsewhere, new elections, etc.
- Coke says product is safe…

Be sensitive to operations and to relationships

- strained relationship b/w government and co which made company's response worse

Cultivate resilience, keep errors small, improvise to keep the system functioning. The structure to make sense of the event was lacking.

Let decisions migrate to those with the expertise

- company talks about co and bottlers
- but bottlers really know more
- experts (physicians) were outside

Versatility of the HRO Framework

- it can be relevant to a large range of situations: levees, fires and soft drinks

	levees	fires	Soft drinks
Time pressure	Low	high	Intermediate
Figure/ ground		Complex, combination of known	Known and unknown
Sense making structure			

Robert Bea
Quality and Reliability

Over 20 years, worked with 600 accidents:

Katrina: high consequences in quality from 80% from extrinsic factors, 80% of operations, but over 60% map back to design and concept development

2 types of failures:
Quiet Project failures, show up in courts
Noisy failures = CNN time

Quality:

- serviceability
- safety
- compatible
- durability: freedom fro

How do you deal with the trade-offs

Durability is critical.

Engineered systems: have to understand the system and its interfaces:

- operators
- organizations
- hardware
- environments
- procedures
- structure
- interfaces!!!!

3 Complimentary Approaches:

- proactive (knowable, before, reduce likelihood of malfunctions)
- Interactive (unknowable, during, increase detection and correction)
- Reactive (reactionary, after, reduce effects)

Org performance, command and control

Non HROs

- focus on success
- underdeveloped cognitive infrastructure
- focus on efficiency
- inefficient learning
- lack of appropriate diversity
- reject early signs of warning failure
- one more…

Case History Success:

- culture and financial incentives were the key factors
- commitment top down and bottom up
- capability – sensitivity and technical management abilities
- cognizance – awareness of hazards and risks
- culture – quality and reliability
- counting – measures created to recognize tangible and intangible benefits

Karl Weick:
The past settles its accounts
Lagadec has a book: Preventing Chaos in a Crisis – structures

Philippe Baumard:
Building HRO-Embedded Communication Systems

2 Focuses of HRO

- HRO is about on-going culture and processes shift – routine work
- Handling disruptions in large-scale systems, temporary HRO designs for interventions (like with Katrina)

Large scale disasters

- it's difficult to find expertise in the context of emergency
    - where are the people who are knowledgeable?
    - Do people know they are knowledgeable?
- Creating HRO from scratch

Lessons from disasters

- uniformed decision making
    - silo learning
    - different mental models of learning collide (archeology of learning)
- status/institutional coordination is not adapted
    - coordination are about economics
- large-scale disasters do require autonomous problem solving

How to use Bayesian networks to simulate a neural network (turn interactions and contents with others into a live network)

Finding the most probably knowledgeable within a network

- dispersion of knowledge makes urgent sense-making difficult

Software:

- creates a neural network for each individual
- current incongruous pattern at NASA = discussions about Thiokol were cropping up, but wouldn't have been expected…

Can learn without the hobbles of hierarchy and legitimacy – overcoming the barriers that occur in human interaction

Based on IM and email communications

Pascale Carayon
When HRO and HFE talk to each other
HFE – human factor ergonomics

SEIPS – patient safety

Pascale's background:

- industrial engineering
- human factors and ergonomics
- work system design, change, implementation
- physical, cognitive and organizational ergonomics

HFE can benefit from HRO

- org level issues and concepts
- integration b/w macro- and micro-ergonomics

HRO benefits

- tools and methods for implementing HRO
- workplace ergonomics

Medication administration technologies

- iv pump technology
- bar code medication administration technology

Safe Medication Administration through Technologies and Human Factors

Implementation of a smart IV pump infusion technology:

- planned to do it
- did a prospective risk analysis team
- piloted the pump,
- got grant
- implemented it
- found a failure mode
- then redesigned and re-implemented it.

The pump was supposed to provide additional safety features, but in the operating room, the pump malfunctioned. People were aware of the importance of looking at failure modes (raised level of awareness).

The human factors engineers were involved in problem and cause assessment.

Usability testing is key – HFE working to see how individuals use the product. Helped the hospital to demonstrate to the manufacturer that their redesign didn't solve the problem.

Lessons Learned

- unique nature of HFE perspective
  - technology design
    - usability of the pump
    - process of technology design (Redesign) – continuous change
- Helps us to do HRO

How does the HRO process intersect with HRO – chart that has elements of HFE, main point is that using HFE practices accomplishes HRO characteristics…
Overall:

- much interaction with cognitive ergonomics
  - human error, error management, org. safety
  - teamwork, training
- need more interaction with….
  - Physical ergonomics
  - Org. ergonomics
- HRO ergonomics
  - Similar to participatory ergonomics
  - Macroergonomics
  - How to implement HROs – HFE can help to produce tools and methods

Ruth Fanning
Research and Theoretical Approaches to High Reliability

How can the theories be applied in healthcare

HRO in healthcare:

- intrinsic hazards
- continuous operations
- operations involve complex and dynamic work
- multiple personnel
- decentralization

Libuser/Roberts

- process auditing
- appropriate reward systems
- avoiding quality degradation
- risk perception
- command and control
- preoccupation with failure

- reluctance to simplify
- sensitivity to performance errors

Gaba
- safety culture: shared belief, good communication, no blame
- optimal structure, systems and procedures: protocols, best practices, procedures
- intensive training: ongoing training, team training not just individuals
- organizational learning: feed-forward learning

APSF/ SCCM project

Strawman:
- core concepts form HRO theories and Baldridge principles
- the application of theoretical concepts into a working formulation: a practically applicable model.

7 Elements of the model
Leadership
    - Patient safety
    - Vision and values
    - How do leaders set values to include?
        - Culture of safety
        - Optimal structures and processes
        - Intensive training
        - Org. learning and safety management
        - Deeply HRO values throughout the leadership system
        - Create and sustain a HRO culture
    - Communication and Organizational performance

Strategic Planning & Development
- How does the org. ensure that safety is addressed at the strategic planning process, and that it is balanced with other objectives?
- How does the org. develop and deploy action plans
- How does the org. track the progress of safety action plans, measurement systems

Patient Relationships
- How are patients complaints managed with regard to patient safety?
- How are these complaints aggregated and analyzed for use in improvement throughout the organization.

(Note: I would like to see her examples of how they're doing each of these… e.g., talked about patient Q&A at every step, survey after procedure….)

Measurement, Analysis and Knowledge Management
- How does the org. select, collect and integrate information to track daily operations and operations overall
- How is data and information regarding patient safety made available?
- How does the org collect and transfer in.
- Confidential data collection system…

Work Systems:

- org and management of work
  - how does the org manage work/skills to promote safety
  - how does the staff performance management system support the HRO
- Staff learning (team drills /simulations for critical events)
- Staff well-being (scheduling so that people aren't fatigued, counseling for adverse events, scheduling people with varying levels of skills, exp…)

Process Management

- How does the organization redesign existing healthcare processes or design new processes to minimize safety issues?
- How does the day to day operation ensure that key safety process requirements are met?

Results:

- healthcare outcomes (typical benchmarks from joint commission, cardiac arrest rate, etc.)
- patient focused (how happy are they)
- financial/market
- staff & work systems (retention)
- org. effectiveness results (incidents)
- leadership and social responsibility

Conclusion: you can take the theoretical points and bring them into a real organization…

Kathleen Sutcliffe
A Mindful Infrastructure for Reliability

1999 – Organizing for Reliability: Processes of Organizational Mindfulness
A set of behaviors that led to mindfulness: a rich awareness of discriminatory detail….

- quality of attention directed at task performance and interactions
- it's more mindful when frontline care providers continuously develop refine, and update their understanding of the situation they face, the problems defining it and the problems they face

Processes

1. attending to failure
2. avoiding simplification
3. sensitivity to operations
4. cultivation of resilience
5. shifting decision structures

Is mindful organizing associated with high reliability?

- surveys plus archival data on risk management

9 item scale

- we've got a good map of each others talents and skills
- We talk about mistakes and learn from them

- We discuss our skills….unique ones
- Etc..

Mindful organizing is positively associated with fewer medication errors and patient falls.

Findings were amplified in surgery (fewer medication errors), in ICU (fewer patient falls)

Working harder by itself didn't help – made it worse.

Need to be aware of the expertise of their colleagues…etc. when they're more mindful…

Medical residents and medical errors: there are 2 approaches. Prevention/anticipation vs. resilience, catch and correct errors in the making. There are limits on both approaches…

NOTE TO SELF: SEND KATHY AN EMAIL FOR THE 2 PAPERS SHE'S GOT
John Carroll, MIT

Change involves 3 domains:

- relational space – the building of relationships
- conceptual space
- action space

Doug Padgett
Totally Kids

Started 30 years ago

Began with a special education teacher who thought that the disabled community living in state hospitals

Living in ICUs is higher risk than at TK

Began with group homes for developmentally disabled

Added sub-acute care in 1990

Padgett came in 1993 when there was confusion on how to do it w/r/t state licensing, etc. TK was closed down for 3 times or so during that process. Resistance to this idea from Doctor regulators.

1985: Company almost went bankrupt b/c workers comp premium was 1.5 million with a budget of 10 million dollars.

- this led to a massive safety program for workers compensation (safety of staff not clients)
- massive safety and safety awareness program
- premiums went down… 60% experience modification program (unheard of)

A few years ago, this went awry again. They began focusing on research and data collection and the safety of care. Experience modification went up 110%. Cost $600,000. They lost focus on staff safety.

How many believers does it take in an organization to be highly reliable? What's a believer? Who is pursuing with vigor the well-being of people in our care? How can we do this better?

- do things that most orgs can't do with their staffing (1 RN for 50 kids
- problem of LA – 60% more nursing staff than LL

Charles Taylor, RMA

- Association of banks in Philly
- Banks make their money by transferring risk
- Usually one thinks of financial risk: credit and market
- In last 20 years, banking has become more complex, more interrelated, so the risks have transferred into operational risks
- Historically they didn't think about this as an organizational problem
- But more recently, the framing has changed – seeing the risks from the interrelationships and organizational problems.
- CIBC: instructions to a central processing center from customers went to a scrap metal company (fax number was wrong!), tried to call the bank, but they wouldn't listen to him, then called customers, took 2.5 years to fix the problems, sued the company, American and Canadian bank regulators finally came down onto CIBC, bank president was finally fired.
- Risk: was all about measuring and managing credit and marketing risk.
- Last 5-10 years as they gathered IT competence, they began to collect the same kind of data to calculate loss distributions of where problems lie
- But they're not very good yet about managing the culture – what can I learn from you on how to manage the culture of care, integrity, transparency, rapid response, managing little things when they go wrong so they don't turn into large things

Jeff Cooper
Can a Subculture be Highly Reliable?
What needs to be done to make such a thing work?

Macro-micro culture
300 people, dept. of anesthesia
120 residents, 120-130 attending, 30K cases / year
Can't tell if this is HRO or not?!
He feels as if he's engaging in gorilla warfare

Characteristics:

- profession known for emphasis on safety
- silo in a larger system
- site of one of first studies of error in medicine
- some existing safety structures

Dept. Safety Culture

- good case-based educational conference but medically based, doesn't usually emphasize discussions of HF issues

- Practices and Safety Committee
- QA committee
- Intension attention on selection of top quality trainees
- Periodic training for critical events via high fidelity simulation (faculty included to be credentialed)

Signs of Safety

- no benchmarks?
- Few measures of outcome
- No visible, embarrassing failures in many years (but many events and close calls)
- Leadership in creating "zone of patient safety)

Involved in a safety climate survey…

Signs of Lack of Reliability

- no safety officer, only QA (don't do anesthesia, surgeons and nursing together)
- blame based culture (cases presented anonymously)
- lack of response to fix systems in face of adverse events
- reliance on individual performance
- conflict with other silos (surgeons)
- production trumps safety
- no requirements for training with new technologies
- little practice of emergencies (evacuation hasn't been practices, only table top drills)

How does one engage in such a system

- engage the leaders?
- Identify and mentor local leaders
- Engineering safety tools
- Measuring outcomes
- Tell stories
- Provoke
- Wait for disaster?

Rewards for finding problems
Trust across disciplines
Selling the urgency - -why – the heart of change
Incentives, cost transparency
Framing: acknowledge burden of always being so good….use that to frame what we're already doing right and of the costs of screwing up…

Traders are akin to hospital

- time pressures
- arrogant
- the good ones are very, very good (they're the high priesthood along with M&A in banks)
- don't work with downstream, if and when money is lost, it's not very much relative to what they make and/or it happens so much later, you can't figure out why (causal mechanisms are not known)
- ethical drift occurred with traders

- one fix would be to remind them that they're part of a larger stream but more importantly get compensation right.

Challenge of incentive structures right:

- how do you measure performance?
- Based on minimizing mistakes (how do you reward a non-event?) vs. preventing mistakes
- Process that leads to HRO vs. outcomes….

Need to think about change according to many different organizational dimensions. All need to fit (congruence):

- Rewards
- Culture
- Symbolic
- Structures
- Systems
- People

Question: Why isn't the behavior I want happening? Ask why five times…

TK:

- life line (employees can call 1 of 12 licensed psychologists)

Does size of organization matter? Is it easier to get HRO if the number is smaller? Creating a social movement inside the organization is what needs to happen?

MONDAY
Barry Strauch, NTSB

Difficulties in the transformation to an HRO
Examples:

- Enron, FBI, Korean Air
- Even in the face of critical information, organization's don't change

This session is about illustrations of how to change org. practices even in the face of impediments

Carolyn Merritt – Chemical Safety and Hazard Investigation Board
History:

- authorized in 1990
- funded in 1998, one Chair and CEO, 3 members
- First investigation was 1999
- 2000, no investigations
- 2001 – inspector general audit
- 2002 chair removed
- Congress threatens de-funding

Carolyn comes in to do a turnaround – the situation

- 3 board members forming alliances, divided up into functional areas
- No leader, no mission & vision
- Top down management, no purpose
- Quality issues, performance issues…
- Close oversight by Congress

Organizational changes:

- change in Board/COO Eliminated
- Formed Leadership Team
    - Responsibility for day to day
    - Set priorities
    - Est. schedules and plans
- set project plans for investigations
- Established recommendation tracking group
- Established outreach and marketing plan
- Staff directed hiring and Human Capital Plan
- Work teams organized for work and skills
- Leadership training and focus for managers and subordinates
- Diversity of skills and preferences understood and balanced
- Team dynamics studied/emphasized

Outcomes:

- productivity and quality
- moving away from incident and system causes
- creative recommendations
- task orientation to courageous strategic planning
- hiring of young, talented interns
- succession plan for LT to manage rather than Board directing day to day and LT strategic plan

Outreach & influence:

- redesigned webpage
- new 2 page digest popular
- Spanish language digests
- Animations of incidents
    - 10/hour on Sterigenics (sp?)
    - 400,000 downloads….

Najm Meshkati
Personal Observations following a major catastrophe/accident

Accident in a chemical plant – a successful story

- equipment malfunction, etc., ending in an explosion.

Problem of HRO on in part of an organization:

- to do it, you would want to buffer your org., but the problem is that the work itself requires interdependence
- Can you think of strategies to overcome the problems that occur from interfaces b/w HRO and non-HRO parts of the system. Dave's example of how paramedics use silence when transporting fits this perfectly.
- Suggests you need to consider this directly and explicitly on top of figuring out the thorny change problem inside….

Added layer of cultural effect, most specifically national culture. What does HRO look like in other cultures? Have to look more deeply at the elements that are more receptive. Successful interventions that build on the existing culture. Tilt the culture w/out overturning it. Example: questioning attitude vs. power distance: use the corporate culture… Can't use a one-size fits all (like International Atomic Agency).

Colin Reid
BP Refining

Organizational Context & Overview:

- 12 refineries ww
- 8 different heritage companies
- 6 different countries – 5 different US states
- Age of plants: 30-125 years
- Very stable and traditional industrial orgs at the plant level (lower) but the higher you go, the less stable, the more mobility (as they've become a global company)
- Very good improving personal safety stats
- Heavily benchmarked
- Huge growth of BP group via acquisition since 1998

HRO in BP

- Task force and HRO founded in 2001 and 2 (focused on the culture)
- 2003-4: trained 250 in HRO principles and leadership expectations
- 7/2004: HRO self-assessment survey
    - Identified areas of concern but no relative risk ranking b/w refineries
    - Record year financially
- 3/2005: Texas City tragedy, 15 dead, 170 injured
- 5/2005: New Safety and Ops function – reporting to Group CE
- 6/2005: reaffirmation by Refining Leadership of HRO
- 6-7/2005: HRO Assessment Protocol developed and piloted
- 8/2005: Independent panel investigation announced
- 7-8/2005: 11 Refineries assessed using the protocol (focused on operators, not management)

Protocol has turned into a "leading indicator" of HRO.

Found 3-4 sites as very good:

- leadership
    - consistent, less churn consequently trusted by workforce
    - buggers organization from well meaning corporate initiatives

- Communication
    - regular
- Behavior
    - Investment in people, technical and social
    - No tolerance for complacency, paranoia is valued
    - Operations centric
    - DM devolved but only after competence in place

Evaluate people and select people for humility…

Dave Thomas
Retired from US Forest Service

"It was an unexpected wind event" that made a prescribed burn get out of control outside of SLC.

Put their shoes: shame, feelings of stupidity b/c it's such a public error. (This is different than in medicine b/c many errors are or can be more easily hidden.)

After problems what tends to happen:

- tighten and clarify policy
- fat investigation reports
- administrative actions

THESE DO NOT LEAD TO LEARNING

Organizing for HRO

- didn't ask for permission from the top
- found a community of practice
- grass roots/bottom up
- didn't over-design
- scholars welcome – did a work shop
- silent support

Workshops:

- 3.5 days
- 120 students
- Karl/Kathleen teach
- Staff ride – tell the story of what happened (not analysis)
- Reflections/commitments: discussed what we learned
- Pushing the edge

Have done this with 300-400 ground-level fire fighters.

DIFFERENCE B/W THIS AND MEDICAL SETTING

- ossification of professional norms about who is the expert, who has more training (he's doing this with new recruits, those with less training)
- much more stratified social system in a hospital – many more layers of organizational complexity and competing status systems

Just culture: can we talk about the things that really matter?
Not quite there in the fire service.

Design is always a battle b/w naming the thing and killing the dream.

As you begin to codify HRO, here's how you do resilience…. Will it kill it?

Use almost events:

- root cause analysis of those
- turn them into a story.
- Need to have committed mgmt. and orgl. capacity to write and produce those stories.

Does HRO work the same in all cultures and in all settings/industries?

Participatory OD model doesn't work well in hierarchical cultures…. How do you intervene in such a system? Many disagreed on this point… example of crew resource management…?

Reliability from the Ground Up: Working with Users to Implement Reliability Standards

Don Hiatt
Counterterrorism Issues

HRO at it's lowest common denominator in the public for the person in emergency services

- we have an HRO system – 911
- paramedics, EMPs, fire fighters, law enforcement, hospitals… all have to communicate based on that 911 response

Levels:

- individual level – if you can't call yourself, some other individual can
- community level - is there a mechanism for them to call if they can't call for themselves?
- New Orleans couldn't recognize they had a problem and they didn't call for help. State of Louisiana? Who steps in and calls for them?
- How can we push the 911 system capability to this next level….

The principal Federal official for Region 7 could have stepped up to call… there's a whole chain of people b/w the president and the person on the roof requesting help!

Some wanted to say it was a posse comotatis (sp) situation – but that's only for enforcing laws NOT for rescuing human lives….

Need many different units/agencies to coordinate – example of air craft crashing and civil and military hospitals split it up.

Hospitals and medical centers: what are the major contributors to accidents?

- communications
- systems
- engineering
- No, it's PEOPLE. They slip, trip, fall – happens in housekeeping – keep it clean and people will feel better.

1996 Olympic games in Atlanta

- Atlanta fire is the only entity to be sued
- Dispatched on that as an explosion in the park
- First thoughts: what's in the park that can explode? Thought of 3 things, these were secured.
- Car 203 is in route to the park that exploded. Turned on the TV. People injured near ATT stage, thinking about location, what mechanism that created the event.
- 22 miles to the site, 5 minutes into the ride, call the Joint Operations Center, Arthur is a cylindrical person (he hadn't heard anything new),
- Called urban search and rescue teams, said I'll call you as soon as someone says something, but get ready.
- Called Marine's chemical and biological response force: 325 Marines, Major Malone wake up, explosion in the park, it's at Harrison…and X , "act accordingly and I'll meet you there.)
- Marine's & Don arrive simultaneously, Don's mad b/c he hasn't heard anything and State Trooper said he can't park there, went to command post, no commander
- They'd never seen anything like that… 2 Commanders, Lieutenant on Rescue (s/b coordinating triage, search & rescue) and a Command Technician. No one is there.
- Local Fire Chief comes in, sees the same thing
- The Marine's come in, Don it looks like an anti-personnel bomb.
- Here come the Commanders who should be sectorizing the operation and have control over the 130 people who are injured. They should have asked the fireman to ask them for reports, not going by yourself!! Reports by radio gives everyone a sense of what's going on so that all can learn
- Bomb tech is waving – secondary device!
- Chief Rio – go 2 blocks up, get organized, and I don't want to hear anything until you're organized.
- Goes to paramedic who is trying to do some triage – say we've got to get out of here now.
- Engine right near the bomb with fire hose off.
- Chief reverted back to our fundamental tendencies – when we see do not look right (DNRs)
- Pull everyone back 2 blocks up. Get organized.
- City of Atlanta but incident happened on state park, terrorist incident, s/b handled by the FBI
- FBI asks what has happened (1 hour into it): tells it what happened and what their plan is for the next few minutes. Still has 15-20 people in the park, can't find a policeman with a working radio, but he did have his Marines. Marines set up a perimeter, got Atlanta police to set up a larger perimeter, most of those milling around are media
- Same Incident Commander and …. Tech that handled the piedmont bombing are on site… FBI is going to detonate the secondary device. That got to the Fire Commander who sits on it, doesn't pass it on, nail goes into a fire fighter's helmet, hence the lawsuit.
- Now: we put together emergency level tape

One other point about emergency services: missile launchers from first Iraq war (from back of Iraq trucks). What does a fire department aerial ladder looks like from an aerial satellite? What does a fire truck look like (like a tank)?

We can tell now: Where is this thing going, what is it going to do?

Gary Provansal

Commonalities of command structure, length of time of regrouping, other things not matching up…

What do we do with a picture of response that doesn't optimally control or contain it as you like?

Incident commander wants to get orientated fast – response is that he runs around.

Operations officer in charge of making sure ops are carried out? Where are they? Getting the orientation that he can't get form the incident commander?

Plans chief then comes to document, intelligence so you can get on top of it and how it will unfold.

All these guys are running around b/c why nothing can get done.

County Fire solutions:
1. Command centers in the back of trucks. Three trucks are backed in to each other, so that these 3 guys are all together and are protected.

How do you communicate urgency to the ops chief…how does the plans chief get the sense of urgency? They need to be together!!! This helps. Plans chief hears the urgency via sense – hears screaming over the radio.

2. Training division: Allow these people to work in shifts, and teach them how to be risk/safety officers. Send them out to scenes of larger incidents, complex ones and will take time to unfold. They stand behind and monitor and evaluate safety. They also evaluate SOP's to see if they were working? Importance of revaluating the policies. Highly trained training specialists go out and evaluate the policies. They also are evaluating training needs.

Nursing hospital policies and procedures may conflict with one another?
Who develops your policies and procedures? Executive staff?
Does it go all the way down to those doing? Is it done more in the middle or a combination b/w top, bottom and middle? Needs to involve all of them…b/c each has different risks involved (Fire Chief worries about political risk, fire fighters are worried about life).

We tend to compartmentalize things that needs to be overcome – e.g. crew resource management brings people together…just as the 3 trucks bring people together. That compartmentalization does good things for the little unit, but it isolates it, and prevents communication across boundaries which creates system failures.

HRO behavior can help foster those interrelated pieces that join all together.

Interconnectivity is key – where public health, emergency management and medical services all overlap, we can see there is a small amount of knowledge that everyone needs to have about one another. This is a culture change that each of these parties need to have in order for the system to work effectively.

In Atlanta, plans were not integrated – OSS tries to look at this strategically to help communities plan. When you have people who can work like this, need to identify them and get them out. Often you'll see informal work-arounds…which are bad.

Suggestion boxes at the ground level – let them suggestion and implement. Takes authority to the lowest common denominator.
Risks at TK
What he does:

- everything from ventilators to clean bathrooms
- 10 years at TK
- Used to have carpeting – housekeeper was cleaning the carpet and kids started getting sick due to the carpet cleaning powder! Housekeeping and maintenance was critical

HRO:

- working with his staff aware of the role they play & the importance of their role (housekeeping, laundry and maintenance)
- They are on the same plane as the RNs, their administrator & the president!
- What scares you about your job – it could hurt the kids!

The Risks:

- bed, ventilator, humidifier, monitors, cords & cables, all in a small room
- lot of treatments, nurse, rt, student, and cleaning crew needs to get in there…
- ventilator maintenance: function is to make sure that it puts out the appropriate amount of air
- want a clear understanding of how they work with the staff…
- after the incident, wanted to make sure all chemicals coming in are reviewed and that they're used safely.
- Construction projects – need to train them to show the possible adverse affects on them so that they take special care.

Carol Baker-Briggs
Director of Nutritional Services at Loma Linda University

Where are the risks?
Where we are in the transition (we're in the tough place).

Dept. is a sub-system in a complex org:

- requires interdisciplinary cooperation
- can't do what they do in an isolated environment
- nurses and physicians, self searching to find info., unit staff enter order, provide care, we provide trays
- staff: PhD all the way to ESL pot and pan washer
- have a continuous operation – closed only for 5 or 6 hours at night
- 250 employees, and staff turnover is 45%

Bob Bilicke
Totally Kids

High Risk Aspects of Our Operations:

- intravenous nutrition
- tube feeding
- more food allergies that are life threatening in patients
- more younger patients with immune compromised situation, primarily related to chemo therapy
- food service has one of the highest employee accident rates
- food service personnel can also carry infectious disease
- disaster preparedness for food service is overwhelming – in Katrina, they had food delivered in advance due to timing. If earthquake here, what do we do??
- Food security – terrorist attacks on food supply
- Basics of food handling, sanitary, safe, food storage, labeling, tracking of food (FIFO)

How they mitigate the risks:

- computer technology – can't select food item if kid has an allergy, need to back this with training (can't substitute)
- standardized processes and procedures
- specific order forms for more complex orders
- audits and monitoring
- teams
- corrective action plans for items identified

Concepts / implementation:

- transition dept. from a top down to a leadership with more bottom up
- clinical failures vs. customer service – how to balance across and do both
- improving manager and employee relationships and increasing trust (using Gallup to identify where they have deficiencies)
- working on raising standards / trying to build employee accountability, have them help to create standards themselves
- want to create non-punitive environment – how to reward and pay employees for speaking out and participating
- medical system is trying to change to a safety culture, but in the past we've been more of a productivity focused culture
- selection of employees: dieticians and professionals (hard to recruit) vs. lower end (need to get the right ones with the right work ethic).
- Extensive orientation – technical as well as a focus on judgment
- Using stories as part of that orientation
- Developing staff self-esteem so that they feel empowered.
- More communication, meetings, newsletters, bulletin boards to communicate objectives and culture change
- Root cause analysis of complaints (beyond personal preferences….e.g., when diabetics are given insulin and meals aren't arriving on a timely basis)

Challenges:

- managing management to employee readiness
- working with a tight management style at first and then loosening it up, then tightening up if there are performance problems
- challenge of a new culture isolated in a larger culture (they experience inconsistent messages which allows them to do what's easiest)
- regulators seem to perpetuate the environment of being punitive – encourages the desire to defend
- time pressures sometimes prevent us from having meetings
- limited resources (short staffed, open positions for 3-4 months, inadequate space, losing space)
- working on a change among the management team, what it means to be consistent, how to provide high reliability care for all

Racquel Calderon
TK
Managing the Unexpected sums up working with Daved Van Stralen!

HRO = problem solving with limited resources
Viewing it as a therapist

11.5 years ago:

- RCP's were contracted
- 10 hr shift, give report to nurse who does treatment at night
- No ventilators
- 1st ventilator patient in late 1994, nurses were scared! They called us for every little instance, didn't want to suction
- Increased to 4 home vents, special nurses were trained to work that room, special monitors were placed in that room and outside
- Ventilator rounds began then..
- Director of Nursing didn't like RCPs, she micromanaged, participating in all emergencies, she was crying during chest compressions, encouraged her to back away but before that her fear response
- Her fear response was to yell…threw things
- If official person wasn't there, Racquel was there, she'd cancel the meeting
- R started working with nurses to figure out transports
- After working in an environment with a DON didn't respect you, when R saw an event where DON put blame, R asked to be transferred back to acute.
- During that time, TK was developing a Respiratory dept, president asked R to be Respiratory Therapist Lead, R went to Administrator, how this person would interact with DON, said yes. The existing Respiratory therapist yelled at her saying she had taken her job.
- Took her experiences at TK and made selection choices
- Began training all of the therapists
- Limited resources so she trained them on the history of each kids, taught them the patient assessment and process they share with Nursing, taught ventilators to rcps and nurses
- Created teamwork to create open communication: open door policy. Most of staff want to vent, and then get to the problem.

- Importance of remaining calm, look at the team dynamics, fight, freeze and flight response, and can use this on the floor.
- Who becomes the leader is the one who becomes calm – this is how you identify the leader
- Uncertainty – want to assume all information is incomplete – keep asking the nurse more questions, assume you're wrong, know your
- Look for pattern recognition, look for overall data…
- Identify objective and goal – not just a calm ventilator, now it's getting the kids to play
- Figure out which intervention will work.
- New hires will bring new methods to the environment – need to educate them into DM for uncertainty, being attacked on person vs. knowledge, though process not idea
- Person who says I know
- Fear: know your own personal fear and how you can overcome it.
- Error: frame it as from the system, not the individual, don't point out problems in public
- Education: real time, problems, teach through failure

Components:

- ventilator class
- try new equipment – they make the decision
- bio-med dept. is included too
- ventilator rounds: repeat ventilator settings over and over
- rounds are about the same time, but 40 vents now vs. 4

Took kids to Disneyland but checked out the facilities first (all managers), next time, fewer people.

Dave: let's talk about our failures more.

TUESDAY

Charles Cowley
Shell Oil's HRO Program

1990s – systematic risk management (technology and standards)
Now: human factors is where they're focusing

Cultural Ladder:
Pathological, reactive, calculative, proactive, generative

Hearts & Minds program for getting to a proactive culture at Shell
3 focus areas:

- Personal proactive interventions – personally intervening to fix problems from happening, interventions in work
- Individual consequences – just culture, encouraging managers to respond in helpful ways when things to wrong
- Personal responsibility

Toolkit of things they're trying….

- one is publicly available through the petroleum institute of UK
- meeting expectations tool
- consequences for breaking the rule (for the individual and for the manager)

Randy Paige
KCBS news investigator reporter

Reliability and thinking about it, all of our professions tend to not want to hurt our profession, be the bringer of bad news. Goes against the grain – want to protect what we do, put our own industry in its best light. So we rationalize why it's not that bad, that things can really be better…

Two examples of examining what's happening inside these paradigms, closed cultures…when you take one step back.

Example of how airway tubes in EMS units aren't used in Los Angeles and Orange County. Decision was made based on a study that hasn't been studied.

Train collision: one yellow traffic light and two sets of eyes. Why didn't the engineer see the yellow light? No warning, no alarms, no automatic warning system. Their eyes may be open but they're too tired to see. Can work up to 12 hours a day, but must have 8 hours off b/w shifts. 90 straight days of 12 hours a day = one example. If you say you're too tired, and ask for time off, then they get investigated.

None of his whistle blowers has been fired.

What mechanisms result from these stories?

- tubes still aren't being used in LA County
- nothing has changed in the RR industry
- Gas cans don't have child resistant caps, yet manufacturers don't sell them. B/c their product doesn't contain a hazardous product when they're sold, they aren't subject to the law. But kids keep getting injured. Waxman introduced legislation, and this is moving through Congress.
- Impact depends on the story, the power of those who want to oppose it. E.g., kids are hurt by tubes…

Two more stories: show the manner in which we get the information.

Subways and terrorist attacks. How do you get out? Many of the emergency exit doors don't work. They're supposed to swing all of the way open, but they only open partway or are too heavyt2tmTAing hknow(aibo, but ppo(s blemsask fhe)Tj0.00031 Tc -0.0009 2Tw 7.685 0 m)8cedaori5ps,aracks

No investigation to see if it was a common source. But state statutes for Health Services would allow them to sanction.

Are we giving terrorists ideas from this story?
What if scenario… usually don't do these kinds, when they saw the pattern, they thought it was something that should be made public.

Impact of lack of sleep is a huge factor…

Wrap Up:

2 differences b/w the last one and this conference.

- the extent to which diverse industries are represented and embracing HROs, but we're not sure they're doing the same thing
- 2 years ago, not a lot of attention paid to human factors, this is the place where we need to make the next step, it's the obstacle and the field to be tilled

Was it worthwhile? Yes, got to meet you and the researchers… Also get motivation – it's been validating, that what we're tying to do this are what you're trying to do, they're valid.

4 Things:

1. What are the areas for future research:
   - near misses, how we disvalue the warning signals, why do some managers place a value on these things and others don't? (Gerhard – looking at what could go wrong…. Individual difference?) then, what do we do about it?
   - Being sensitive to the operator level. How do we lose track of that? Lose the sense and understanding that operations are our core (and we shift to finance)? How do we keep this as our core priority?
   - How do we do HRO type analysis? We all do event investigation… but the technical mark aren't enough?

Importance of always having consistent mental models of what is OK. Having everyone understand the boundaries, can sense when we're approaching those boundaries, there are dragons over there!

HRO can connect to Baldridge Awards – this can become the umbrella under which HRO can be sold.

Variability vs. stability: requisite variety, California Management Review, 1987(?)

What is HRO and how to sell it: have a very high threshold for ambiguity, how to sell HRO, have a library of material that resonates with you, find occasions to engage in the dialogue and give things to people that fit them, know all of the tools, use some of them, come up with the answer that is meaningful to the person you're talking with.

Tony: as I listen to all of these viewpoints and theories. We're all talking about organizational dynamics from different viewpoints. If you look at the history of Crew resource management, it took accidents to reveal it wasn't technical error, but it was social psychology, look at the cockpit as a group, then focus on that process, then translate that to a methodology to pilots, but after 20

years, it's now taken for granted, and has changed culture. But it was a very hard sell at first. We have to develop a common framework that bridges the gap b/w academics and practioners, so that we can be on the same page re. what HRO is, how to measure it, how to take a company from non-HRO to HRO….

Jim, Charles and Nadjm

John: HRO is a social movement, there is a brand name around HRO that has become valuable and has begun to sell. People are attracted to that, might help them to get things done. As a social movement, it's operating on 3 levels:

1. creating a relational space, creating network amongst us, meetings, community of practices, stories, tools, etc. HRO's in orgs also create this… HRO is a social movement inside an organization. Politics are important here – dealing with actors with different preferences. HROs do not win b/c they are objectively right. Gaining key supporters, winning hearts and minds, getting into turf wars… How to get the system in the room to work together. If HRO is the umbrella for making that happening, then you can begin to make progress…
2. creating a conceptual space: we're creating ideas. World of practice is meeting the world of theory. Started with observation that some organizations are doing better – the world of practice is leading the world of theory. Now is it theory leading practice. But always there is this back and forth. Not is clear what is HRO and what it's not. HRO lives in a world of other activities like change management. How do we get there. HRO is not a theory of change. So we're drawing on other theories of change, some of which are more or less compatible with HRO. Have a paradox of bringing something about without killing it in the process? To what extent is HRO a set of practices vs a set of principles where there is no list of what to do? (these are a very different world.)
3. We live in an action space: what do you do? How do you move forward? Relational space is absolutely critical to bring practitioners and academics together to see what is working and what is not. Groping for solutions….

Root Cause analysis: surveys, values is not that it provides an indicator, creates an occasion for conversation. It's not the scorecard, it's how the scorecard gets people to talk.

Charles Taylor:

- We're at a threshold in terms of development of this paradigm or discipline… How do we position it w/r/t other management theories and tools. This is something we'd sort out in the organizations – very important for nuclear power, less important for a toy manufacturer. For financial institutions, it's important b/c we manage risks, and the kinds of risk we manage are emergent, the world is more turbulent, we work at higher speeds
- We've been asking the diff. b/w HRO and safety: We're focusing on the reliability of orgs, helping an organization to deliver on its mission. Tie the concept of HRO to governance: if I was on BP's board, I'd want to know that it's an HRO and want to see reports of it, because I want to be confident that the downside risks are being managed appropriately. Link HRO to governance!
- Where we go: Operational risk managers don't have certification programs, but many other areas…. Should they be? How well do you as in individual notice stuff? How well as an organization notice stuff? Can we move towards an informed view of knowing how good you are? Right now it's all or nothing? You are or are not an

HRO… can you quantify how much is enough? Calibrate the value of what we do better… this is the amount of it you should have.

- Caution: actuarial became a science and created the pension crisis. The rules were the wrong ones, so we don't want to do this – follow rules…

Nadjm:

- Questions of economic benefit of HRO: good ergonomics is good economics. Maybe we need to produce such a document… case studies from lots of different industries.
- Tying HRO to other activities like CRM, TQM, Baldridge Award is important
- How can HRO be institutionalized by regulators: HRO certification. Need someone to regulate this and that will be how it will take off.
- Where does HRO fail? When it comes at the end of the line, it fails, but it wins when it's integrated at the upstream level…
- HRO and quality is a journey. If you stop you are dead.

Joe Martin:
The challenge is to go back the economic nature of humans… people won't change unless you have their hearts. I cannot get folks to perform unless they trust me. Need to use time and effort to validate them. How do you overcome that bureaucratic glaze? Integrity is at the individual level…but you've got to bring all of this down to the individual level. "I don't trust someone in an instant if I'm not validated when I talk with them. And I know this in an instant." Study: Sergeants personality was associated with sick time, more friendly times had less sick time.