A brief look at the New Look in complex system failure, error, and safety

CL

① Triggers

LATENT FAILURES

"Normal" operations

DEFENSES

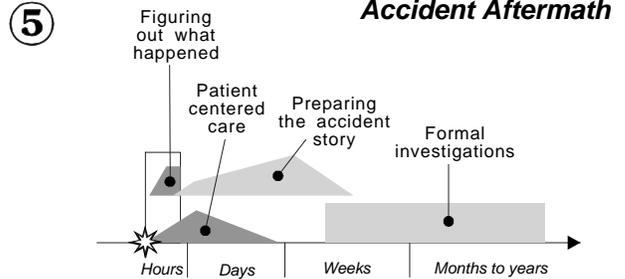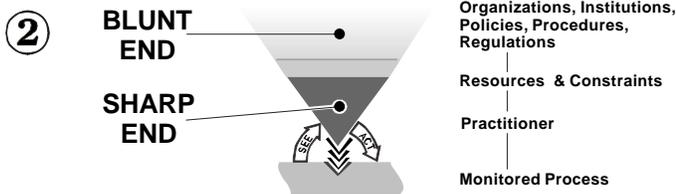**Accident**

Modified from Reason, 1990

Complex systems fail because of the combination of multiple small failures, each individually insufficient to cause an accident. These failures are *latent* in the system and their pattern changes over time.

②

BLUNT END

SHARP END

SEE / ACT

Organizations, Institutions, Policies, Procedures, Regulations

Resources & Constraints

Practitioner

Monitored Process

Modified from Woods, 1991

Practitioners at the *sharp end* of the system interact directly with the hazardous process. The resources and constraints on their technical work arise from institutional, management, regulatory, and technological *blunt end* factors.

③

Need to avoid being sued for malpractice

Need to maintain good relationships to other professionals (e.g. surgeons)

Need to protect patient safety

Pressure to reduce costs

Change surgery to outpatient, same day admission

Maximize preoperative workup and information

Maximize patient turnover

CONFLICT **CONFLICT**

Avoid injury to the heart

Prevent the heart muscle from being starved for oxygen

keep heart muscle work low

provide oxygen to the heart muscle

keep heart rate low

keep blood pressure low

keep blood pressure high

keep oxygen saturation high

keep oxygen carrying capacity of blood high

CONFLICT

Competing demands, dilemmas, conflicts, and uncertainty are the central features of operations at the sharp end. Technical and organizational conflicts overlap and interact.

④

Prepare for workload surges

Save budget

Increase production

Invest in staff experience for future

Build good relations with staff

Save time for sicker patients

Avoid technical failure

Avoid regulatory scrutiny

Work at the sharp end inevitably encounters competing demands for production and failure-free performance. Action resolves all dilemmas. Successful operations are the rule. Failure is rare.

⑤ *Accident Aftermath*

Figuring out what happened

Patient centered care

Preparing the accident story
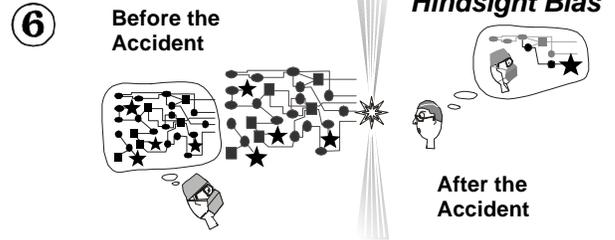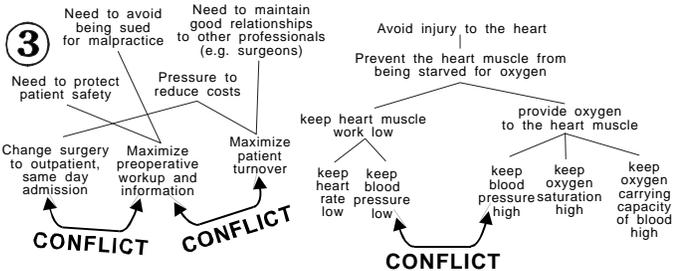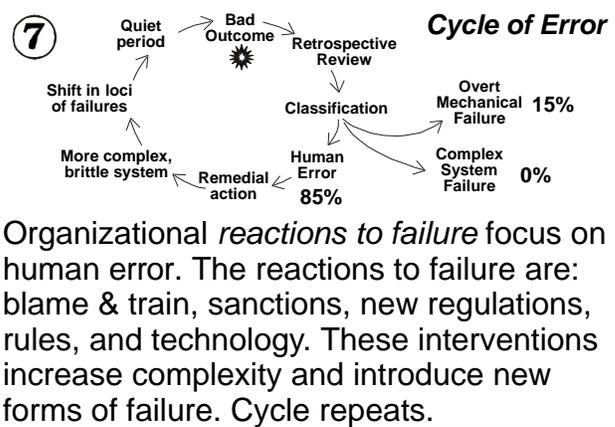
Formal investigations

Hours *Days* *Weeks* *Months to years*

Accident/incident investigation normally stops with error. Sterile incident collections result. Learning halts. End of story.

⑥ *Hindsight Bias*

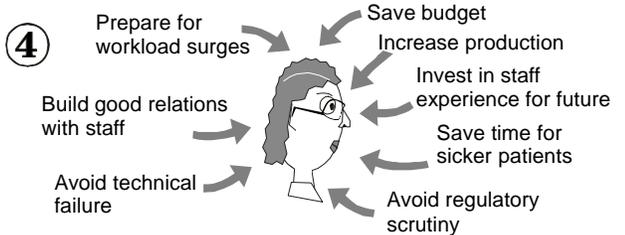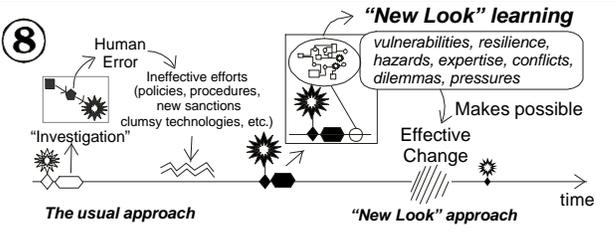**Before the Accident**

After the Accident

Post-accident reviews identify *human error* as the 'cause' of failure because of *hindsight bias*. Outcome knowledge makes the path to failure seem to have been foreseeable - although it was not foreseen.

⑦ *Cycle of Error*

Quiet period

Bad Outcome

Retrospective Review

Classification

Shift in loci of failures

Overt Mechanical Failure **15%**

More complex, brittle system

Human Error **85%**

Complex System Failure **0%**

Remedial action

Organizational *reactions to failure* focus on human error. The reactions to failure are: blame & train, sanctions, new regulations, rules, and technology. These interventions increase complexity and introduce new forms of failure. Cycle repeats.

⑧

Human Error

Ineffective efforts (policies, procedures, new sanctions clumsy technologies, etc.)

"Investigation"

The usual approach

"New Look" learning

vulnerabilities, resilience, hazards, expertise, conflicts, dilemmas, pressures

Makes possible Effective Change

"New Look" approach

time

People make safety. Improving safety depends on understanding the details of technical work, how success is usually achieved, and how failure sometimes occurs. Effective change follows.

Revision E (99.06.02)