

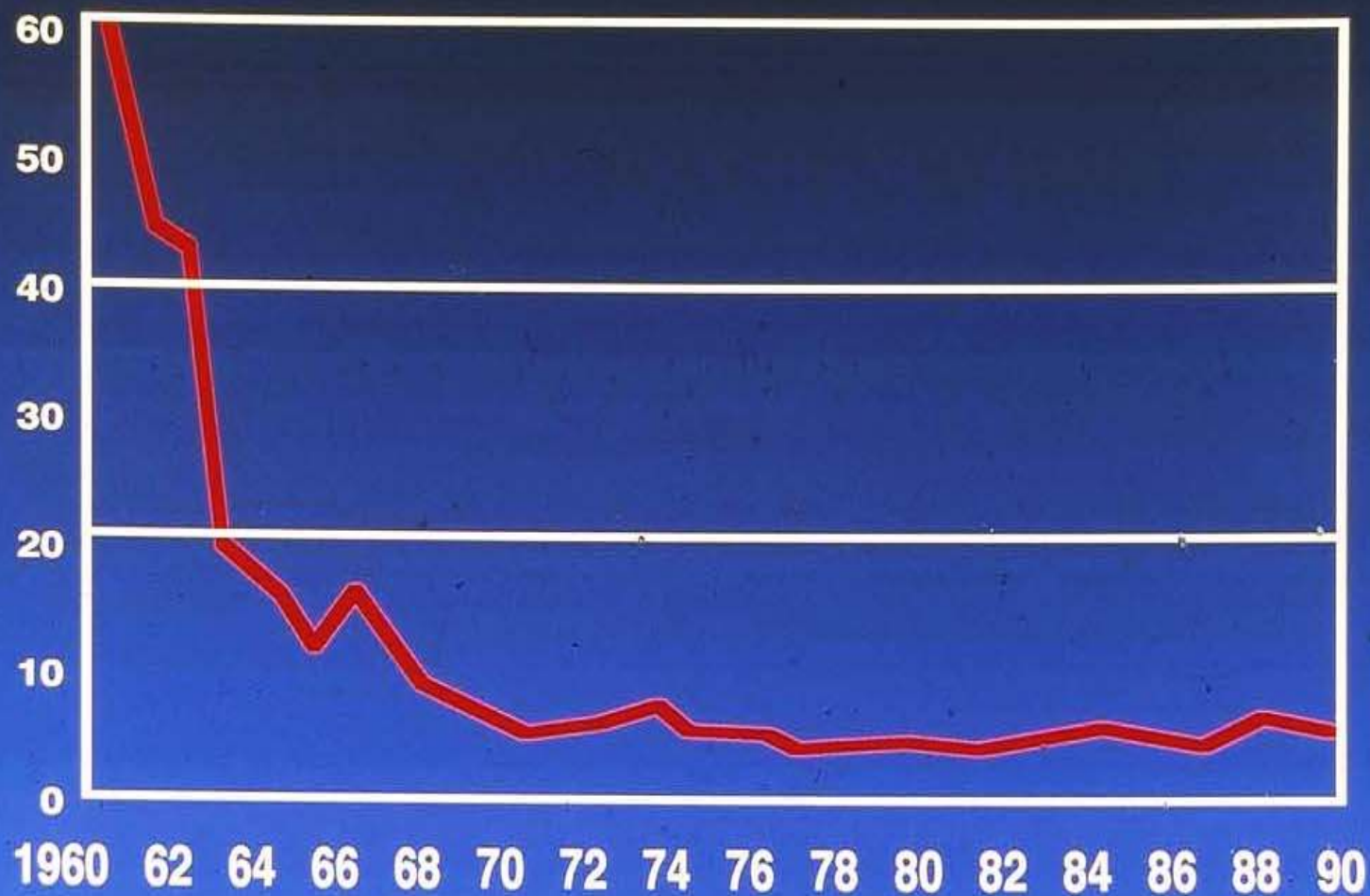
# QUALITY and SAFETY

## **Lessons from the Aviation Industry**

*Professor Michael Bagshaw*

King's College London  
Cranfield University

## ACCIDENTS PER MILLION DEPARTURES (ANNUAL RATES)



From Boeing, Statistical Summary of Commercial Jet Aircraft Accidents,  
Worldwide Operations 1959-1991

# Reasons for improvement

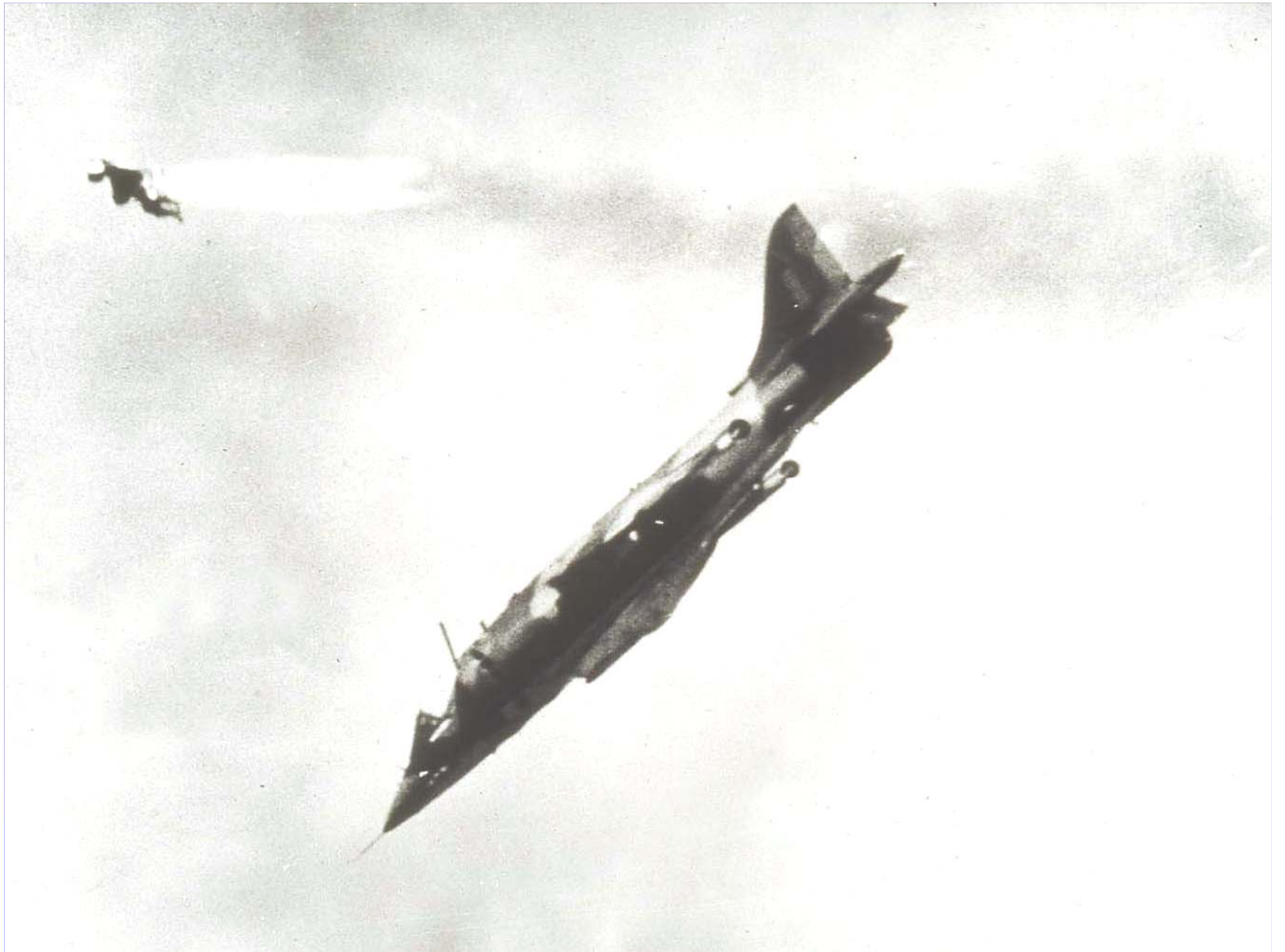
- Design & technology
- Operating procedures
- Regulation
- Training
- Automated aircraft and terrain avoidance systems





# Flight Safety

- 70 - 80% of accidents due to human factor
  - ◆ Inability of human to break error chain
- Humans WILL make errors
  - ◆ System and procedure design to minimise effects













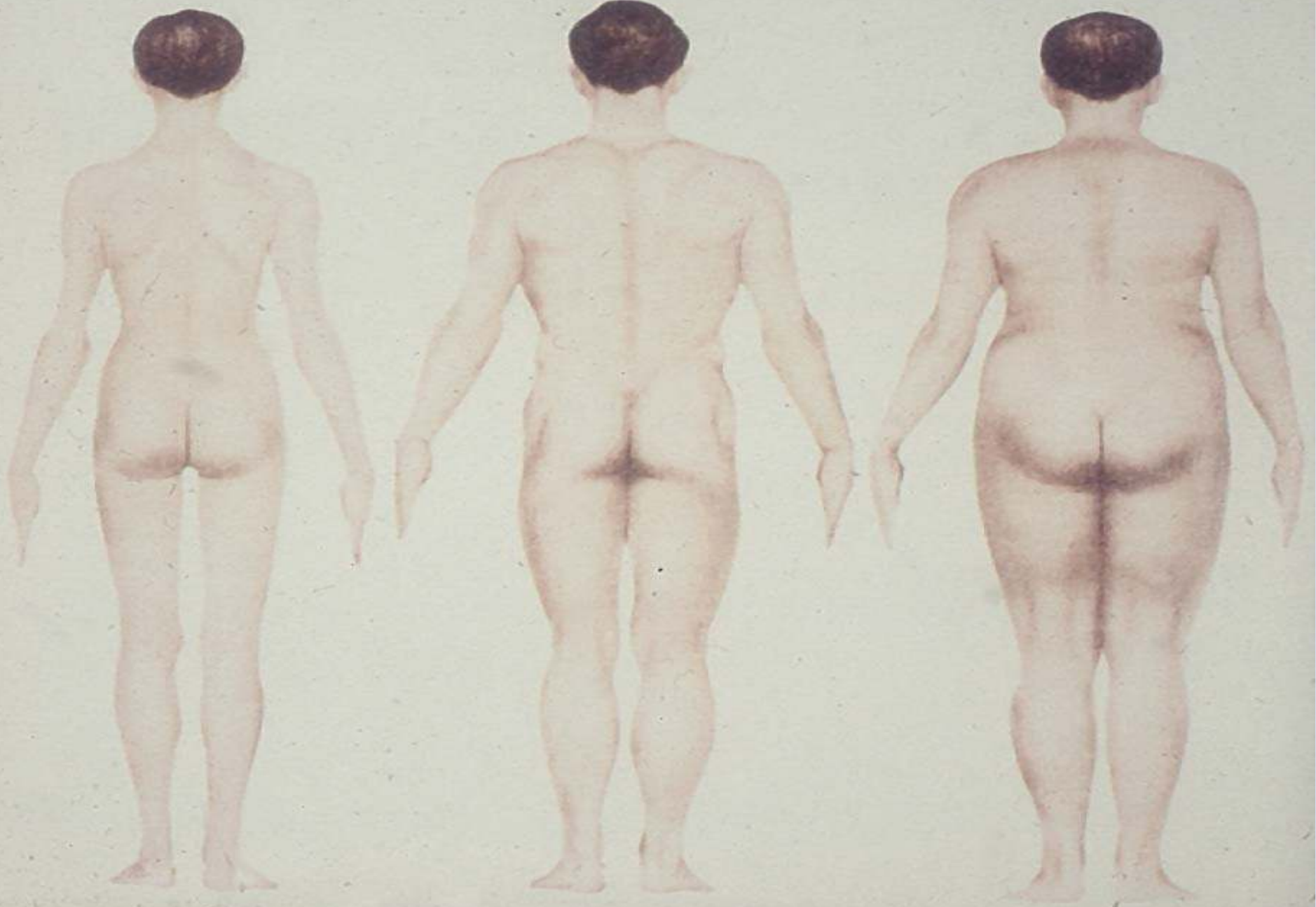
- Standardisation

- SOPs

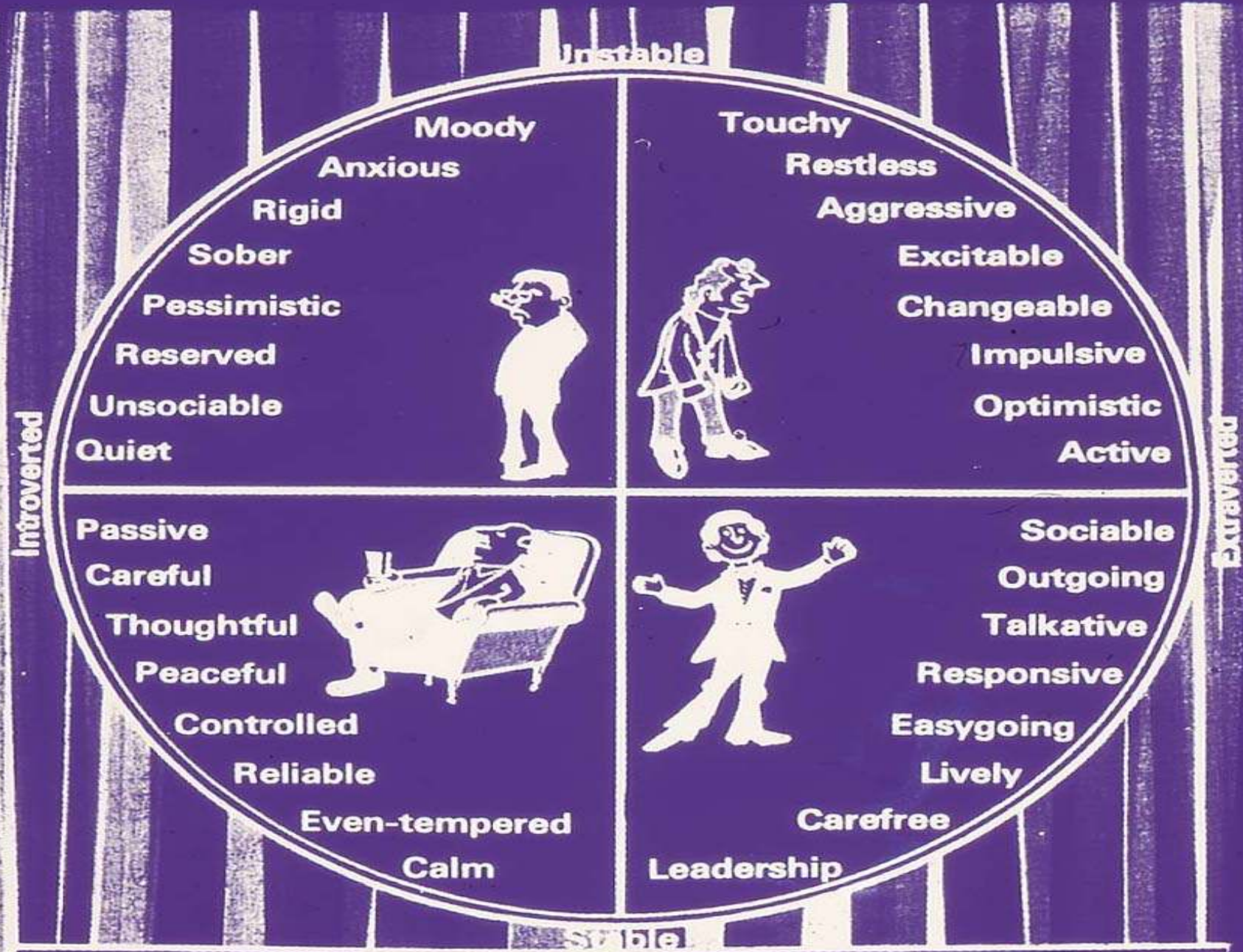
- Training

Humans are different.....

Sheldon's body types. Ectomorph (*left*), mesomorph (*centre*) and endomorph (*right*).



Psychologically as well as physically.....



# What is a team?

- Two or more beasts of burden harnessed together
- Set of players on one side
- Set of persons working together

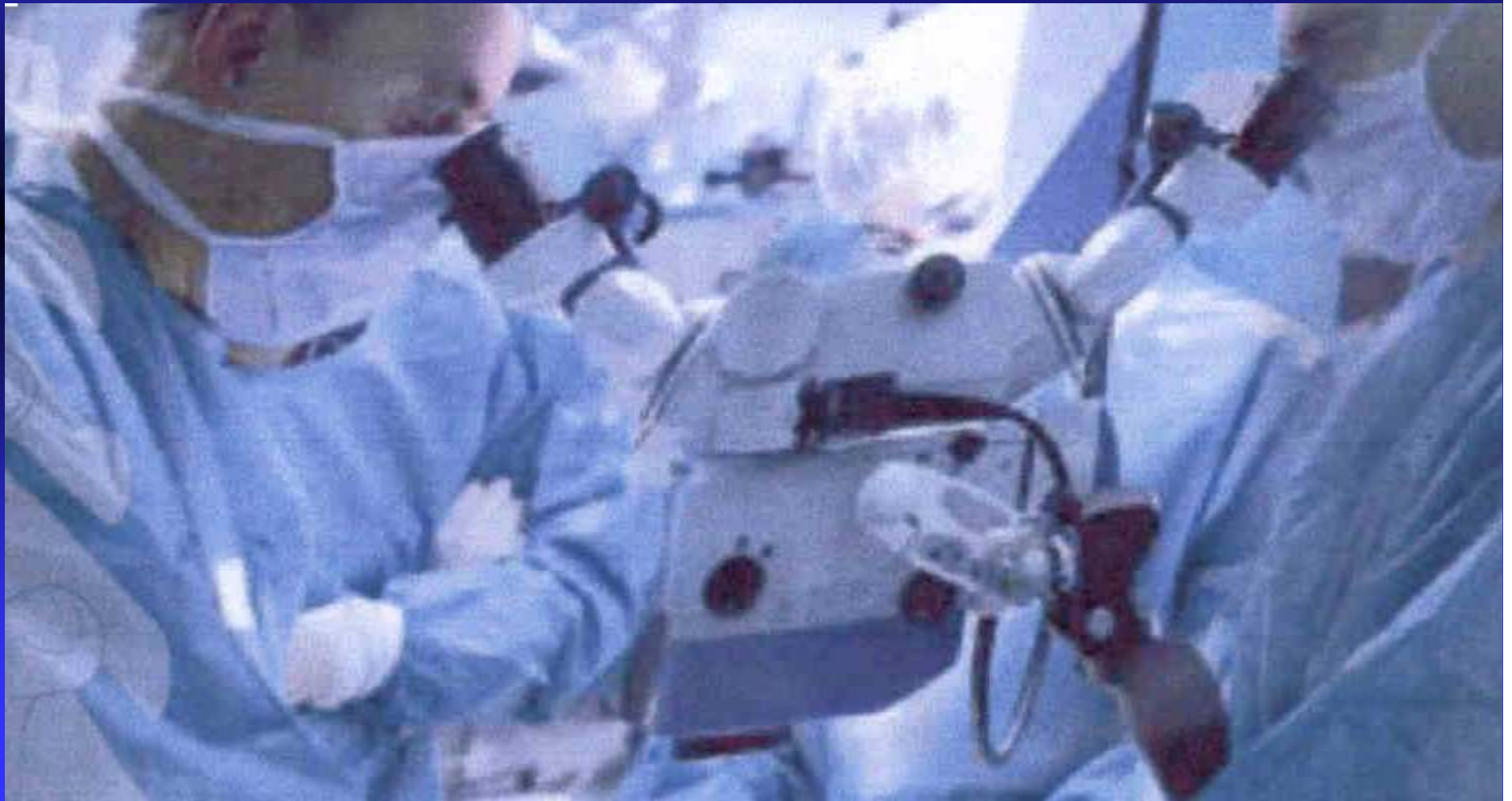
In aviation.....

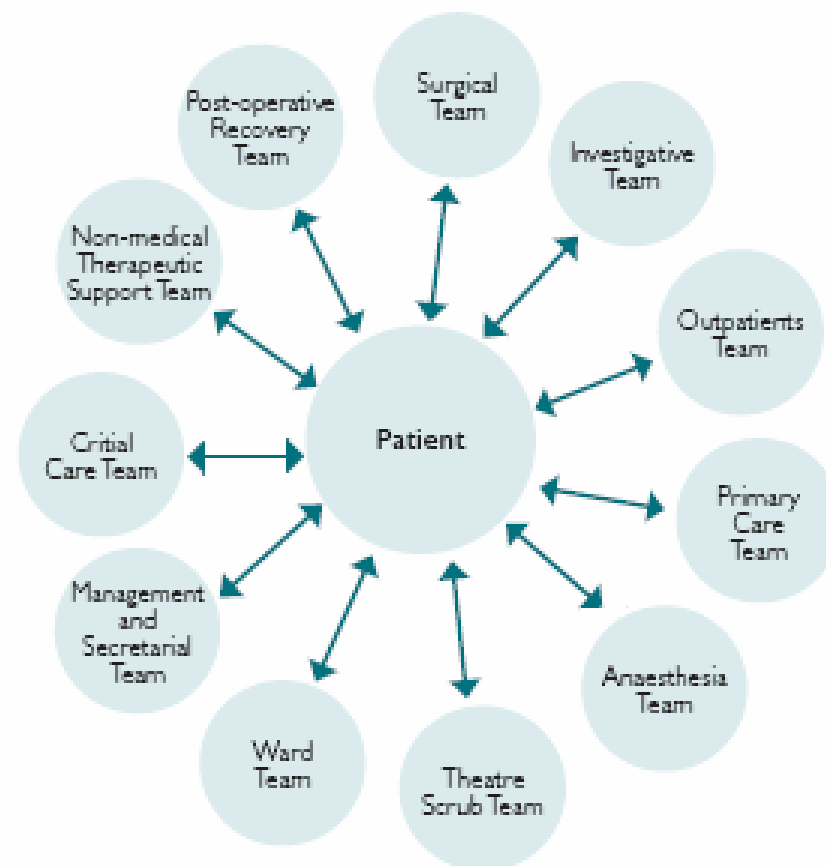
The presence of more than one crew member  
in a cockpit or on a flight deck constitutes a  
team or a crew.





# Surgical Team





# High Performing Clinical Teams

*(Nicol and Sang: J R Soc Med 2011)*

- Excellent clinical leadership
- Management goals expressed as clinical benefits understood by patient and team
- Clearly understood common culture
- Clinical ownership of service performance
- Strong emphasis on measurement and use of 'real-time' data

# High Performing Clinical Teams

- Eagerness to compare with other services
- Continuity of senior staff
- Workload managed to avoid excessive burden on staff
- Quality improvement integral to work with skilled use of performance improvement techniques

# High Performing Clinical Teams

- Patient and family involvement strong
- Jobs and individual developed through education, training and role development

*Nicol E, Sang B. A co-productive health leadership model to support the liberation of the NHS. J R Soc Med 2011; 104: 64-68*

# Team performance influenced by

## Leader's

- Personality
- Behaviour
- Management style

## Team members'

- Personalities
- Behaviour

Effective co-ordination requires

- Co-operation
- Communication

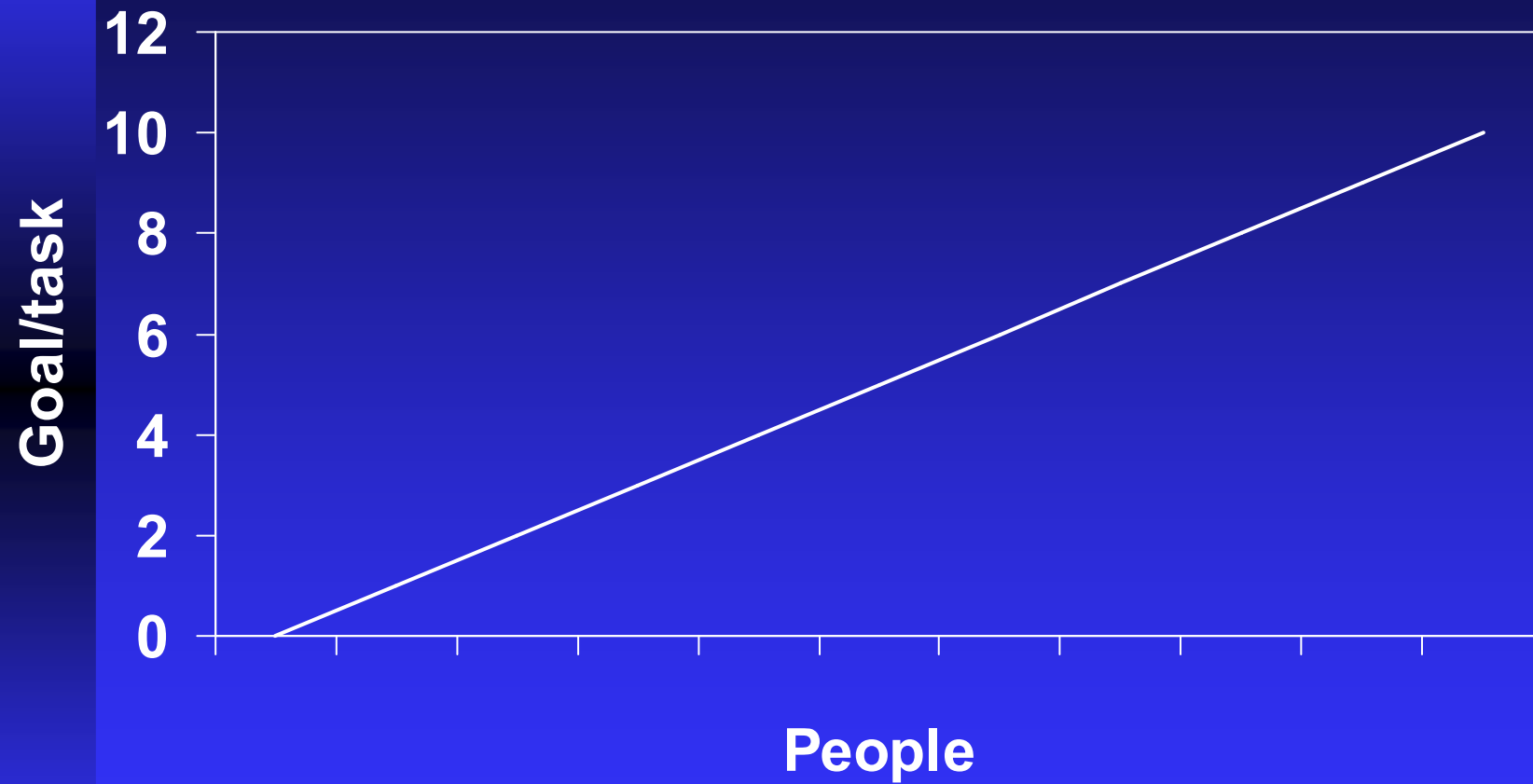
# Co-operation

- Action taken as part of an overall strategy
- Depends on group dynamics

# Group dynamics

- Role of each individual
- Status of individuals
- Personalities
- Behaviour
  - ◆ Conformity
  - ◆ Compliance
  - ◆ Risky shift
  - ◆ Group duration

# Leadership Style



# Ideal leader.....

- P max, G max
- Confident and relaxed
- Communicates & involves others
- Accepts criticism
- Technically competent
- Gains respect and commitment of all team members
- All team actively & positively feels that contributing to achievement of goal.

# Communication

■ Words	7%
■ Delivery	38%
■ Body language	55%

# Communication

## Source

- Communication skills
- Knowledge
- Social system
- Culture
- Attitudes

# Communication

## Message

- Elements
- Structure
- Content
- Treatment
- Code

# Communication

## Channel

- Seeing
- Hearing
- Touching
- Smelling
- Tasting

# Communication

## Receiver

- Communication skills
- Knowledge
- Social system
- Culture
- Attitudes

*Same as for Source*

# Teamwork

## Advantages

- Decision arrived at by group likely to be better quality than that derived by individual
- Technical competence enhanced
- Workload reduced by task sharing
- Work stress reduced

# Teamwork

## Disadvantages

- Personality clashes
- Time taken to reach committee decision
- Conformity
- Risky shift

# Teamwork

Requires appropriate behaviour and leadership style.



# AIRLINE RISK MANAGEMENT

1 in million risk of death or serious injury:

- 5 hours travel by air
- 5 minutes travel by bicycle
- 30 minutes travel by car
- 30 minutes on foot

# Remember -

~ 1 in 10 patients admitted to hospital in developed countries suffers some form of medical error

# AIRLINE RISK MANAGEMENT

Scheduled air carrier annual accident rate:

Prior to 1960-

60 per million departures

Since 1960-

0.5 per million departures

Since 2000-

0.3 per million departures

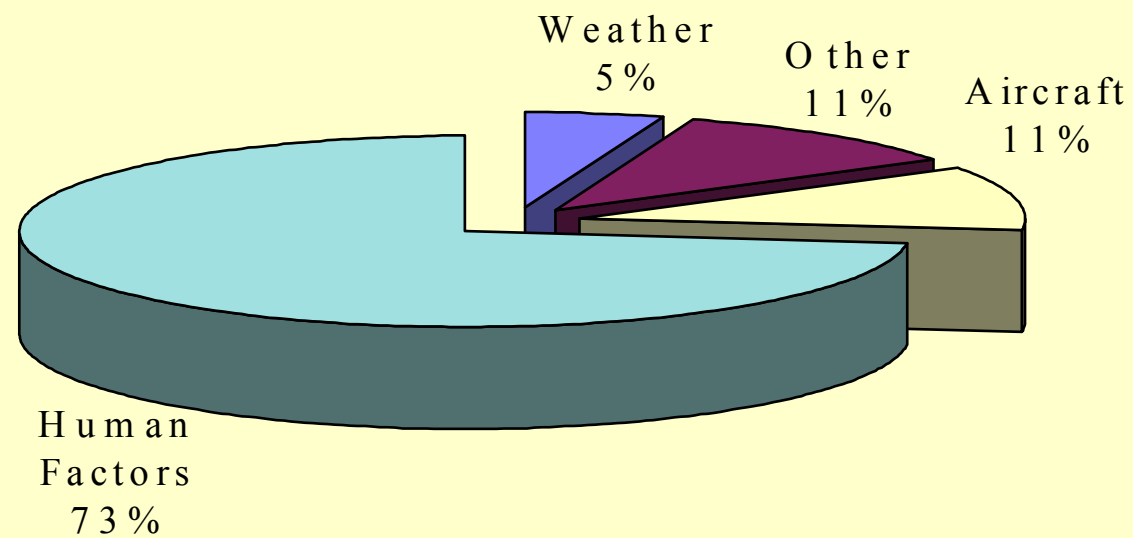
# AIRLINE RISK MANAGEMENT

Since 1960, improved:

- Technology
- Manufacturing standards
- Maintenance
- Operational procedures
- Training

# AIRLINE RISK MANAGEMENT

## Accident Causes



- Risks & complexity in controlled aviation environment different from unlimited conditions faced by health professionals and their patients

*BUT .....*

## ■ Aviation –

- ◆ >70% of fatal events – failures are non-technical, i.e. human failure

## ■ Medicine –

- ◆ 70% incidence of communication failure in adverse events, i.e. human failure

# AIRLINE RISK MANAGEMENT

- Confidential reporting
- Data Collection
- Airline safety database
- CAA safety database
- Audit
- Training

# AIRLINE RISK MANAGEMENT

## Human Factors concepts

- Crew Resource Management (CRM)
- Multi-Crew Co-ordination (MCC)
- Line Oriented Simulated Flight Training

# AIRLINE RISK MANAGEMENT

- Human Information Processing
- Human Error and Reliability
- Decision Making
- Avoiding and Managing Errors
- Personality
- Human Overload and Underload
- Advanced Cockpit Automation

■ Recognised as normal part of initial and recurrent training by

- ◆ Government
- ◆ Regulatory authorities
- ◆ Management
- ◆ All levels of work-force
- ◆ Unions
- ◆ General public

# AIRLINE RISK MANAGEMENT

Parallels for the clinician?

# AIRLINE RISK MANAGEMENT

## Pilots and Health Professionals

- Work in highly complex & large organisations
- Lead multi-disciplinary teams
- Operate in potentially stressful situations
- Encompass new technology
- Managed by many professional managers

- Perform management roles within their organisations
- Unique responsibilities for well-being of team and of passengers/passengers
- Often have, and generally need, a ‘can-do’ mentality

# Human Factors Training

- Defined objectives rather than being activity-driven
- Objectives
  - ◆ Development of knowledge, skills, attitudes
- Long term attitude development

# Human Factors Training

- Human interaction much more than behaviour
- Cognitive non-technical skills
  - ◆ Leadership
  - ◆ Teamwork & Communication
  - ◆ Decision-making
  - ◆ Situation awareness

# AIRLINE RISK MANAGEMENT

- Mutual Respect
- Openness and Honesty
- 'Just' culture
- Learn, and thus Train, from experience

‘It should be the norm for surgical teams (the surgeon, anaesthetist, theatre nurses, operating department assistants) to have time together and with other teams, such as those in the ITU, to review and develop their performance as a team.’<sup>1</sup>

Sir Ian Kennedy – *Learning from Bristol*, 2000

# The Leadership and Management of Surgical Teams

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND

June 2007





