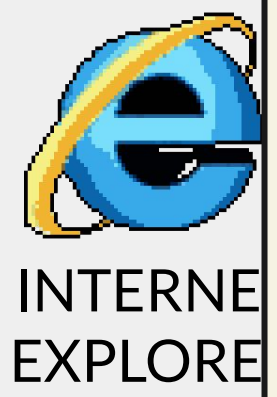


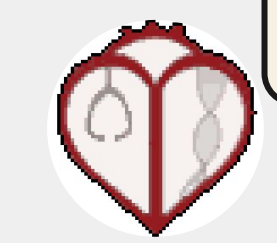
FILE 1



INTERNET EXPLORER



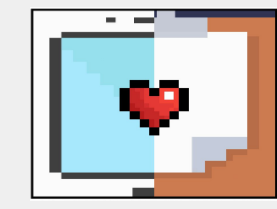
RECYCLE BIN



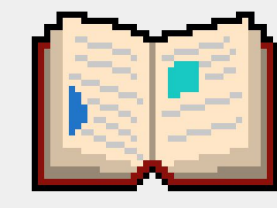
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Academic Leaders



Medical informatics 439



\*THE REFERENCE\*



\*EDITING FILE\*

Medical Informatics

Lecture 6   **Lecture 7**   Lecture 8   Lecture 9

Lecture 7

# Patient Safety and Health Informatics

**Content:**

- 1-Medical informatics.
- 2- Patient safety definitions, imperatives and current issues.
- 3- Medical errors and adverse events.
- 4- Error types.
- 5- Human errors.
- 6- The impact of health informatics on patient safety.
- 7- CPOE Benefits.
- 8- Take Home Messages.

**Color index:**

Main Text | Female Slides | Male Slides | Extra | Important | Dr's Notes | Golden notes | Textbook

[Patient safety and health informatics.pdf](#)

## Medical Informatics

- Medical informatics is a rapidly developing scientific field that deals with the storage, retrieval, and optimal use of biomedical information, data, and knowledge for problem solving and decision making." Blois, M.S., and E.H. Shortliffe. in Medical Informatics: Computer Applications in Health Care, 1990, p. 20.
- Medical informatics is the application of computers, communications and information technology and systems to all fields of medicine - medical care, medical education and medical research." definition by MF Collen (MEDINFO '80, Tokyo, later extended). (This is an earlier definition, it is focusing more in computer application and communication. at the same time it defines the areas as medical services, education and research).

## Safety in healthcare

Has been defined as:

1. Freedom from accidental injury due to medical care, or medical errors (by IOM,2000).
2. The avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of healthcare (Vincent,2011).
3. **Patient Safety defined as; The prevention of errors and adverse effects to patients associated with health care** (by WHO).
4. **Patient safety** refers to the prevention of healthcare errors, and the elimination or mitigation of patient injury caused by healthcare errors (Patel and Zhang 2007 ).

## Errors vs. adverse effect

**Case:** A 67 year old patient is prescribed Nonsteroidal anti-inflammatory drugs – NSAID for osteoarthritis pain, and is admitted 4 weeks later with GI hemorrhage.

- This is an adverse event, even though the prescribing decision was not erroneous (not a clear error). Recording it as a patient safety issue is honest, as the patient was harmed by medical care.
- Being less tolerant of threats to patient safety such as this may lead to more recommendations to take precautionary action (such as guidance regarding co-prescription of proton pump inhibitors - PPIs for all older people given an NSAID).

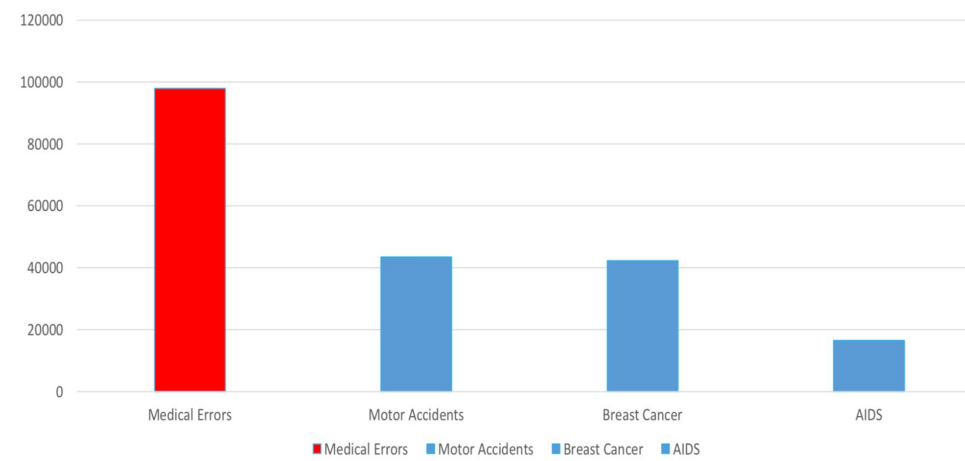
Error	Adverse effect	Near miss
<ul style="list-style-type: none"> <li>• <b>Error</b> is the failure of a planned sequence of mental or physical activities to achieve its intended outcome when these failures cannot be attributed to chance (Arocha et al. 2005 ; Reason 1990).</li> <li>• <b>Error:</b> he is old and almost 70 and can not tolerate NSAIDS</li> <li>• Errors: Prescribing Nonsteroidal anti-inflammatory drugs – NSAID without considering patient condition (age) which require co-prescription of proton pump inhibitors – PPIs.</li> </ul>	<ul style="list-style-type: none"> <li>• An <b>adverse event</b> refers to any unfavorable change in health or <b>side effect that occurs in a patient who is receiving the treatment.</b></li> <li>• <b>Adverse effect:</b> the result of an error, So not every error result in an adverse effect BUT sure we try to avoid errors as much as we can</li> <li>• Adverse Effects: GI hemorrhage.</li> <li>• Potential adverse drug event (PADE): is a medication error with the potential to cause associate degree injury.</li> <li>• Preventable adverse drug event: An injury or harm occurred as a result of a medication error.</li> </ul>	<ul style="list-style-type: none"> <li>• An event or a situation that did not produce patient harm because it did not reach the patient, either due to chance or to capture before reaching the patient.</li> </ul>
<p><b>Error is the action, Adverse effect is the result.</b></p>		

## Statistics related to medical errors

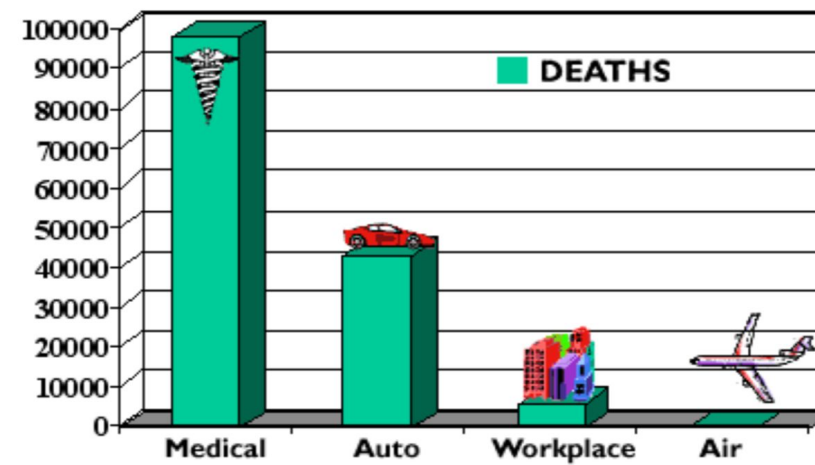
-98,000/365 = 268.49 patients' death a day in the US because of medical error. (from To Err Is Human, 1998-1999)

-Equal to one plane crashes every day!

- Death rate (US)(published 1 or 2 years later):



- Annual accidental deaths:



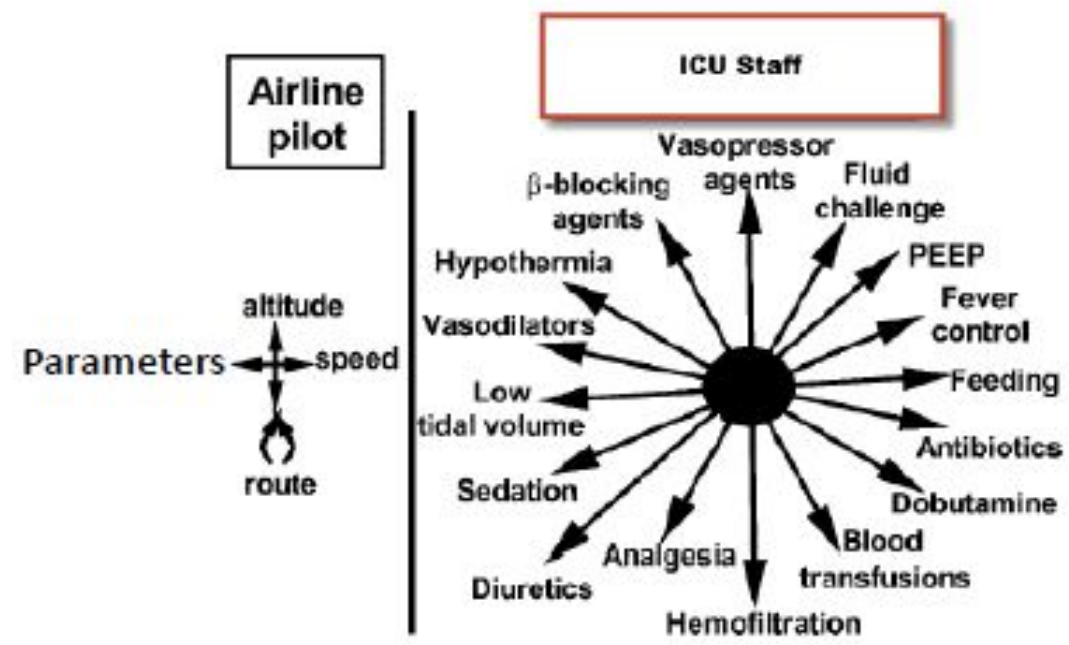
### The magnitude of deaths due to medical errors

### Status quo

- One in 5 patients discharged from hospitals end up sicker within 30 days and half are medication related
- One of 10 inpatients suffers as a result of a mistake with medications cause significant injury or death.
- To Err Is Human:
  - Over 7,000 deaths annually Resulted by medication errors alone, occurring either in or out of the hospital.
  - **Between \$17B and \$29B** : Cost of errors estimated **per year**
- A study of two UK hospitals found that 11% of admitted patients experienced adverse events of which **48%** of these events were most likely preventable if the right knowledge was applied. (highlighting the underutilization of the available information and knowledge during healthcare delivery.)
- The under-utilization of healthcare data- Information- knowledge contributes to:
  - improper clinical decisions,
  - medical errors,
  - underutilization of resources
  - raise in healthcare delivery costs.

(We are suppose to improve patient safety through proper clinical decision and proper utilization of information).
- The Harvard Medical Practice Study was Based on an extensive review of patient charts in New York State, they were able to determine that an adverse event occurred in almost 4 % of the cases (Leape et al. 1991 ). They further determined that almost 70 % of these adverse events were caused by errors and 25 % of all errors were due to negligence.

# Aircraft & ICU



-This is a comparison between ICU staff and Pilots to show the complexity of healthcare, the ICU staff have many parameters that require control in comparison to Airplane pilot.  
 -All parameters and functions are well defined in aircraft while more complicated situations in ICU.

This was described by Lucian Leape:

- Modern healthcare is the **most complex human activity** there is, due to interpersonal relationships between many different clinicians with different expertise and interests, and we haven't figured out how to make that work well.
- We have come to a full stop against a complex environment that resists accepting change on the scale clearly required.<sup>2</sup>

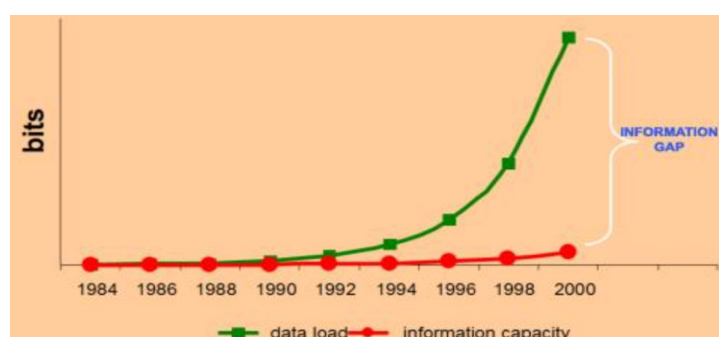


Lucian Leape, MD  
 Founder of the Modern Patient Safety Movement  
 Adjunct professor of health policy at Harvard University "Error in Medicine," published in JAMA, 1994

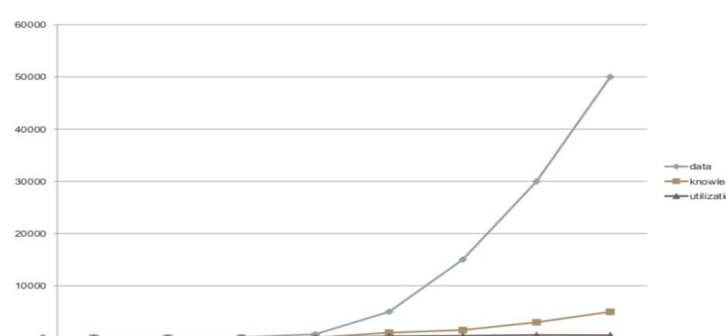
# Safety issues

- Medication errors. **one of the most common medical errors**
- Failure to rescue.
- Readmissions. **1 out of 5 patient** require readmissions in the next 30 days.
- Falls.
- Pressure ulcer. **bad outcome** for hospitalized patients
- Sentinel events. **risky, complicated**
- Hospital acquired infections.
- Under reported incidents.

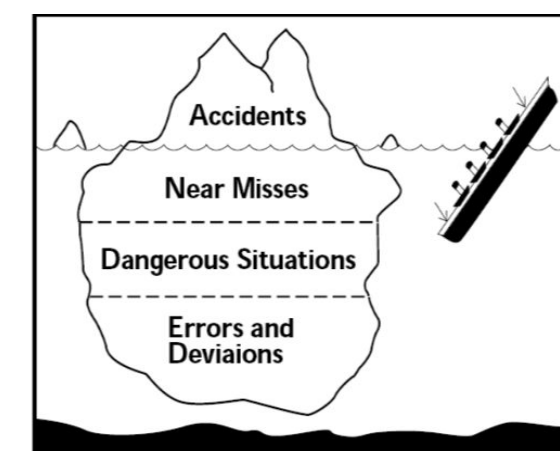
# Flood of information



Huge gap in data acquisition and information → knowledge capacity (Explained before in Research Focus lecture).



Data – knowledge - utilization (We are not fully utilize and interprets the data we receive, medical informatics help us in that).



Battles JB, Kaplan HS, van der Schaaf TW, Shea CE. The attributes of medical event-reporting systems. Arch Pathol Lab Med. 1998;122:231-238.

(Many issues and complex situations underneath that need to be tackled).

# Medications errors

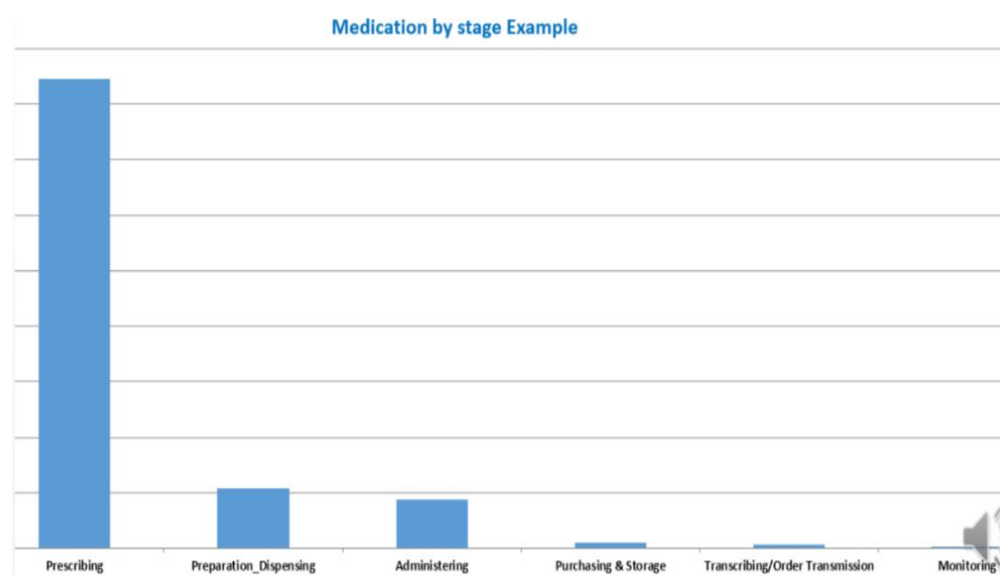
## I.e Medication Process



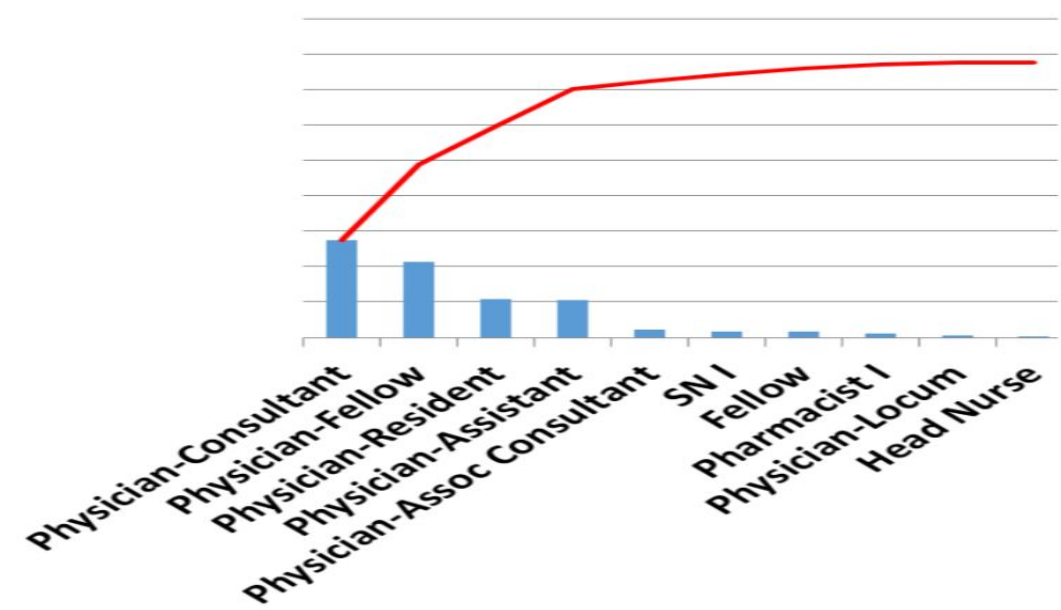
-Medication errors (MEs) are common and considered one of the highest risk factors that threaten patients in hospitals. The majority of these errors are considered common during prescribing medication stage (Shulman et al, 2005).

-Prescribing is the most common phase to face medication errors.

## Where did it happened



## Who did it ?



-The higher the rank is the higher the percentage of committing medication errors.

-Prof. Lucian Leape MD explains this by saying that:

- Incompetent people are, at most, 1% of the problem.
- The other 99% are good people (more competent and have more knowledge) trying to do a good job who make very simple mistakes.
- It's the processes that set them up to make these mistakes (so it maybe the systems making these silly mistakes).

## Error types

- 1-Prevention: Failure to provide prophylactic.
- 2-Diagnostic: Delay in diagnosis.
- 3-Treatment: Wrong medication administration.
- 4-Others: Failure of communication.

## Reporting errors

- Report by British Airways that shows how they were able to improve patient safety.
- We can see that the number of reports doubled from 1994-99 from 4000 to 8000, also they were able to reduce the High and medium risk events from 3% to 0.2%
- This improvement that we see in the graph was because they implemented a new strategy that they were asking everybody to report errors (reporting is a tool that could be used to improve safety).



## Contributing Factors to Medical Errors

1-Lack of communication main aspect leading to many medical errors.

2-Lack of coordination between teams and different department of healthcare services.

3-Lack of proper check.

4-Lack of knowledge.

5-Insecure access of patient information.

6-Look alike medications (438: CPOE helps in differentiating look alike drugs).

7-Inadequate staffing.

8-No / inadequate resources or supplies.

9-Failure to follow up.

10-IPP/standards not followed.

11-Improper assessment/ reassessment.

12-Illegible handwriting (438: COPE prevent this factor).

## CPOE Benefits

≥50% of non-intercepted serious MEs (Medical errors) rate decreased significantly (Bates et al, 1998).

81% reduction of medication errors (Bates et al, 1999).

Decreased patients LOS (Length of stay) (Rothschild, 2004).

Improves medication reconciliation process (Vira et al, 2006).

Improves the prescribers' compliance 438: to standards and guidelines (Cunningham et al, 2008).

Decrease mortality rate by 20% per month (Longhurst et al, 2010).

Improves patients satisfaction (Splading et al, 2011). (438: Many studies support the implementation of CPOE)

## CPOE Negative Impacts <sup>1</sup>

1

Facilitates 22 new types of medication errors (Koppel et al, 2005).

2

Lack of information systems compatibility, configuration and usability with end users **cause different kind of medical errors** (Colpaert and decruyenaere, 2009; Rothschild, 2004).

3

A significant increase of mortality rates post CPOE (Han et al,2005).

## Informatics Benefits

- 1- Tracking System.
- 2- Effective communication.
- 3- Prompt alerts and notifications.
- 4- Decision support system.
- 5- Manage data and store information.
- 6- Secured access and defined privileges.
- 7- Protocol guided and standardized practices.
- 8- Shortened length of patients' hospitalisation due to effective enhancement of antimicrobial management.
- 9- Accessible documentations.
- 10- Legible orders, requests, and reports.
- 11- Integrated care delivery.
- 12- Support lean processes toward more efficient workflows.
- 13- Facilitate productivity measurements and monitoring.
- 14- Reduce medication errors.
- 15- Reinforce clinicians compliance on evidence-based practices.

## Barriers to Tech Implementations

Cost **(36%)** 438: **sustain income to healthcare is not that easy.**

Difficulties in proving quantifiable benefits and ROI **(Return on investment) (32%).**

Vendors inability to provide satisfactory products or services **(27%).**

Lack of standardization with integration and interfaces (HL7 (Health Level 7) , NAHIT (National Alliance for Health Information Technology)).

Level of system evolution needed to meet growing demand on technology advancements.

People, **resistance against using these systems and technologies.**

1. Find more details in reference slide.

## Benefits

You can't manage what you can't measure! - Peter F. Drucker

-Informatics help us much to quantify, measure and evaluate the process and efficacy and whatever we are doing in healthcare.

What medical informatics tools can do?

- Improve communication.
- Make knowledge more readily accessible **438: and utilized.**
- Assist with calculations.
- Perform checks in real time **438: and alerts.**
- Assist with monitoring.
- Provide decision support.
- Require key pieces of information (dose, e.g).



## The Accenture Study

- The Accenture survey asked physicians about the extent to which they used **12** different “functions” of EMR (Electronic Medical Record) and HIS (Hospital Information System) – such as electronic entry of patient notes, electronic referrals, electronic ordering and prescribing and communicating with other physicians or patients via secure email.
- The results showed that physicians who are routine users of a wider range of healthcare IT functions have a more positive attitude towards these technologies. On average across all the countries, as physicians start to use more “functions” –the more positive they are about the benefits.
- Majority of doctors surveyed believe that healthcare IT does provide some common top benefits, including:

Better access, quality data for clinical research (70.9%).

Improved coordination of care (69.1 %).

Reduction in medical errors (66%).

Average score of (61%).

In England, physicians perceived other healthcare IT benefits to include: increased speed of access to health services to patients (55.3 %), reduced number of unnecessary interventions and procedures (52 %).

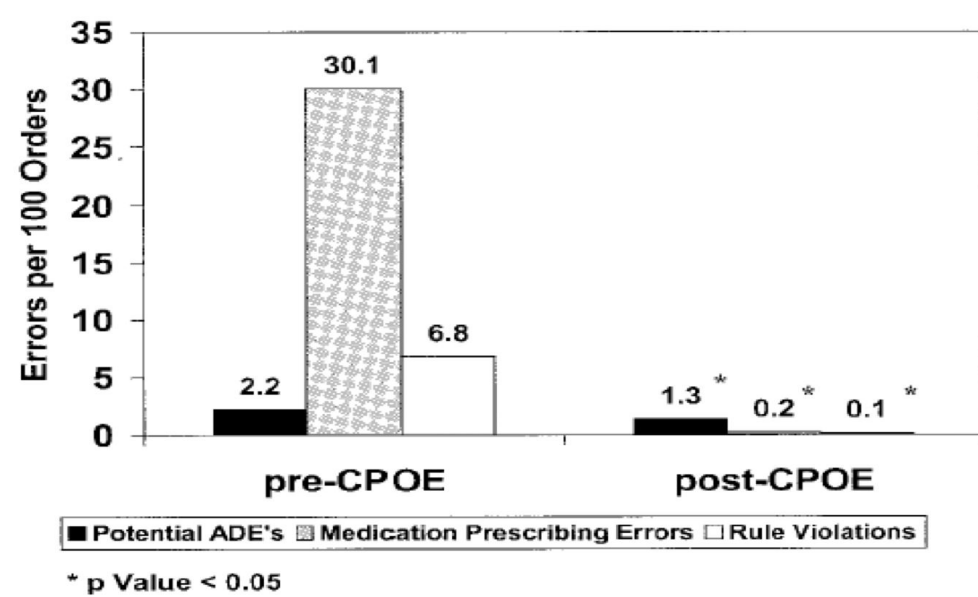


Information assessed	No. of prescription with omission (%)
Patient name	0 (0.0%)
Hospital no.	0 (0.0%)
Sex	64 (32.2%)
Age	132 (66.3%)
National ID	171 (85.9%)
Diagnosis	39 (19.6%)
Generic name	85 (42.7%)
Frequency	3 (1.5%)
Dose	20 (10.1%)
Duration	2 (1.0%)
Route of administration	29 (14.6%)
Physician's name	12 (6.0%)
Extension and bleep	25 (12.6%)
Physician's signature	7 (3.5%)
Date	12 (6.0%)
Clinic name	1 (0.5%)
Total of prescriptions were evaluated: 199 (100%)	

-We can conclude that handwritten prescription is less in compliance compared with e-prescription

### Example CPOE reduce errors

Potts studied ADE (Adverse Drug Events) rates in 13,828 medication orders before/after CPOE implementation at Vanderbilt Children's PICU:



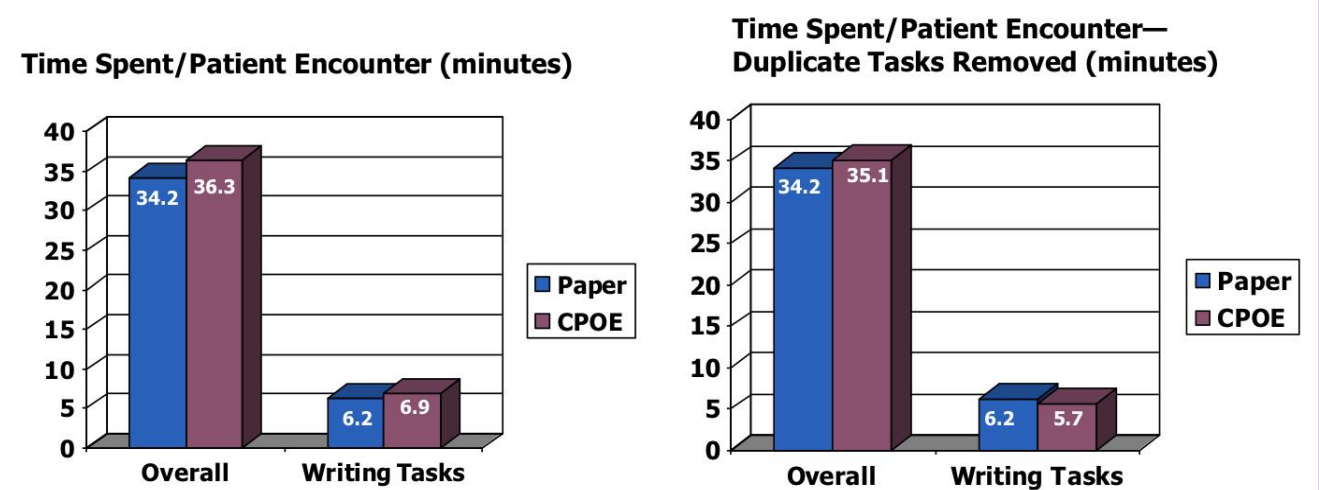
Potts AL, Barr FE, et al. Pediatrics. 2004 Jan;113(1 Pt 1):59-63.

After implementation potential ADE's, medication prescribing errors and rule violations were reduced.

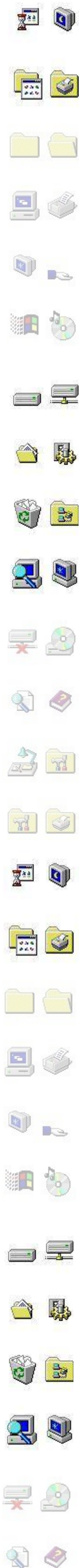
Scale*	No. of prescription (%)		% of average scale
	Pharmacist A	Pharmacist B	
1	195 (98.0%)	156 (78.4%)	88.2
2	3 (1.5%)	27 (13.6%)	7.5
3	1 (0.5%)	16 (8.0%)	4.3
<b>Total</b>	199 (100%)	199 (100%)	100%
<b>Total of illegible and partially illegible !</b>	4 (2.0%)	43 (21.6%)	11.8%

\*1= Legible, 2= legible with effort, 3= illegible  
 ^ pharmacist 1= expert  
 ~ pharmacist2= new  
 ! scale of 2 and 3

### Does CPOE takes more time?



Evidence shows that CPOE adds less than one minute to the time physicians spent writing orders and overall only added 1-2 minutes per patient encounter. As physicians gained experience with the system, the time for orders actually decreased. (Overhage JM, et al J Am Med Informatics Associ 2001;8:361-371)



# Healthcare

- The healthcare industry is different from, other industries. We are talking about healing and dealing with human.
- NOT a process based, and can't just apply systems and global optimization techniques in the traditional, industrial engineering sense to the healthcare industry.
- Health is something that is very difficult to measure nor to quantify.
- “The science and technologies involved in healthcare - the knowledge, skills, care interventions, devices and drugs - have advanced more rapidly than our ability to deliver them safely, effectively, and efficiently” 438: they are continuous in improvement. IOM. 2001. Crossing the Quality Chasm: A New Health System for the 21st Century.

## Informatics Limitations

- 1 Limited funds.
- 2 Limited studies on the benefits of informatics on patient safety.
- 3 Lack of visionary leaders. 438: Could lead to a complete miss!
- 4 Resistance to change.
- 5 Inadequate hardware logistics.
- 6 Under developed IT infrastructure (In healthcare institutions)
- 7 Facilitate errors due to inappropriate / poor designing of systems customisations and automations of processes.

## Technology Adds New Concerns

Poor designed systems due to lack of proper planning and early involvement of clinicians.

Inflexible processes.

Changes in workflows.

Ease of use and interface with the various technologies.

Power outage + no backups.

Risk adjustment.

Overload data and system slowness.

he primary kinds of errors caused by health information systems, those related to entering and retrieving information and those related to communication and coordination. For example, many interfaces are not suitable for settings that are highly interruptive (e.g., a cluttered display with too many options), / information entry screen that is highly structured and requires completeness of entry can cause cognitive overload. Ash, Stavri, and Kuperman ( 2003b ).



## Dr. Watson's the IBM's supercomputer

- The computer can analyze about 200 million pages of data in less than three seconds, which could allow physician to more accurately diagnose and treat complex cases. Physicians could, for example, use Watson to consult medical records and the latest research findings for recommendations on treatment.
- This is one example on how AI can aid physicians on making the right diagnosis, improve outcome of healthcare & reduce medical errors.
- FDA Approved?



## Just a culture principle

- **Values** and expectations-what is important to the organization.
- **System** design and continual redesign of system and address processes and systems so it does not happen to someone else.
  - Coaching and open environment 438: better communication coaching with teams or organization trying to help others to overcome struggling.
- **Peer to peer** coaching where helping one another to stay safe and make sure things are being done correctly.
  - Just culture algorithms can help
- Patient safety needs to be viewed as a **strategic** priority.
- The entire hospital needs to be focused on patient safety if a culture of safety is to be established.

Dekker S. Just Culture: Balancing Safety and Accountability. Burlington, VT: Ashgate Publishing;; 2008.

Marx D. Patient Safety and the Just Culture: A Primer for Health Care Executives. New York, NY: Trustees of Columbia University;; 2001.

## Examples

### On what to have in our hospitals

- Having a patient safety **plan**.
- Doing an **annual** report card (able to summarize and review safety issues and considerations in the hospital), use **trigger** tools.
- Have a patient safety committee (with clear roles and responsibilities).
- Many also have separate medication management committee from safety committee (more **attention**).
- **Education** for staff to make sure they know near misses must be included in definition of medical error and what policies and procedures they should follow in such situations.
- Doing patient safety walkabout **rounds** by senior leaders (look at the readiness and preparedness of departments with respect to safety in hospitals).

## Key success of a culture of safety

- **Acknowledgment** of the high-risk nature of an hospital's activities and the determination to achieve consistently safe operations.
- A **blame-free** environment where individuals are able to report errors or near misses without fear of reprimand or punishment.
- **Encouragement** of collaboration across ranks and disciplines to seek solutions to patient safety problems.
- Organizational **commitment** and resources to address safety concerns (should be a strategic objective for any organization and should be number 1 priority to any healthcare organization).

## Event 'management'

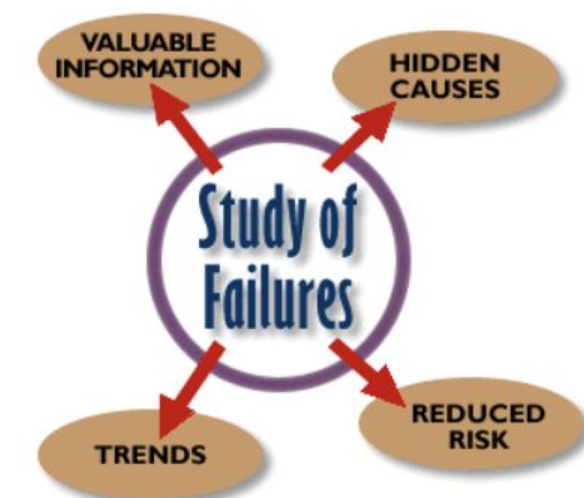
1 Prevent failure but if you can't, make failure **visible** and report it so others can work on it

2 Prevent **adverse** effects of failure or **mitigate** the adverse effects if they are happening.

3 Learn from all events 438: most important

## Errors provide useful information

- We can learn more from our failures than from success.
- Our processes can be improved when studied.
- "Give me a fruitful error anytime, full of seeds, bursting with its own corrections. You can keep your sterile truth to yourself." *Vilfredo Pareto*.
- 438: Be able to understand trends and hidden causes and analyze valuable information available and then reduce errors in future.



## Which Patients Are Most at Risk of Medication Error ?

1	Patients on <b>multiple</b> medications.
2	Patients with <b>another</b> condition, e.g. renal impairment, pregnancy.
3	Patients who <b>cannot communicate</b> well.
4	Patients who have <b>more than one doctor</b> .
5	Patients who do not take an <b>active role</b> in their own medication use.
6	<b>Children</b> and babies (dose calculations required).

## Systems process changes structure, environment and people

Simplification	Environment/product improvements
Standardization (ex: same color code everywhere)	Training (is the key success)
Process design includes prompts	Teamwork
Elimination of sound/look-alikes (eliminate confusion)	Communication

## Select resources for patient safety information

<b>Agency for Healthcare Research and Quality</b>	<a href="http://www.ahrq.gov">www.ahrq.gov</a>
<b>Institute of Medicine of the National Academies</b>	<a href="http://www.iom.edu">www.iom.edu</a>
<b>The Joint Commission</b>	<a href="http://www.jointcommission.org">www.jointcommission.org</a>
<b>Institute for Safe Medication Practices</b>	<a href="http://www.ismp.org">www.ismp.org</a>
<b>National Patient Safety Foundation</b>	<a href="http://npsf.org/">http://npsf.org/</a>
<b>JCAHO "Speak Up" program</b>	<a href="http://www.jcaho.org/general+public/patient+safety/speak+up/index.htm">http://www.jcaho.org/general+public/patient+safety/speak+up/index.htm</a>

-Some organizations that are concerned with pt safety so if you are interested you can read more about it through these links.

# Reference Notes

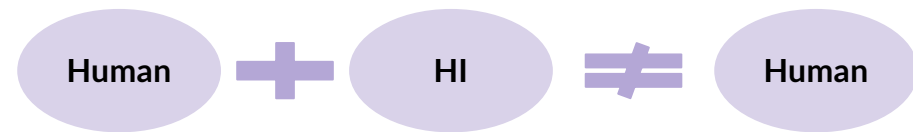
- in hindsight, it is exceedingly difficult to recreate the situational context, stress, shifting attention demands and competing goals that characterized a situation prior to the occurrence of an error. This sort of retrospective analysis is subject to hindsight bias.
- **Hindsight bias** masks the dilemmas, uncertainties, demands and other latent conditions that were operative prior to the
- Reason ( 1990 ) introduced an important distinction between **latent** and **active failures** .
- **Active failure** represents the face of error. **The effects of active failure are immediately felt.**
- In healthcare, active errors are committed by providers such as nurses, physicians, or pharmacists who are actively responding to patient needs at the “sharp end”.
- **The latent conditions** are less visible, but equally important. Latent conditions are enduring systemic problems that may not be evident for some time, combine with other system problems to weaken the system’s defenses and make errors possible.
- There is a lengthy list of potential latent conditions including poor interface design of important technologies, communication breakdown between key actors, gaps in supervision, inadequate training, and absence of a safety culture in the workplace—a culture that emphasizes safe practices and the reporting of any conditions that are potentially dangerous.
- We can further classify errors in terms of **slips** and **mistakes** (Reason 1990 ).
- A **slip** occurs when the actor selected the appropriate course of action, but it was **executed inappropriately**.
- A **mistake** involves an **inappropriate course of action** reflecting an erroneous judgment or inference (e.g., a wrong diagnosis or misreading of an x-ray).
- Mistakes may either be
  - knowledge-based owing to factors such as incorrect knowledge.
  - or they may be rule-based, in which case the correct knowledge was available, but there was a problem in applying the rules or guidelines.
- **Medical devices:** include any healthcare product, excluding drugs, that are used for the purpose of prevention, diagnosis, monitoring, treatment or alleviation of an illness.
- There is considerable evidence that suggests that **medical devices can also cause substantial harm** .
- It has been reported that more than one million adverse medical device events occur annually in the United States.
- Although medical devices are an integral part of medical care in hospital settings, they are complex in nature and clinicians often do not receive adequate training (Woods et al. 2007 ).
- In addition, many medical devices such as such as smart infusion pumps, patient controlled analgesia (PCA) devices, and bar coded medication administration systems **have been partially automated and offer a complex programmable interface.**
- Although this affords opportunities to facilitate clinical care and medical decision making, it may add layers of complexity and uncertainty.

## CPOE **Negative** Impacts:

- The errors were classified into two broad categories: (1) information errors generated by fragmentation of data and failure to integrate the hospital’s information systems and (2) human machine interface flaws reflecting machine rules that do not correspond to work organization or usual behaviors.
- It is a well-known phenomenon that users come to rely on technology and often treat it as an authoritative source that can be implicitly trusted. This can result in information/fragmentation errors.
- Medication discontinuation failures are a commonly documented problem with CPOE systems.
- The system expects a clinician to (1) order new medications and (2) cancel existing orders that are no longer operative.
- Frequently, clinicians fail to cancel the existing orders leading to duplicative medication orders and thereby increasing the possibility of medical errors. Perhaps, a reminder that prior orders exist and may need to be canceled may serve to mitigate this problem
- Particular usability problems were associated with the occurrence of error in entering medication. For example, the problem of inappropriate default values automatically populating the screen was found to be correlated with errors in entering wrong dosages of medications.

## Take Home Messages

- Safety is everyone's job!
- Learn from previous errors.
- Report incidents to learn not to blame.
- Errors are not only human related but the majority are system failure!
- Technology has been designed by human factors so systems could have the risk of human factors being embedded within!!



Human + health informatics tools and technologies are better than human alone.

## Summary

<p><b>Medical Informatics</b></p>	<ul style="list-style-type: none"> <li>• Medical informatics is the application of computers, communications and information technology and systems to all fields of medicine - medical care, medical education and medical research.</li> <li>• Medical informatics is a rapidly developing scientific field that deals with the storage, retrieval, and optimal use of biomedical information, data, and knowledge for problem solving and decision making.</li> </ul>
<p><b>Safety in healthcare</b></p>	<ul style="list-style-type: none"> <li>• IOM,2000: Freedom from accidental injury due to medical care, or medical errors.</li> <li>• Vincent,2011:The avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of healthcare.</li> <li>• WHO: Patient Safety defined as; The prevention of errors and adverse effects to patients associated with health care.</li> </ul>
<p><b>Errors vs. adverse effect</b></p>	<ul style="list-style-type: none"> <li>• Error is the action, Adverse effect is the result.</li> </ul>
<p><b>Safety issues</b></p>	<ul style="list-style-type: none"> <li>• Medication errors. one of the most common</li> <li>• Failure to rescue</li> <li>• Readmissions. 1 out of 5 patient require readmissions in the next 30 days.</li> <li>• Falls</li> <li>• Pressure ulcer. bad outcome for hospitalized patients</li> <li>• Sentinel events. risky, complicated</li> <li>• Hospital acquired infections</li> <li>• Under reported incidents</li> </ul>
<p><b>Error types</b></p>	<ol style="list-style-type: none"> <li>1- Prevention : Failure to provide prophylactic</li> <li>2- Diagnostic : Delay in diagnosis</li> <li>3- Treatment : Wrong medication administration</li> <li>4- Others :Failure of communication</li> </ol>
<p><b>Key success of a culture</b></p>	<ul style="list-style-type: none"> <li>• <b>Acknowledgment</b> of the high-risk nature of an hospital's activities and the determination to achieve consistently safe operations.</li> <li>• A <b>blame-free</b> environment where individuals are able to report errors or near misses without fear of reprimand or punishment.</li> <li>• <b>Encouragement</b> of collaboration across ranks and disciplines to seek solutions to patient safety problems.</li> <li>• Organizational <b>commitment</b> and resources to address safety concerns.</li> </ul>

# Summary

<b>Contributing Factors to Medical Errors</b>	Lack of communication - Lack of coordination <b>between teams and different department of healthcare services</b> - Lack of proper check - Lack of knowledge - Inadequate staffing - No / inadequate resources or supplies - Insecure access of patient information - Look alike medications - Failure to follow up - IPP/standards not followed - Improper assessment/ reassessment - Illegible handwriting
<b>Which Patients Are Most at Risk of Medication Error ?</b>	Patients on <b>multiple</b> medications. Patients with <b>another</b> condition, e.g. renal impairment, pregnancy. Patients who <b>cannot communicate</b> well.
<b>Event 'management'</b>	1- <b>Prevent</b> failure but if you can't, make failure <b>visible</b> and <b>report it so others can work on it</b> 2- Prevent <b>adverse</b> effects of failure or <b>mitigate</b> the adverse effects. 3- <b>Learn</b> from all events
<b>Informatics limitations</b>	Limited funds Limited studies on the benefits of informatics on patient safety Lack of visionary leaders. Facilitate errors due to inappropriate / poor designing of systems customisations and automations of processes
<b>CPOE Benefits</b>	≥50% of none- intercepted serious MEs rate decreased significantly 81% reduction of medication errors Decreased patients LOS Improves patients satisfaction
<b>CPOE Negative Impacts</b>	1- Facilitates 22 new types of medication errors. 2- Lack of information systems compatibility, configuration and usability with end users. 3- A significant increase of mortality rates post CPOE.
<b>Barriers to Tech Implementations</b>	Cost ( <b>36%</b> ) Vendors inability to provide satisfactory products or services ( <b>27%</b> ). Level of system evolution needed to meet growing demand on technology advancements.
<b>Technology Adds New Concerns</b>	1- Inflexible processes 2- Power outage + no backups 3- Changes in workflows 4- Ease of use and interface with the various technologies 5- Overload data and system slowness 6- Poor designed systems due to lack of proper planning and early involvement of clinicians.
<b>Examples on what to have in our hospitals</b>	<ul style="list-style-type: none"> <li>● Having a patient safety <b>plan</b>.</li> <li>● Doing an <b>annual</b> report card, use <b>trigger</b> tools.</li> <li>● Have a patient safety committee.</li> <li>● Many also have separate medication management committee from safety committee (more <b>attention</b>).</li> <li>● <b>Education</b> for staff to make sure they know near misses must be included in definition of medical error.</li> <li>● Doing patient safety walkabout <b>rounds</b> by senior leaders.</li> </ul>
<b>Systems process changes structure, environment and people</b>	Simplification - Standardization should <b>be everywhere is the same</b> - Environment/product improvements - Training - Process design includes prompts - Teamwork - Elimination of sound/look-alikes - Communication



# MCQs

**1- According to WHO, "The prevention of errors and adverse effects to patients associated with health care." Is the definition of ?**

- A- Patient safety
- B- Hospitals safety
- C- Medications error
- D- Medical informations

**2- A nurse was passing out her scheduled medications and right before she was about to give a patient their pills, she realized she grabbed the wrong medication when going through the 'five rights'.**

- A- Adverse drug event
- B- Preventable adverse drug event
- C- Potentially adverse drug event
- D- Near miss

**3- What is the most common phase to face medication errors?**

- A- Administration
- B- Dispensing
- C- Prescribing
- D- Monitoring

**4- Which of the following patients at risk of medication error?**

- A- Patients who have one doctor.
- B- Patients who can communicate well.
- C- Patients on multiple medications.
- D- Patients who take an active role in their own medication use.

**5- Which of the following considered as a contributing factor to medical errors?**

- A- Failure to follow up.
- B- Standardization.
- C- Change in workflows.
- D- Tracking system.

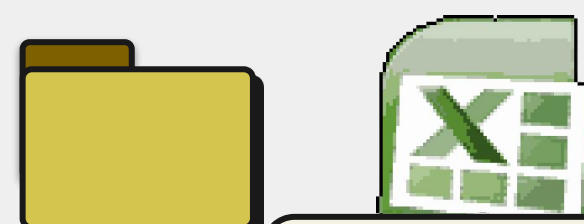
**6- Which of the following is an informatics limitations?**

- A- Limited funds.
- B- Various studies on the benefits of informatics on patient safety.
- C- Developed IT infrastructure.
- D- Adequate hardware logistics.

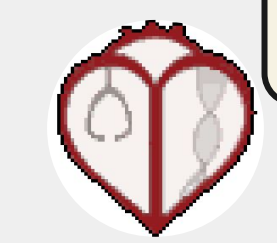
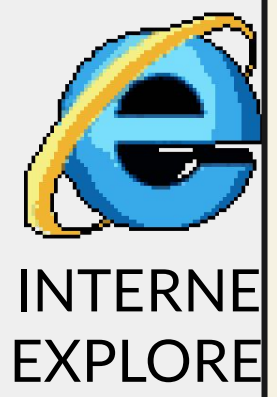
## Answers key

1- A    2- D    3- C    4- C    5- A    6- A



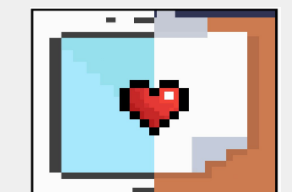


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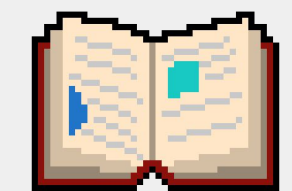


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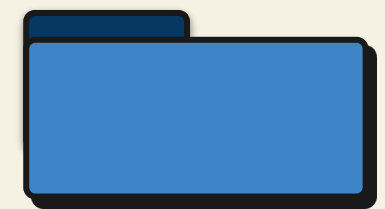
Lecture 6



Lecture 7



Lecture 8



Lecture 9



FILE 2

Lecture 7

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*Thank you all..!<3*