Role of EHR in providing quality patient-centric care

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About Me

- Family Physician (General Practitioner) – MBBS graduate (1986) from Medical College, Bengal
- MBA International Management from Belgium (1997) – Capstone thesis “Telemedicine – Its place and it’s use”
- Worked as Medical Administrator in Hospitals (1995 – 2002) and full-time in healthcare informatics field in IT companies since 2002
- Functional (business) architect
- Over 31 years of experience in the fields of medicine, hospital management and healthcare informatics

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- Previously
  - President (2010 – 2011), Indian Association for Medical Informatics
  - Honorary Secretary (2010 – 2013), Indian Medical Association, Faridabad Branch
  - Honorary Secretary (2015), Indian Medical Association, Haryana State Branch
  - Member, PRSG for Distributed EHR project of CDAC-Pune, Department of IT, Government of India
  - Member, iHIND Project, National Knowledge Commission, Government of India
  - Worked in iSOFT plc, Satyam, Oracle, GE Healthcare
  - Retired from TCS as Head – Health Informatics in August 2017

Currently

- Running own organisation focusing on research as Founder & CEO, BC2RI
- Member, Standing Committee of Indian Medical Association for IT (All India)
- Member, EMR Standards, Ministry of Health & Family Welfare, Government of India
- Member, MHD 17/TC 215, BIS
- Vice Chairman Election Commission (2017 – 2019), Indian Medical Association, Haryana State Branch
- Visiting Faculty, MBA Healthcare IT and Analytics, Chitkara University since early 2018

Publications

- Books (International)
  - Introduction to SNOMED CT, Springer (2016)
  - A DIY Guide to Telemedicine for Clinicians, Springer (2017)
- Numerous articles in national and international journals

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Medical Records

Electronic Health Record (EHR)

The **Electronic Health Record** is a longitudinal electronic record of patient health information generated by one or more encounters in any care delivery setting

(*As defined by Health Information and Management Systems Society – HIMSS*)

In simple terms, what is an EHR & an EMR?

EHR

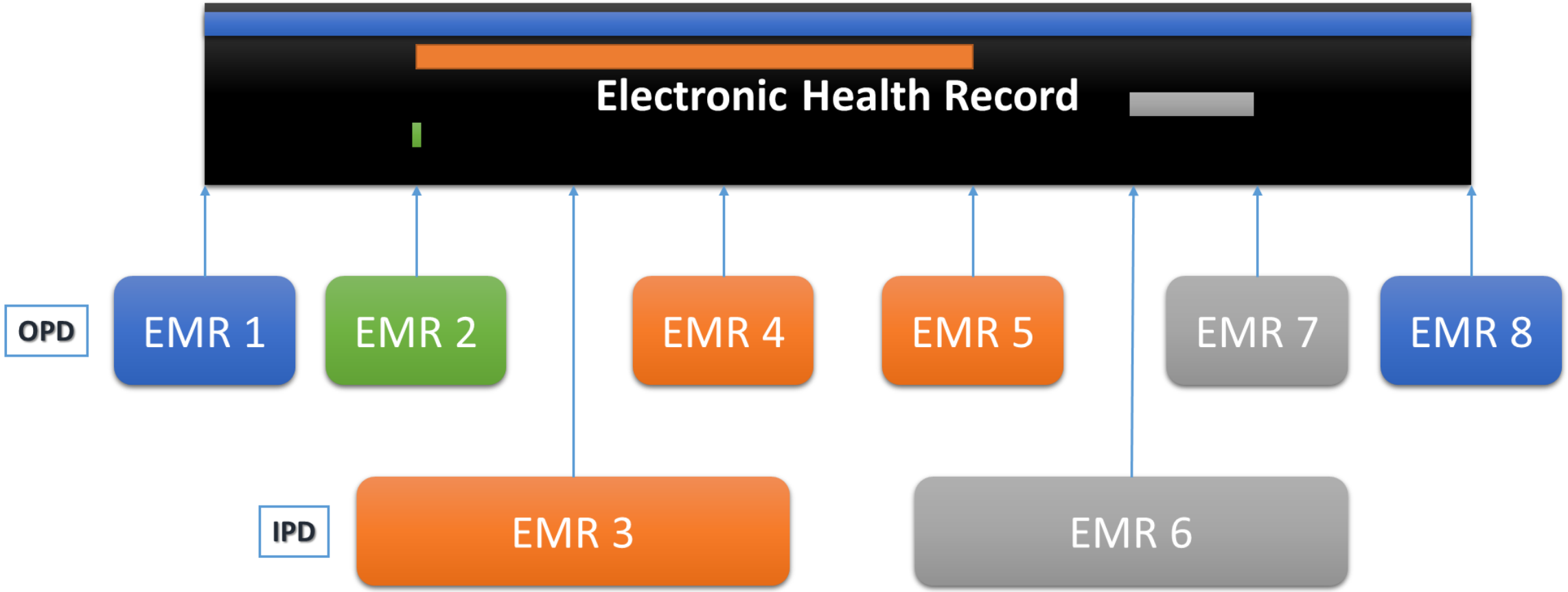
A longitudinal record of a person's health composed by temporally arranging ***all clinical encounter records from the very first to very latest***

- "Womb to tomb"
- "Cradle to grave"

EMR

A record composed during the process of a ***single clinical encounter*** between a patient and his clinical care provider in any healthcare delivery setting

- Outpatients
- Inpatients
- Casualty/Accidents & Emergency


Electronic Health Record
OPD
EMR 1
EMR 2
EMR 4
EMR 5
EMR 7
EMR 8
IPD
EMR 3
EMR 6

Why keep medical records?

- For reuse
  - **As a source of historical data & information**
  - **To identify deviations from the expected**
  - **Information exchange among providers**
  - As a record standard preventive measures
  - To anticipate future health problems
  - As basis for clinical research – trials and observational
- ***As legal evidence*** – medical errors are the third largest reasons for death in the US (BMJ, May 2016)

EMR and Knowledge Sources

- The most effective time to provide access to knowledge is when the care provider is browsing the patient record
- A query can be formulated in a context-sensitive manner with respect to the patient record, thus anticipating the physician's needs
- Analysis in terms of epidemiology including those that are evidence based and predictive analytics – most helpful if conducted in real-time

Clinical Science is Empirical

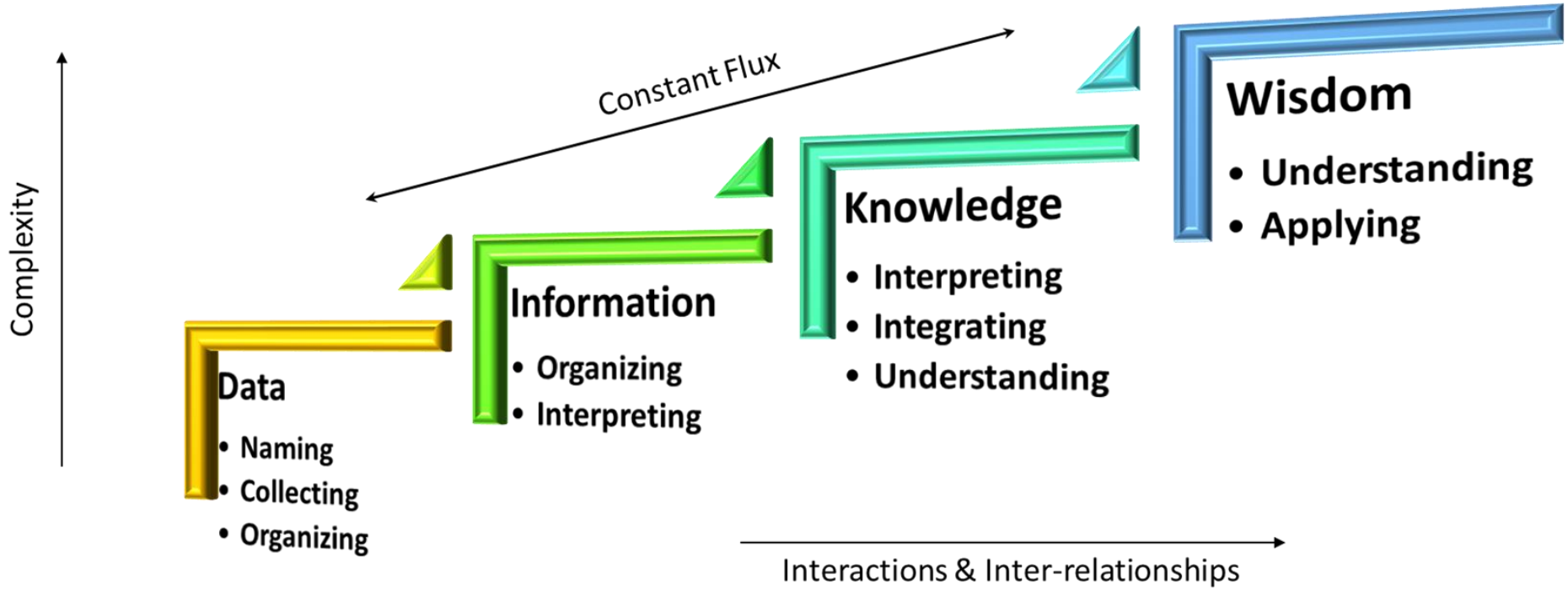
- The word **empirical** denotes information gained by means of *observation*, *experiment*, or *experience*
  - **Empirical data** is data that is produced by experiments like clinical data analysis or through observations like clinical observations
- This is as opposed to the word **theoretical** that depends on **hypotheses**

History

- First known record by Hippocrates in 5th century BC
- Prescribed goals were:
  - *Accurately reflect* the course of disease
  - *Indicate the probable* cause of disease – i.e., basically support conclusions and justify course of action adopted
- The Sleepwalking Scene from Macbeth by William Shakespeare, Act V, Scene 1, ll 36, 37…

Doctor: Hark! she speaks: I will set down what comes from her, to satisfy my remembrance the more strongly

Thus, medical records hold untold wealth of information within them all waiting to be unleashed…



Nelson's Data to Wisdom…

Sources of clinical data

- (Electronic) Health Records
- (Electronic) Medical Records
- Order Entry Systems & Prescriptions
- Progress Notes
- Investigation Results & Reports
- Medical Devices : Monitors & Wearables
- Nursing Notes
- Treatment & Discharge Summaries
- Immunisation Records
- Dental Records
- Paramedical Records
- Psychiatry Records
- Referral Notes
- Health Worker Notes

Long-term Use

- Clinical Research
- Data mining → Dashboards
- Enable Evidence Based Practise

- Case Based Reasoning
- Enable & Refine Clinical Care Pathways
- Design individualized clinical care

Clinical Decision Support In Real-time

- Rules-based
  - Preset
  - Custom-set
- Alerts for findings
  - Above value
  - Below value
  - Within range
  - Missed observations
- Evidence-based
- Prompts
  - Diagnostic
  - Prognostic
- Warnings
  - Interactions
  - Contra-indications
  - Repetitions
- Substitution
  - By a more cost-effective intervention

Role of Healthcare analytics in improving patient outcomes and paring costs

According to IBM, analytics in healthcare can play a key role in reducing high-risk healthcare problems and usher in evidence based personalized medicine

Some of the key areas addressed by healthcare analytics are:

- Bringing personalization and engagement into healthcare via patient centricity
- Analytics as an enabler for evidence-based medicine and disease prevention
- Building a pro-active, sustainable healthcare system and usher in accountability and transparency
- Providing supply forecasting, dynamic budgeting and reducing overall cost
- Promoting data-centricity and data literacy

Some Measures…

Examples of what can be calculated

OPD Records & Discharge Summaries – Some Indices

- Total no. of Records/Summaries
- Total Length of Stay, ALOS
  - By Disease
  - By Speciality

- Total no. of Records & %-ages of Records with specific items present
  - With at least one entry
  - With age entered
  - With gender entered
  - With complaints entered
  - With physical exam entered
  - With diagnosis entered
  - With plan entered

OPD Records & Discharge Summaries – Some Indices

- Total no. of Patients
  - By Gender
  - By Age group
  - By Age group & Gender
  - By Marital status
  - By Employment status
  - By Occupational status
  - By Earning status
- Disease Prevalence
  - By Gender
  - By Age group
  - By Age group and Gender
  - By Other Demographics

OPD Records & Discharge Summaries – Some Indices

- Total no. of Investigations
  - By Disease
  - By Clinical Finding
- Total no. of Medications/Surgeries
  - By Disease
  - By Clinical Finding
  - By Investigation Findings
- Total no. of records where admission/preliminary diagnosis match discharge/final diagnosis

Evidence Based Medicine

- Likelihood ratios
  - By Disease
  - By Clinical Finding & Disease
  - By Past Investigation Findings
- Numbers Needed to Treat/Harm
  - By Disease
  - By Clinical Finding & Disease
  - By Past Investigation Findings

Correlation Studies

- Clinical Findings
  - With Patient Status at discharge
  - With re-admission within 30 days
- Treatment plan
  - With Patient Status at discharge
  - With Patient Status at follow up visit
- ALOS
  - With Clinical Findings (including Patient Status at discharge)
  - With Patient Status at follow up visit
- ALOS and re-admission within 30 days of discharge
  - With Clinical Findings (including Patient Status at discharge)
  - With Patient Status at follow up visit

Thank You!

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