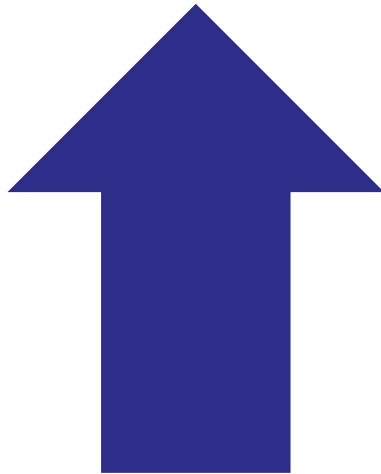# What does EMRAM enable for better healthcare quality?
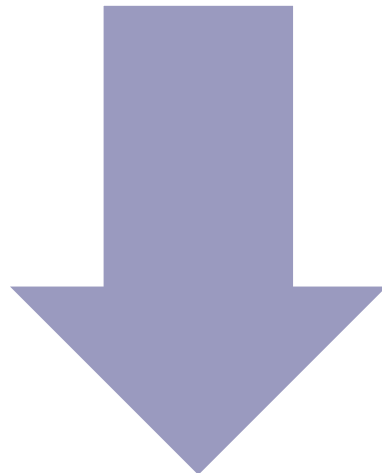
HIMSS Eurasia

İlker KÖSE, PhD
Country Director of HIMSS Analytics, Turkey
Istanbul Medipol University, Turkey

25 October 2018
Istanbul, Turkey

I'm supposed to do…

Life expectancy

Accessibility

Equality

Quality

Satisfaction

Productivity

Deaths

Errors

Mal practices

Expenses

I have to use to make decisions based on…

- Statistics

- Reports

- Scientific papers

- Business Intelligence Systems

- …

I can use some tools for management…

- Policy
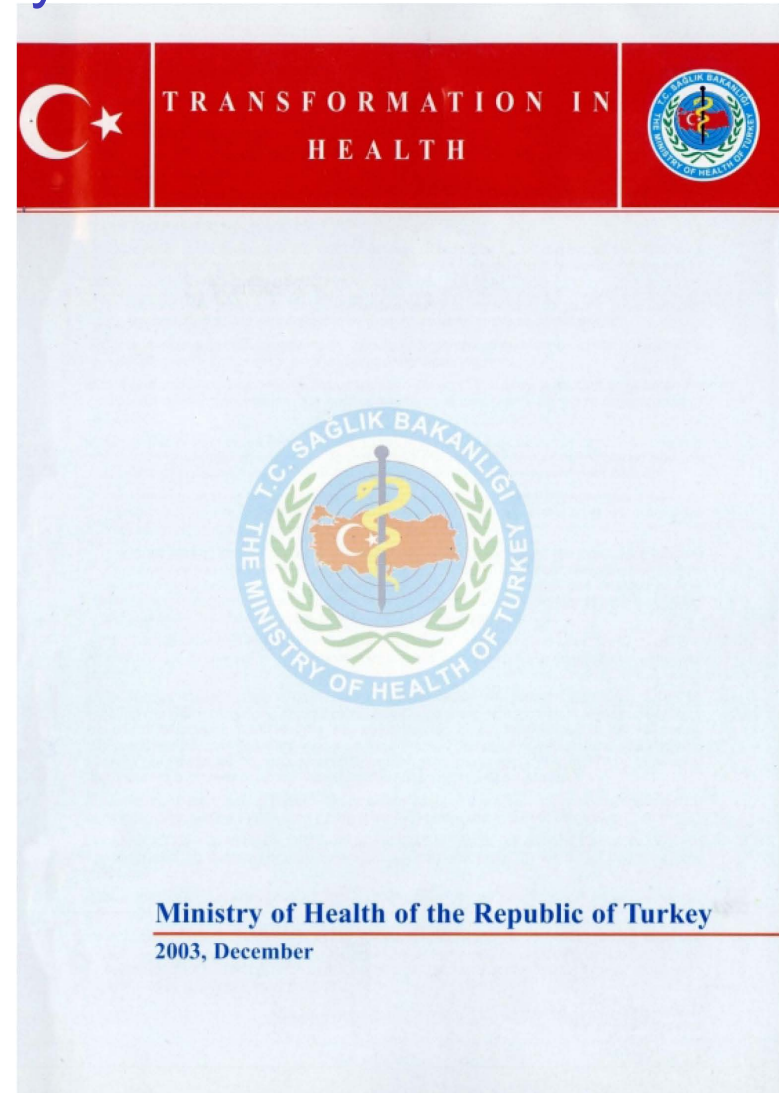- Strategic Plan
- Balanced Score Cards
- …

What about measuring the progress?

- Difficulties on having overall perspective

- Fragmented nature of most scientific studies on the field

- Statistical values cannot represent what is exactly going on within the facilities

- Problem of "pretending do"!

- Culture vs. strategy!

- Vertical organizational structure vs. horizontal and transient processes

- …

Health Transformation Program of Turkey

- The story was started with Health Transformation Program in 2003

Turkish Model in Using EMRAM for Digital Hospital Transformation

- In the Strategic Plan of MoH for 2013-17, one of the aims was as follows:

  – *«Creating and expanding the **digital hospital** concept in the facilities affiliated to the Ministry and its affiliates»*
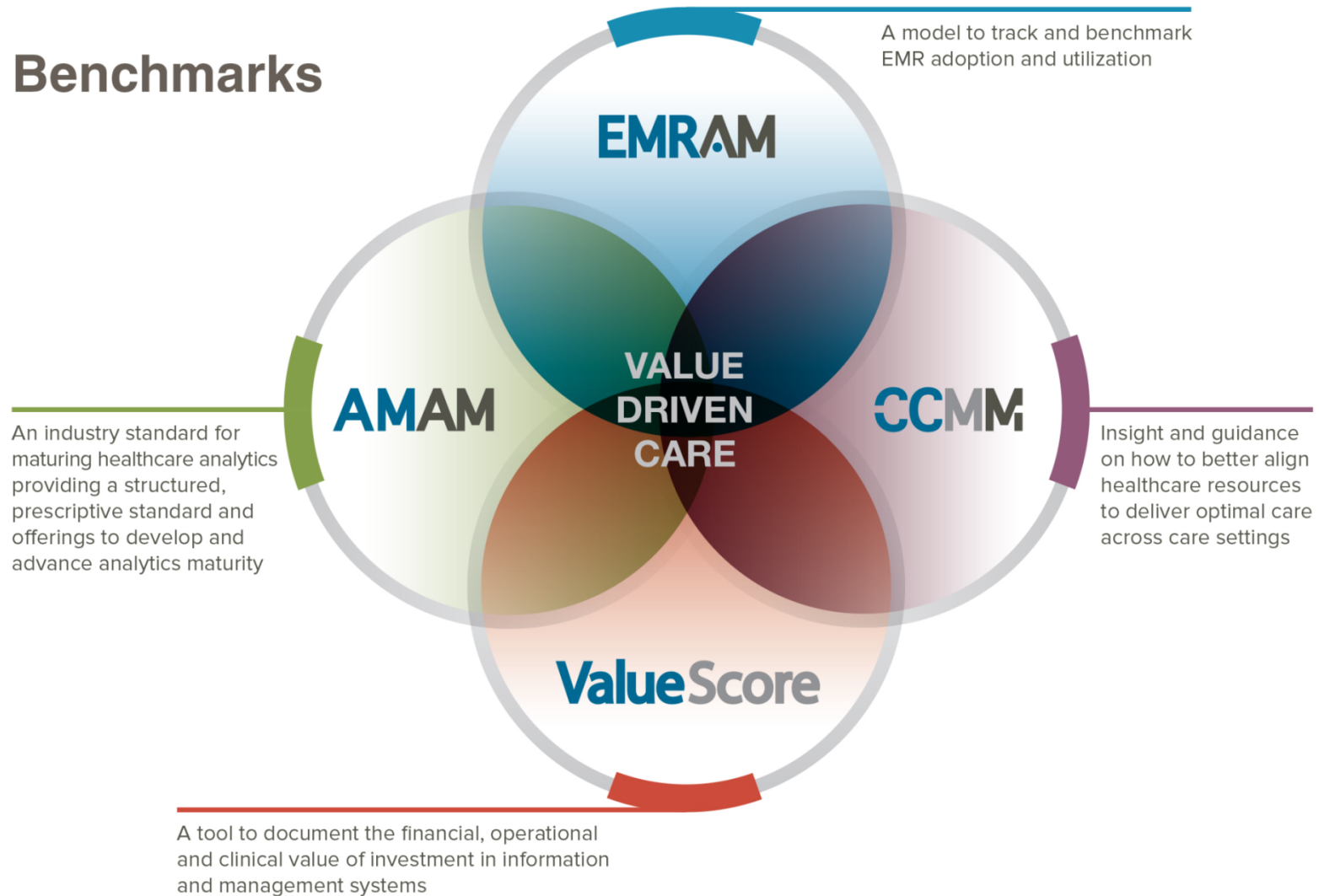
- What happened then?

Turkish Model in Using EMRAM for Digital Hospital Transformation

- The first public hospital got EMRAM Stage 6 certificate in **May of 2013**

- A workshop was organized with the attendance of 10 public hospitals

- A collaboration protocol was signed by MoH and HIMSS in **December of 2013** for **5 years**.

What does a maturity model do?

- Gives a patient centric overall perspective

- Requires interoperability rather than stand alone perfect systems

- Focuses on results rather than steps.

Benchmarks

EMRAM — A model to track and benchmark EMR adoption and utilization

AMAM — An industry standard for maturing healthcare analytics providing a structured, prescriptive standard and offerings to develop and advance analytics maturity

CCMM — Insight and guidance on how to better align healthcare resources to deliver optimal care across care settings

VALUE DRIVEN CARE

ValueScore — A tool to document the financial, operational and clinical value of investment in information and management systems

Maturity models of HIMSS

STAGE	HIMSS *Analytics* EMRAM EMR Adoption Model Cumulative Capabilities
7	Complete EMR; External HIE; Data Analytics, Governance, Disaster Recovery, Privacy and Security
6	Technology Enabled Medication, Blood Products, and Human Milk Administration; Risk Reporting; Full CDS
5	Physician documentation using structured templates; Intrusion/Device Protection
4	CPOE with CDS; Nursing and Allied Health Documentation; Basic Business Continuity
3	Nursing and Allied Health Documentation; eMAR; Role-Based Security
2	CDR; Internal Interoperability; Basic Security
1	Ancillaries - Laboratory, Pharmacy, and Radiology/Cardiology information systems; PACS; Digital non-DICOM image management
0	All three ancillaries not installed

CDSS

Effects of Computer-based Clinical Decision Support Systems on Clinician Performance and Patient Outcome: A Critical Appraisal of Research

Mary E. Johnston, BSc; Karl B. Langton, MSc; R. Brian Haynes, MD, PhD; Alix Mathieu, MD

1994

Results: Three of 4 studies of computer-assisted dosing, 1 of 5 studies of computer-aided diagnosis, 4 of 6 studies of preventive care reminder systems, and 7 of 9 studies of computer-aided quality assurance for active medical care that assessed clinician performance showed improvements in clinician performance using a CDSS. Three of 10 studies that assessed patient outcomes reported significant improvements.

Conclusions: Strong evidence suggests that some CDSSs can improve physician performance. Additional well-designed studies are needed to assess their effects and cost-effectiveness, especially on patient outcomes.

CDSS

Improving clinical practice using clinical decision support systems: a systematic review of trials to identify features critical to success

Kensaku Kawamoto, Caitlin A Houlihan, E Andrew Balas, David F Lobach

2005

Conclusions Several features were closely correlated with decision support systems' ability to improve patient care significantly. Clinicians and other stakeholders should implement clinical decision support systems that incorporate these features whenever feasible and appropriate.

Electronic Order

Effects of Computerized Physician Order Entry and Clinical Decision Support Systems on Medication Safety

A Systematic Review

Rainu Kaushal, MD, MPH; Kaveh G. Shojania, MD; David W. Bates, MD, MSc

2003

Conclusions: Use of CPOE and isolated CDSSs can substantially reduce medication error rates, but most studies have not been powered to detect differences in adverse drug events and have evaluated a small number of "homegrown" systems. Research is needed to evaluate

Electronic Order

Computer Physician Order Entry: Benefits, Costs, and Issues

Gilad J. Kuperman, MD, PhD, and Richard F. Gibson, MD, PhD

2003

Several analyses have detected substantial quality problems throughout the health care system. Information technology has consistently been identified as an important component of any approach for improvement. Computerized physician order entry (CPOE) is a promising technology that allows physicians to enter orders into a computer instead of handwriting them. Because CPOE fundamentally changes the ordering process, it can substantially decrease the overuse, underuse, and misuse of health care services. Studies have documented that CPOE can decrease costs, shorten length of stay, decrease medical errors, and improve compliance with several types of guidelines. The costs of CPOE are substantial both in terms of technology and organizational process analysis and redesign, system implementation, and user training and support. Computerized physician order entry is a relatively new technology, and there is no consensus on the best approaches to many of the challenges it presents. This technology can yield many significant benefits and is an important platform for future changes to the health care system. Organizational leaders must advocate for CPOE as a critical tool in improving health care quality.

Ann Intern Med. 2003;139:31-39.
www.annals.org
For author affiliations, see end of text.

Electronic Order

The Effect of Computerized Physician Order Entry on Medication Errors and Adverse Drug Events in Pediatric Inpatients

W. James King, MSc, MD*‡; Naomi Paice, MD*; Jagadish Rangrej, MMath‡§; Gregory J. Forestell, MHA‖; and Ron Swartz, BScPharm¶

2003

Conclusions. The introduction of a commercially available physician computer order entry system was associated with a significant decrease in the rate of medication errors but not ADEs in an inpatient pediatric population. *Pediatrics* 2003;112:506–509; *computerized physician order entry, inpatients, medication error, injury.*

Closed Loop Medication Application

The impact of a closed-loop electronic prescribing and administration system on prescribing errors, administration errors and staff time:
a before-and-after study

Bryony Dean Franklin, Kara O'Grady, Parastou Donyai, Ann Jacklin, Nick Barber

2010

Conclusions: A closed-loop electronic prescribing, dispensing and barcode patient identification system reduced prescribing errors and MAEs, and increased confirmation of patient identity before administration. Time spent on medication-related tasks increased.

Closed Loop Medication Application

Provider risk factors for medication administration error alerts: analyses of a large-scale closed-loop medication administration system using RFID and barcode

2009

Yeonsoo Hwang[1,2†], Dukyong Yoon[1†], Eun Kyoung Ahn[1], Hee Hwang[2] and Rae Woong Park[1*,‡]

Results   A total of 2 874 539 medication dose records from 30 232 patients (882.6 patient-years) were included in 2012. We identified 35 082 MAE alerts (1.22% of total medication doses). The MAE alerts were significantly related to administration at non-standard time [odds ratio (OR) 1.559, 95% confidence interval (CI) 1.515–1.604], emergency order (OR 1.527, 95%CI 1.464–1.594), and the number of medication doses administered (OR 0.993, 95%CI 0.992–0.993). Medication route, nurse's employment duration, and working schedule were also significantly related.

Conclusion   The MAE alert rate was 1.22% over the 1-year observation period in the hospital examined in this study. The MAE alerts were significantly related to administration time, order type, medication route, the number of medication doses administered, nurse's employment duration, and working schedule. The real-time closed-loop medication administration system contributed to improving patient safety by preventing potential MAEs. Copyright © 2016 John Wiley & Sons, Ltd.

PACS

The Hidden Costs of Delayed Access to Diagnostic Imaging Information: Impact on PACS Implementation

William H. Straub[1] and David Gur

1990

Discussion: Our results clearly demonstrate that the perceived potential impact of increased efficiency and reliability of any archival system on radiology users' practices and on treatment of patients, as determined by the need for repeated examinations and potential increases in patients' length of stay, is significant.

PACS

Evaluating the Implementation of Picture Archiving and Communication Systems in Newfoundland and Labrador—a Cost Benefit Analysis

Don MacDonald[1] and Doreen Neville[2]

2010

CONCLUSION

Using methods of accounting generally employed in the Canadian health care system, our study found that the cost per exam in the PACS environment was $11.8, compared to $9.5 in the film environment.

Further, our study estimated that it will cost an average of $2.65 more per exam in PACS than in film for the first 6 years of PACS operation. PACS was very costly to implement and to maintain in the Western Health Authority, making it difficult to justify PACS based solely on a financial costing model. Other benefits, such as enhance patient care, need to be considered when evaluating the overall benefits of PACS. The primary reasons for not achieving a return on investment for PACS in many sites under study was a combination of low exam volume, a preexisting efficient film environment and the high costs for PACS hardware, software, and ongoing maintenance.

EMRAM Stage 6 Validations

# of Stage 6 Validations
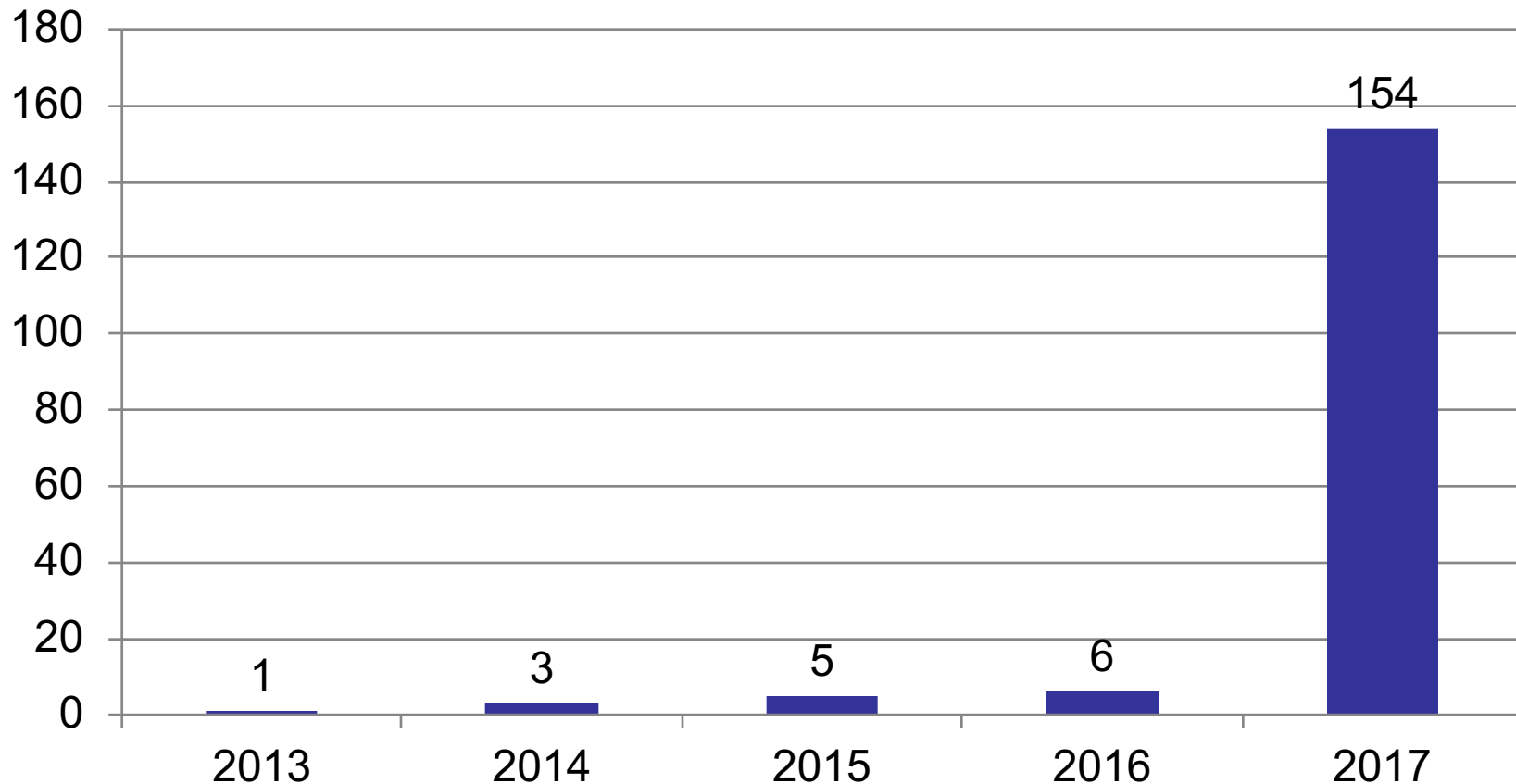
EMRAM Stage 7 Validations

Hospital	Validation Date
İzmir Tire Public Hospital	26.04.2016

The keys of our success…

1. Strong support at ministerial level
2. Different, but well coordinated stakeholders for HIMSS events and analytics studies
3. Evidence based approach about the benefits of *«meaningful usage of EMR»* for improving healthcare quality and patient safety
4. Convincing the top level executives of the hospitals
5. Training the staff who will be in charge of digital transformation
6. Supplying rich and detailed gap analysis and training material

Thanks