ADVANCED DIAGNOSTIC AND DATA INTEGRATION OF AN EMR FOR THE CARDIOLOGIST AND OTHER SPECIALISTS

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FACULTY/PRESENTER DISCLOSURE

- **Faculty:** Dr. Maheswaran Srivamadevan
- **Relationships with commercial interests:**
  - **Grants:** none
  - **Speakers Bureau/Honoraria/Research Support:** Abbott, Boehringer Ingelheim
  - **Consulting Fees:** none
  - **Advisory Board:** none
  - **Clinical Trials:** Amgen, Bayer, Pfizer

DISCLOSURE OF COMMERCIAL SUPPORT

This program has received ***No Commercial Support***

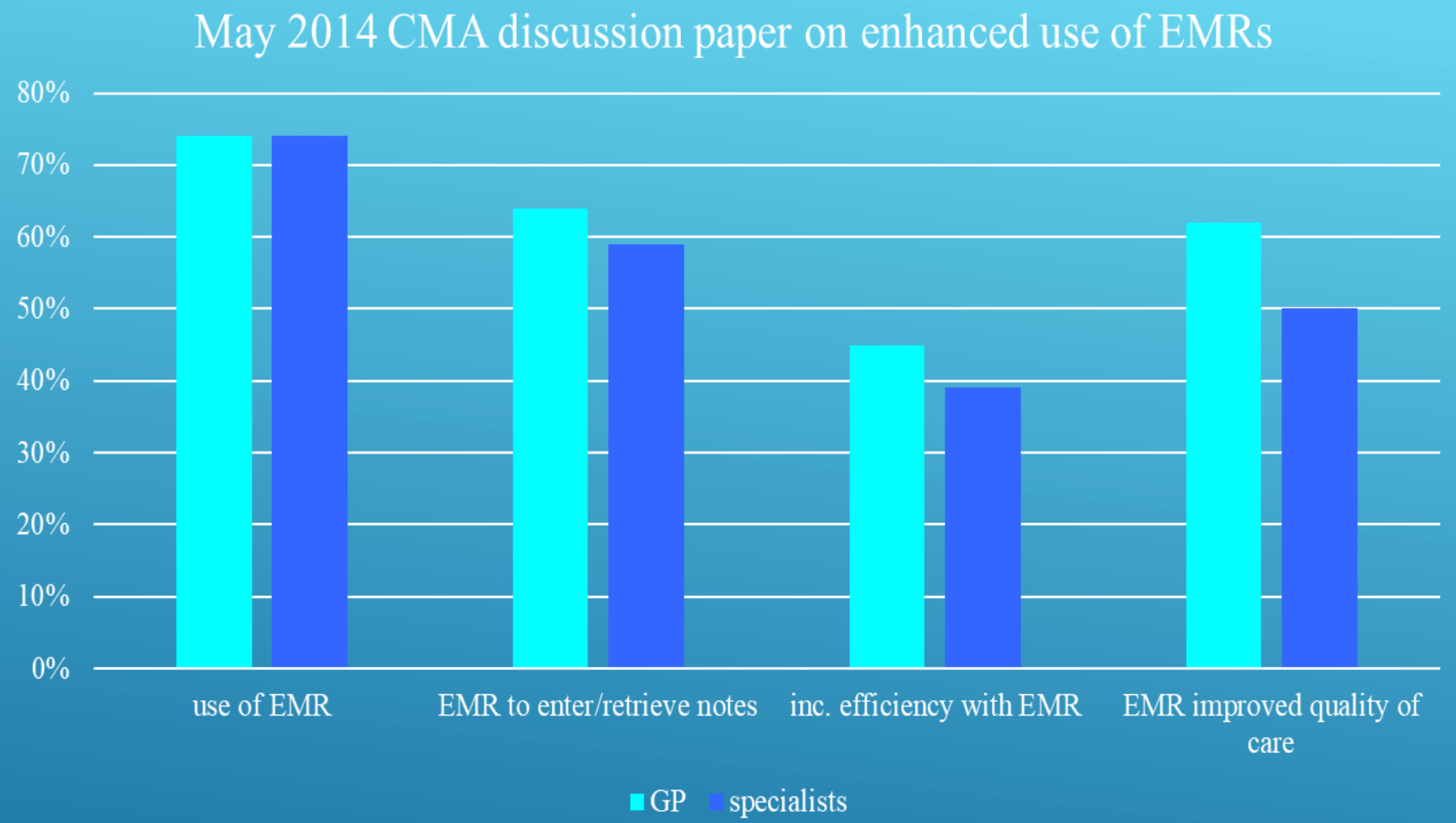
- **Potential for conflict(s) of interest:**
  - No conflict of interest

MITIGATING POTENTIAL BIAS

- There is no commercial involvement in the development of this program or its content and no potential bias

OBJECTIVES

- Principles in customization of EMR into a stand-alone solution for cardiac diagnostics reporting and data integration
- Integration of evidence-based Medical Algorithms into the EMR to optimize patient care
- Planning for integration of artificial intelligence



SPECIALISTS VS GP EMR USE

THE BEST KIND OF **SPECIALTY EMR** IS NOT THE ONE THAT HAS TO BE **CUSTOMIZED** JUST FOR YOU, BUT THE ONE YOU CAN EASILY **CUSTOMIZE** YOURSELF.

OSCAR EMR

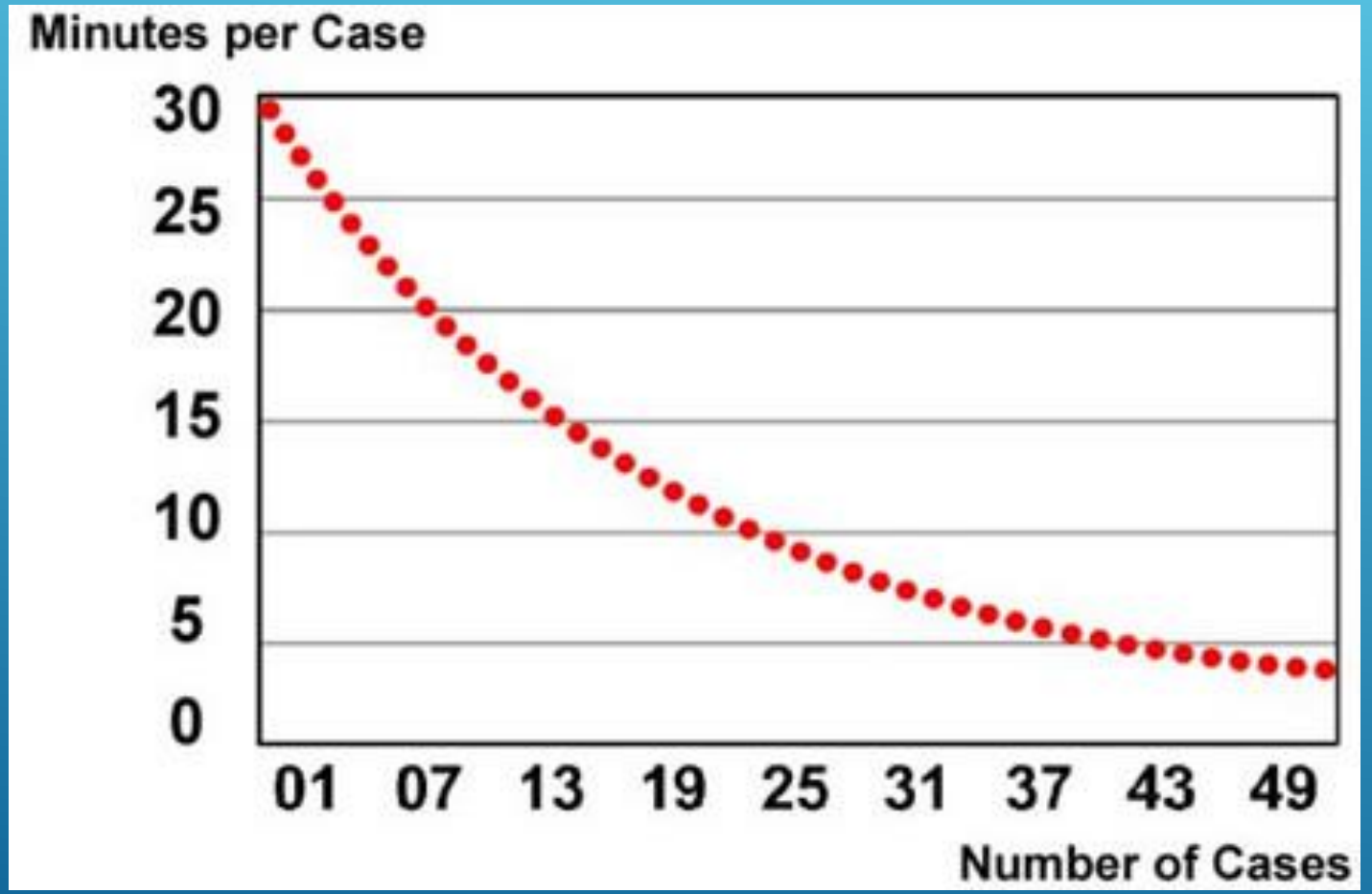
***O**pen **S**ource **C**linical **A**pplication **R**esource (OSCAR) **E**lectronic **M**edical **R**ecord (EMR) Incorporated*

- A not-for-profit technology / software corporation
- Governed by Users (clinicians, academic institutions, industry experts) and Service providers
- Open and transparent operations (source code, features, bugs, manual are publicly assessable)
- ISO 13485 certified / OntarioMD-certified

OSCAR AT ORHC/BCDC

- OSCAR certified service provider
  - Sets up and runs the server/database
- 3 receptionists
  - Processing of patients, billing
  - Uploading incoming faxes, outgoing faxes
- 3 staff cardiologists
  - customization
- 2 ECG technologists
- 3 Echosonographers
- 1 physician assistant

? TIME DO I NEED TO DEVOTE TO CUSTOMIZING?



WHAT PARTS OF THE EMR CAN BE CUSTOMIZED?

- Scheduling
- Data collection/integration
- Letter generation
- Applications/Eforms

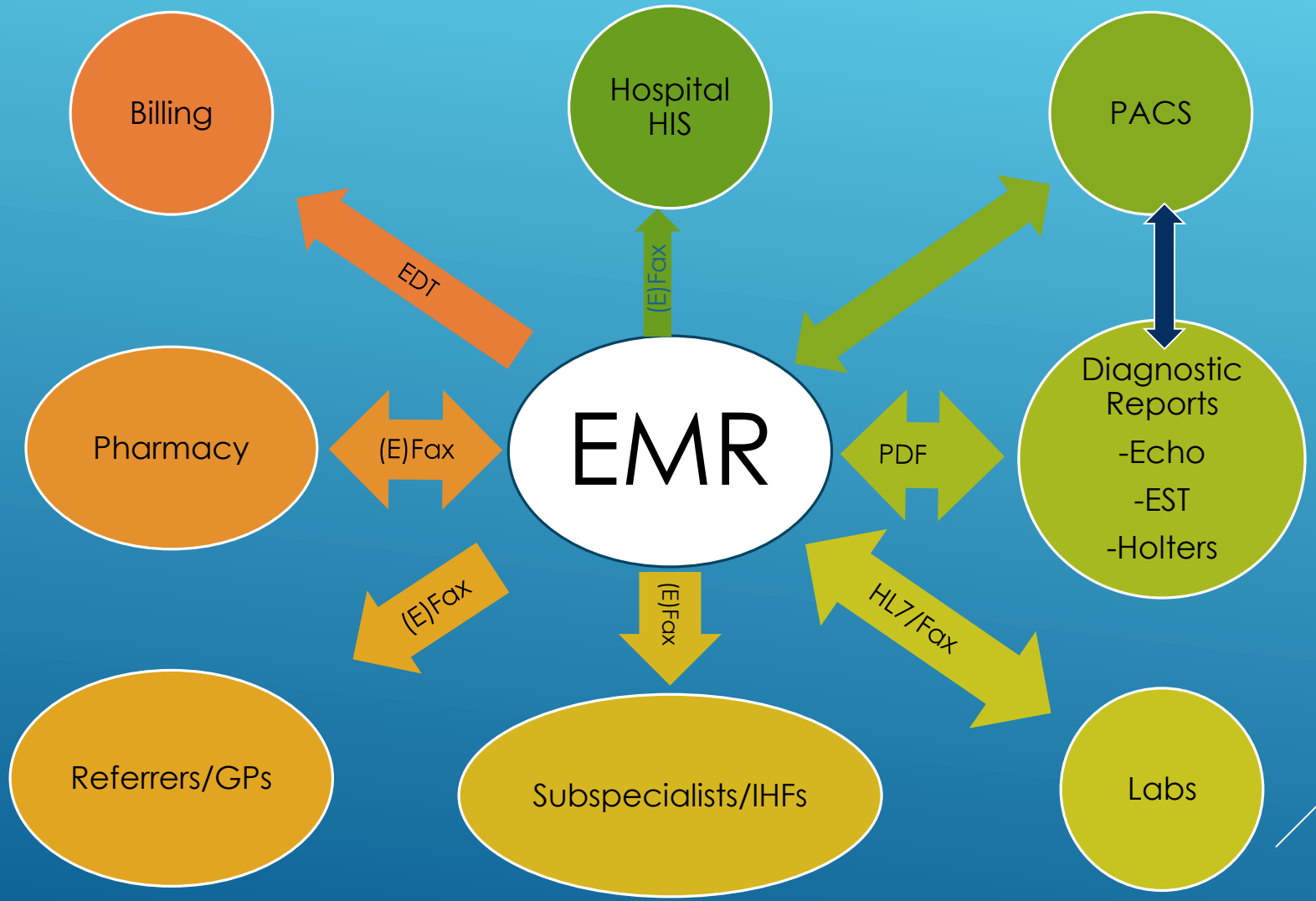
ENHANCED PATIENT CARE

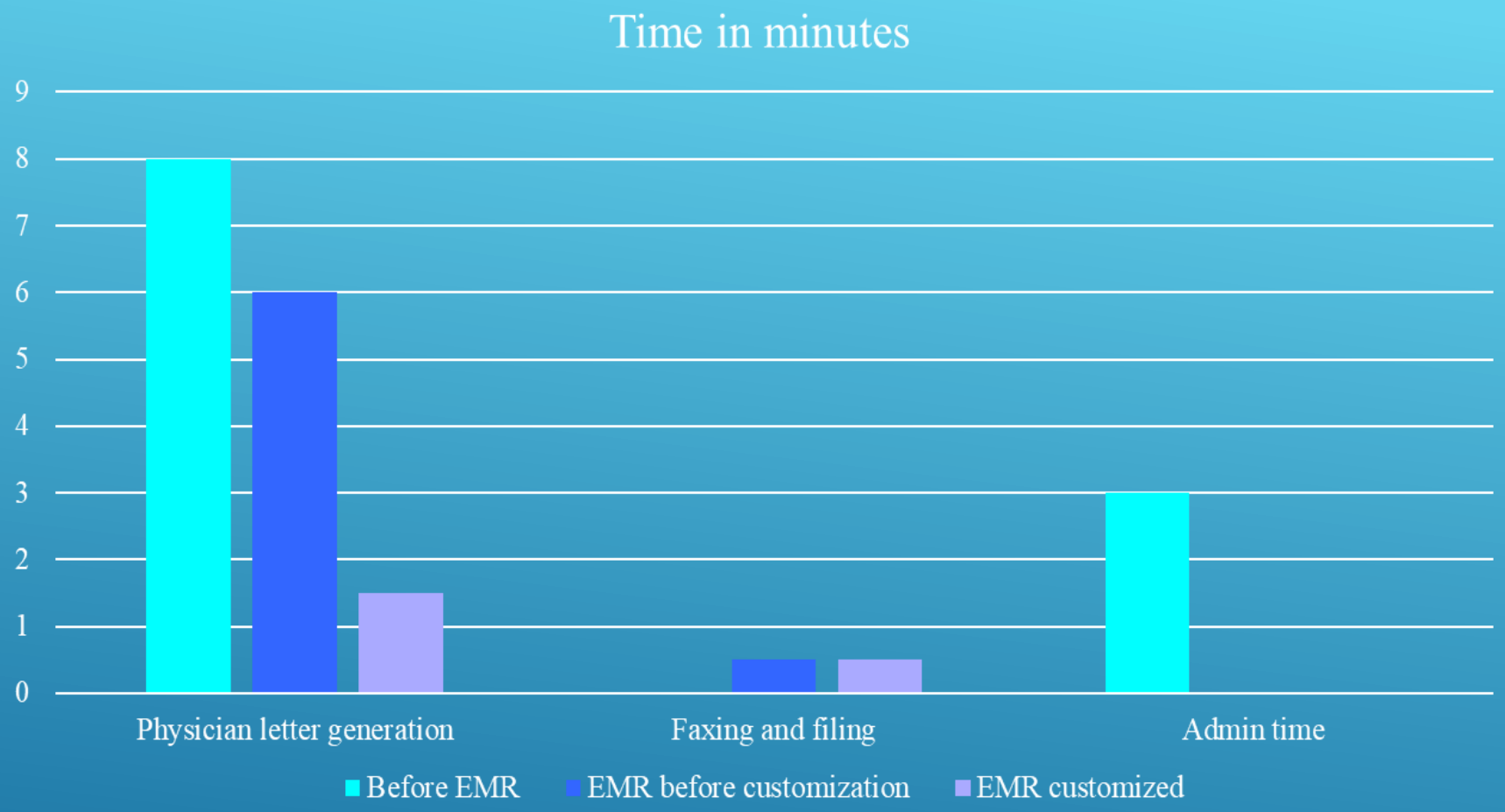
- Integrated evidence-based algorithms
- Automated and personalized risk assessments
- Can download from websites
  - http://oscarcanada.org/oscar-users/emr-resource/eform/eform-examples
  - https://www.medicalalgorithms.com

FURTHER OPTIMIZATION AT ORHC

- Turning the open source EMR into a stand alone solution
  - Integrate diagnostics data
    - Echocardiogram (automating parsing of CSV [excel] data to HL7
    - All reporting of tests (echos, stress tests, Holters, ECGs) to be done through EMR
      - Presently reported through separate solutions and PDF report uploaded to the EMR

STATUS PRE-CUSTOMIZATION <2014



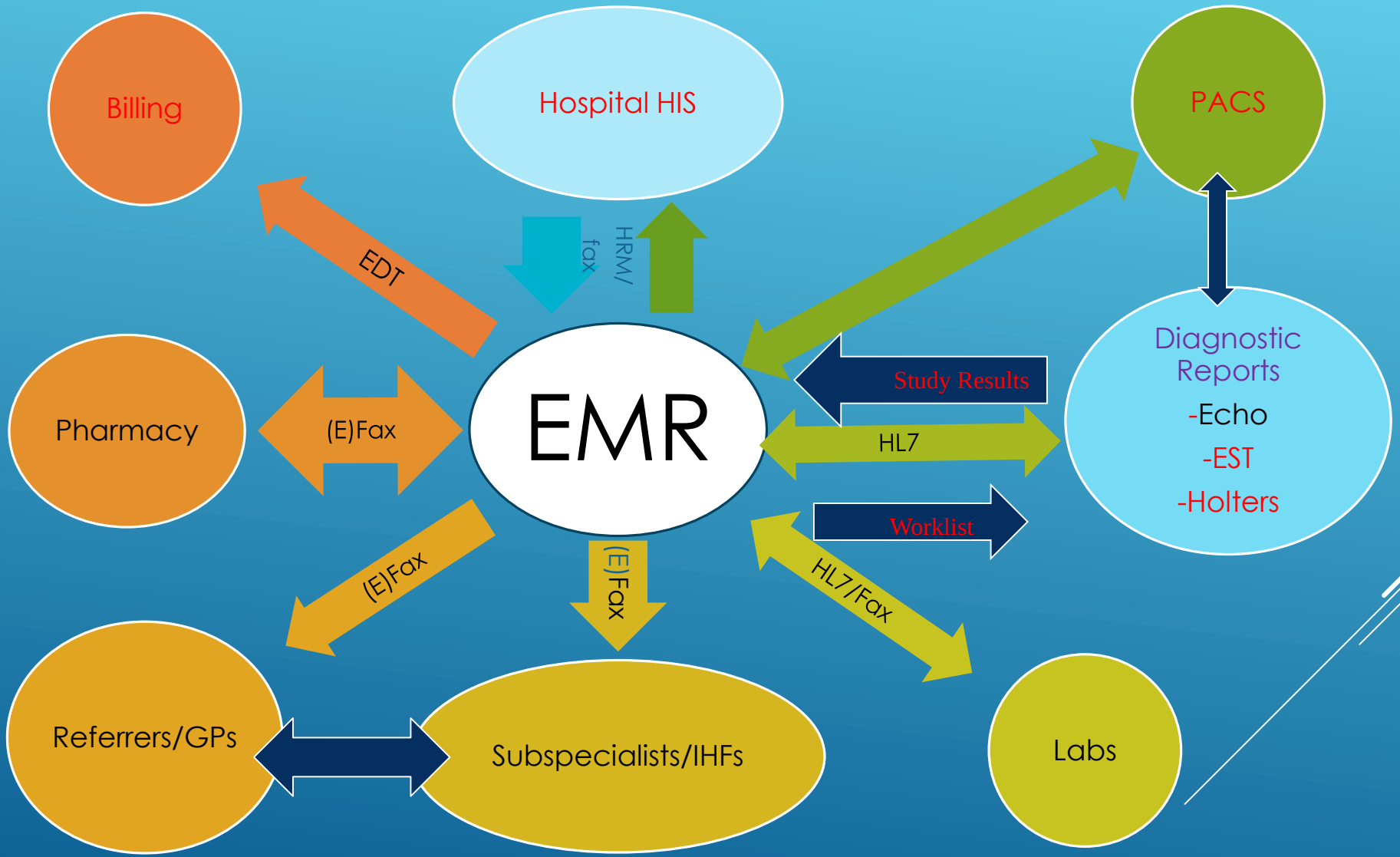


TIME SAVINGS

ENHANCED PATIENT CARE

- Integrated evidence-based algorithms
- Automated and personalized risk assessments
- Automated echocardiography reporting
- Working on :
  - Automation of ECG reporting
  - Automation of Holter reporting

WITH CUSTOMIZATION, >2014



ROLE OF AI

- Involve big data analytics to personalize decision making
  - analyze patient/practice population to determine differences with those underlying EBM data
    - Can write programs within OSCAR EMR to achieve this
  - Understand what has succeeded and what failed
    - Can compare event rates with clinical trial data
  - Neural networks can be employed to adjust decision making to suit physician's style/preferences based on previous practice

WHY OSCAR FOR AI?

- Almost all data points of interest can be databased and manipulated
- Organization rather than Vendor has control over creation and advancement of applications within EMR e.g. E-Forms
- OPEN SOURCE so can collaborate with online community for ideas, E-Forms

SPECIFIC AI PROJECTS AT ORHC

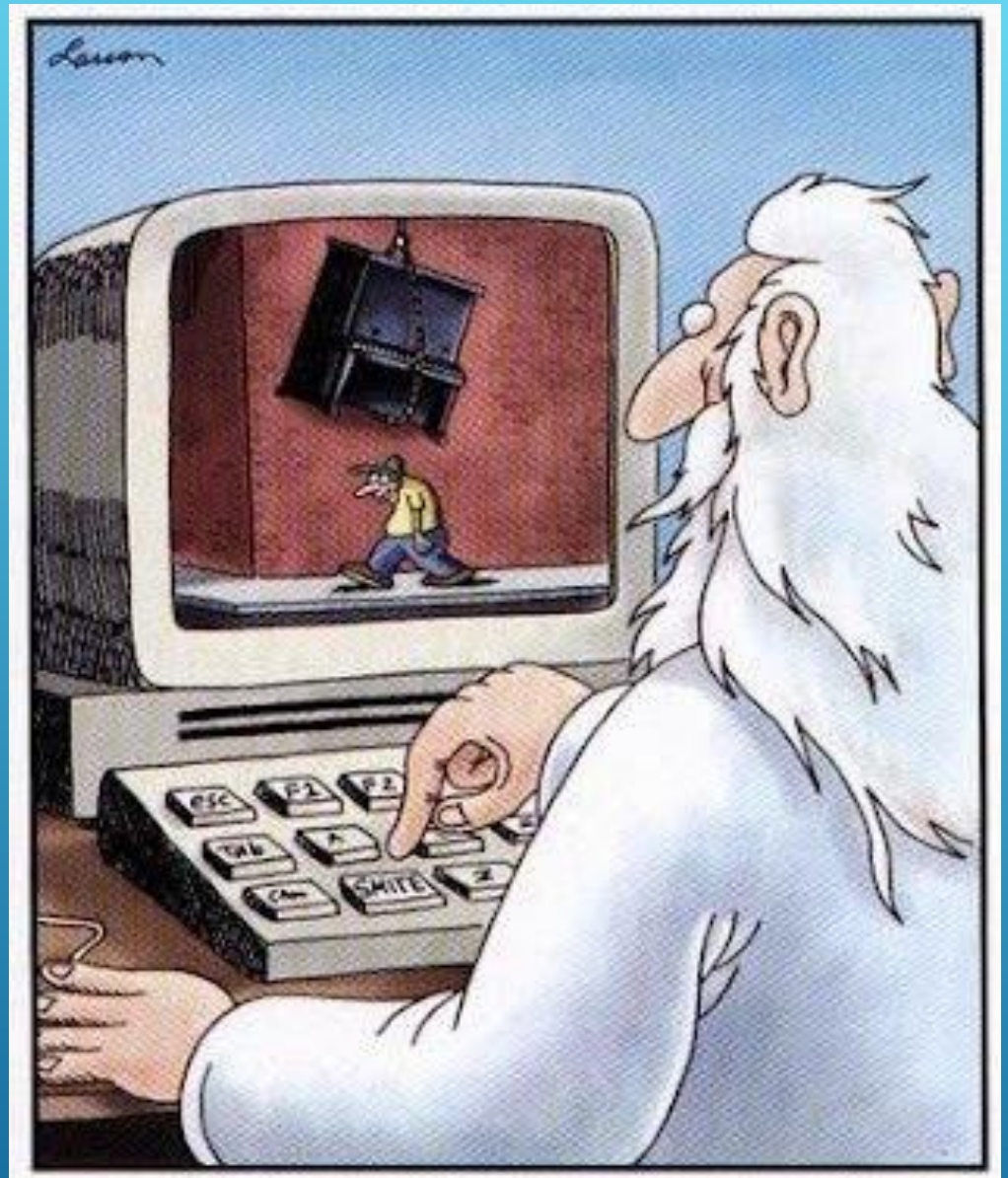
- Improve automation of diagnostic reporting
  - ECG analysis
  - Echo reporting e.g. with chamber size qualifications (RV especially)
- Clinical decision support
  - Risk stratification
    - MIBI/stress echo/CT-CA/cath
  - Evidence-based decision making

PROCESS

- Step 1 – collect data
  - ongoing
  - databased
- Step 2 – generate relevant algorithms
  - ongoing
- Step 3 – insert machine learning algorithm(s) where feasible and needed
- Step 4 – Use new model with new data
- Step 5 – if successful, scale up models to other areas within EMR

FINAL POINTS

- Customization easy to do and very rewarding
- Can improve quality of care by incorporating medical algorithms
- Work needed to be done:
  - Integration of artificial intelligence for decision making and data integration



God at His computer