

University of Iowa Health Care

Presentation to

The Board of Regents, State of Iowa

June 5-7, 2018

Agenda

Today's Presentation

Opening Remarks

Operating and Financial Performance

Faculty Presentation: Autonomous Diagnostic Artificial Intelligence



OPENING REMARKS

*Brooks Jackson, MD, MBA
Vice President for Medical Affairs
& Dean, Carver College of Medicine*



OPERATING AND FINANCIAL PERFORMANCE

Kenneth P. Kates

Associate Vice President

& Chief Executive Officer, UI Hospitals and Clinics

Doug True

Interim Associate Vice President for Finance

& Chief Financial Officer

Volume and Financial Highlights

Through April 2018

Operating Margin

- April year-to-date actual 3.1%, budget of 2.3%
- Continuing good financial recovery against budget

Volume Growth

- Year-over-year: Inpatient 2.7%, Surgeries 3.7%, Clinic Visits 6.6%

Acuity

- Case Mix Index continues to be high – above 2.0 for all payers (2.11) and Medicare (2.32)
- At the 64th percentile compared to other AMCs

Census

- Many days above 90% occupancy
- 138 days where census at 5AM (M-F) above 700.
- 2 more Operating Rooms to open in Children's Hospital in FY19 bringing the total to 50
- Closer relationship with post-acute providers being developed

Length of Stay Index (through March)

- Adult at .90 – below the expected index of 1.0
- Pediatrics at 0.99 - below the expected index of 1.0
 - much progress achieved over past several months

Readmission Rates (through December)

- Adult at 9.92% - below target of 12.08%
- Pediatrics at 8.56% - above target of 7.69%
 - Patients with multiple comorbidities and chronic illness
 - Inappropriately including planned admissions and patient transfers as readmissions
 - Trending positively since previous quarter

Revenues

- 2.1% above budget year-to-date

Payer Mix

- Medicare growth continues
- FY17: 35.7%, FY18: 36.9%

Accounts Receivable

- Positive trend for government and out-of-state payers
- Progress resolving older cases

Salary Expenses

- 2.8% below budget year-to-date

Non Salary Expenses

- 5.6% above budget year-to-date
- Implant and pharmacy costs

Volume - Highlights and Trends

Operating and Financial Performance

Inpatient Discharges

- Volume growth continues year over year – up 759; 2.7 % compared to last fiscal year to date
 - All major clinical areas have grown year over year except Pediatric Psychiatry – down 17%
 - driven by our continued challenges to place these patients when they no longer require acute care
 - Compared to other AMCs, UIHC benchmarks at the 93rd percentile in terms of Acute Care Occupancy Percentage.
-

Surgical Cases

- Progress continues in surgical case volume growth since the slow start in July
- Year to date, case volumes are up by 967 cases; 3.7% compared to the same time period last fiscal year
- All services experiencing growth except Otolaryngology/Head and Neck Surgery
 - decline driven by the departure of three faculty members. Two have been replaced and are performing well with recruitment underway for the third. Preferred candidate has been identified.

Volume - Highlights and Trends

Operating and Financial Performance

Emergency Department Visits

- Compared to last fiscal year, visits continue to be down—1,217 visits; 2.4%
 - This decline is driven by:
 - lower acuity patients seeking care at other sites (i.e. Quick Care)
 - increases in psychiatry patients who require inpatient services when our psychiatry beds are often filled
 - days with very high inpatient census resulting in patients having to wait in the ED for admission
- New outpatient Crisis Stabilization Unit to open for patients requiring emergency psychiatric care
- Acuity of patients continues to increase – 34.8% are admitted compared to 33.3% last year
- Admissions through the Emergency Department make up 58% of all inpatient admissions

Volume - Highlights and Trends

Operating and Financial Performance

Length of Stay

- Continued improvement in our length of stay (12 month rolling average) for both adult and pediatric patients
 - Adult index has improved from 0.91 last year to 0.90 this year
 - Pediatrics index has improved from 1.03 last year to 0.99 this year
- Focused efforts on:
 - Documentation to ensure we accurately reflect the acuity of our patients
 - Discharge Preparation - working with outside facilities as well as patients and family members to transition them to the most appropriate setting post-discharge

Readmissions (All-cause 30 day)

- Adult patients readmission rates continue to perform well compared to AMC colleagues
- Pediatrics, while making progress is above the benchmark; primarily driven by planned readmissions being included in the data set and patient transfers being counted as readmissions

Volume - Highlights and Trends

Operating and Financial Performance

Outpatient Visits

- Growth continues to be experienced year over year – up a total of 50,600 visits; 6.6% increase
- Increased volumes at all locations; main campus, Iowa River Landing (IRL) and off-site
- All services experiencing growth year over year except Family Medicine and Neurology
 - The reported decline in General Surgery visits is due to the Vascular Surgery Clinic and the Vascular Ultrasound Lab moving to the new Heart and Vascular Center facility that opened in mid September 2017. Excluding the vascular patients, General Surgery Clinic visits are up year over year by 672 visits; 5.3%
 - Family Medicine is showing a year-over-year decline due to the closure of three of our Quick Care locations, one of which has now reopened, and one outreach clinic. From ongoing operations, visits have increased by 2,793 visits or 2%

Financials - Highlights and Trends

Operating and Financial Performance

Revenue

- Given the strong volume, year to date net revenue is 2.1% above budget
- Collections for the second half of the fiscal year will be impacted by \$6.5M of governmental payment reductions
- Significant collections of very old accounts receivable (AR > 270 days old) occurred in October – December of FY18. This was the result of diligent collection processes and structured communications with the Medicaid MCO's. This represents significant progress, but some challenges with collection efforts for this payer group still exists.

Expenses

- Salary expenses are 2.8% below budget, due to successes in the \$86M budget initiative plans
- Non-Salary expenses are 5.6% above budget, mainly due to supply and pharmacy expense. The expense increases are directly tied to increasing surgical volume and acuity, and specific pharmacy initiatives

Financials - Highlights and Trends

Operating and Financial Performance

Update: \$86M Revenue Enhancement/Expense Reduction Initiatives

- Achieving good progress to date on our \$86M plan
- \$50.7M has been realized through April*; 83% of the year to date target
- 60% of the initiatives to achieve the \$86M were planned for the second half of the fiscal year; 37% of the initiatives were planned for the last quarter of the fiscal year
- Over half of the full year target is tied to reducing labor costs
- 500 FTE targeted savings - through April 27th – 479.3 FTEs achieved
- Goal to reduce agency nurses by 149 positions – 192 positions reduced through April 10th. Replaced with UIHC nurses
- Progress continues to be achieved on revenue growth (\$14.8M) and non-labor expense reductions (\$6.7M). Examples include: PET/MRI expanded hours, pharmacy initiatives, contracts for virtual hospitalist services, supply reductions.
- Deferred the start of some capital projects and major equipment acquisitions. This will reduce capital spending this fiscal year by about \$60M.

**Some initiatives are not reported through April due to a lag in the data.*

Financials - Highlights and Trends

Operating and Financial Performance

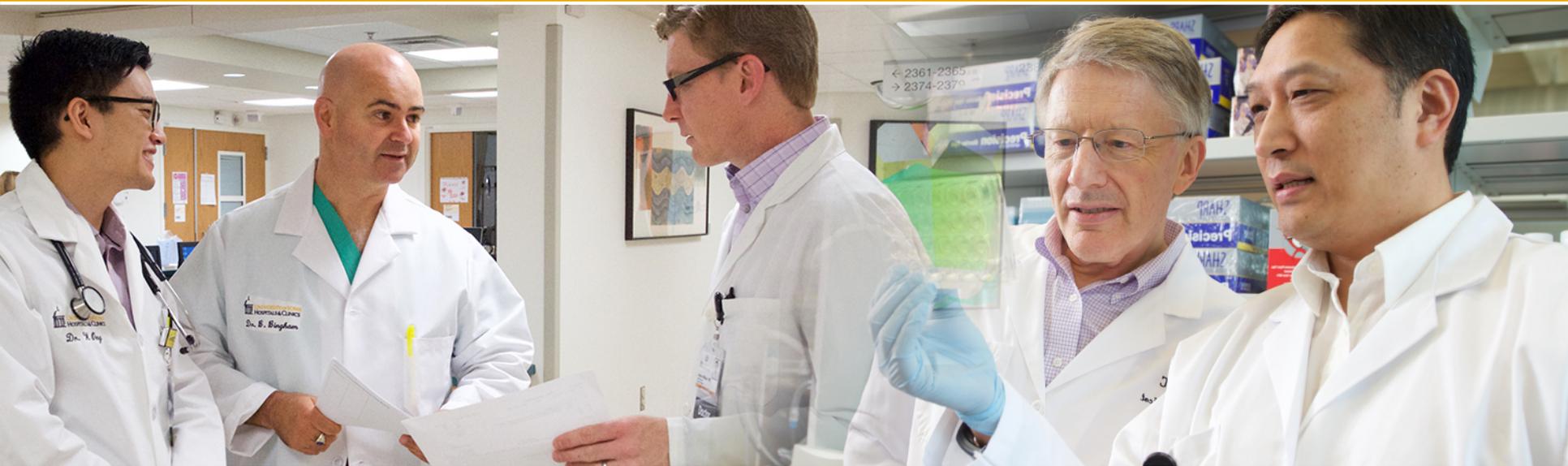
Update: Medicaid MCOs

- Days in Accounts Receivable for Medicaid MCOs is in a range of 51 to 67
- 21% of Medicaid hospital claims require UIHC action after initial claim submission compared to 10% for commercial payors
- Overall MCO denial rate is 2.5 times greater when compared to other commercial payors for hospital claims
- Percent of hospital Accounts Receivable over 180 days is in a range of 15% to 25% across the MCOs
- AmeriHealth Resolution
 - Actively working through resolution of claims
 - Estimated Net Accounts Receivable was \$12M at end of November. Current net estimate of Accounts Receivable outstanding is \$2.8M
 - Goal is to resolve all claims by June 30th

Board Action Requested

Operating and Financial Performance

- Approve UI Health Care salary policy for FY19
- Approve authority to transfer up to \$9.5 million additional funds from UI Health Care to UI Health System



FACULTY PRESENTATION: AUTONOMOUS DIAGNOSTIC ARTIFICIAL INTELLIGENCE

Michael D. Abramoff, MD, PhD
Robert C. Watzke, MD, Professor of Retina Research
Professor of Ophthalmology and Visual Science,
Electrical and Computer Engineering, and Biomedical Engineering

Support IDx LLC, Arnold and Mabel Beckman Initiative for Macular Research, National Eye Institute R01 EY019112, EY018853, EY017066, Veterans Administration I01 CX000119, Alimera Inc.

Conflicts of Interest IDx LLC – Founder, Employee, Patents and Investor. ■

DR can be detected algorithmically

May 2000, Copenhagen

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ABSTRACTS

LOW LEVEL SCREENING OF EXSUDATES AND HAEMORRHAGES IN BACKGROUND DIABETIC RETINOPATHY

M.D. Abramoff^{1,2,3}, MD MSc, J.J. Staal^{2,3}, MSc, M.S. Suttorp¹, MD PhD, B.C.P. Polak, MD PhD, M.A. Viergever, PhD,

Dept. of Ophthalmology and Diabetes Center, Vrije Universiteit University Hospital, Amsterdam, Netherlands
Image Sciences Institute, University Hospital, Utrecht, Netherlands
I2 Engineering, Amstelveen, Netherlands

Purpose: to develop a fast and reliable method to screen fundus images on exsudates and haemorrhages in early background diabetic retinopathy

Methods: a differential topology based, scale and color space indexed operator was used to obtain geometrical features in digital fundus images (Canon non-mydratic fundus camera, 800x600pixels, 24 bit JPEG decompressed). Using this operator the eigenvalues of the Hessian and the structure tensor were mapped nonlinearly to a multidimensional probability measure

$$f_i = \text{prob}\{\Gamma_i(H_{\sigma}\{\lambda_1 \dots \lambda_m\}, G_{\sigma}\{\lambda_1 \dots \lambda_n\})\}$$

The operator is constructed in such a way that reddish and white-yellowish ellipsoid structures (20-520 μm) give optimal response

Results: 500 images were used for optimization. The features detected were found to correspond closely to the exsudates and haemorrhages



Case made at my investiture

Robert C. Watzke, MD, Professor of Retina Research

Scientist

- **h-index**

metric for scientific productivity

~ citations * publications

Physician / scientist

- **p – index** =
$$\frac{\textit{number of patients that improve}}{\textit{number of patients}}$$

'The Retinator'

Revenge of the machines



By Peter J. McDonnell, MD

director of the Wilmer Eye Institute, Johns Hopkins University School of Medicine, Baltimore, and chief medical editor of *Ophthalmology Times*.

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When I was a boy, an older friend told me

ies should be performed to validate the work of these computers. They anticipate that this approach will result in a reduction of [diabetes] complications in patients who need early retinal imaging.

At a time when we are seeing a dramatic increase in the loss from diabetes, it is clear that we need better ways to manage diabetes. Some ophthalmologists

guest editorial

The Retinator II: Judgment Day?

Most human aspect of computers is they are, as humans, prone to error



Ian C. Han, MD

Dr. Han is assistant professor, Wynn Institute for Vision Research, Department of Ophthalmology and Visual Sciences, University of Iowa Carver College of Medicine, Iowa City.

Dr. Han has no financial disclosures related to the subject matter.

HOLLYWOOD LOVES TRILOGIES, and though not all sequels are created equal, as a general rule, the second installment tends to be the best. The examples of this phenomenon are numerous (*Godfather Part II*, *Back to the Future II*, *The Empire Strikes Back*, etc.). However, the most-cultured *Ophthalmology Times* readers

Ophthalmology Times

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The day after—*h*-index 52, starting on that *p*-index!

U.S. Department of Health and Human Services

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FDA News Release

FDA permits marketing of artificial intelligence-based device to detect certain diabetes-related eye problems

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For Immediate Release April 11, 2018

GE Reports | INNOVATION | PERSPECTIVES | PERFORMANCE

THE VANGUARD

The 5 Coolest Things On Earth This Week

Apr 14, 2018 by Tomas Kellner

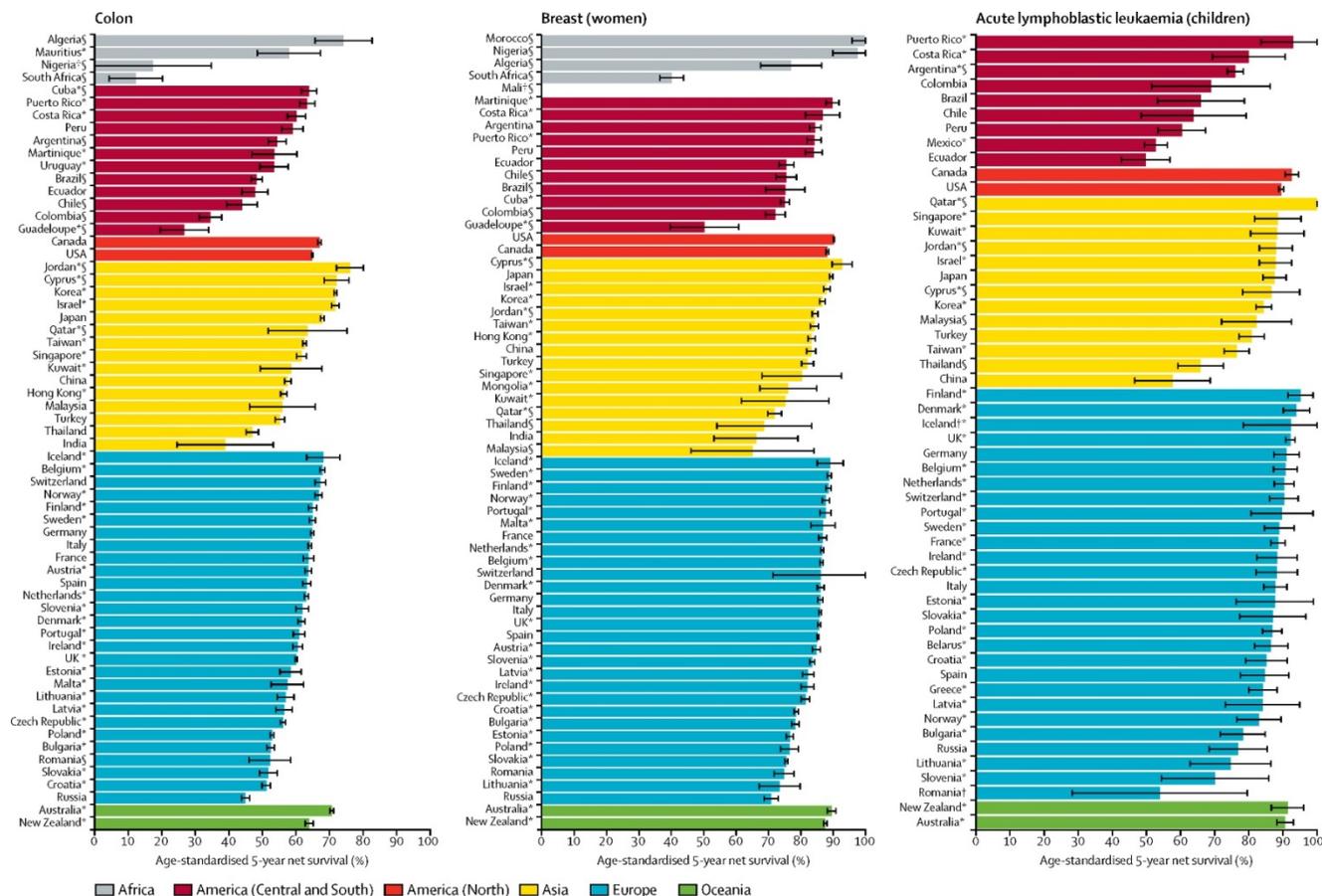
An AI For An Eye



The FDA just approved the marketing of a new device that uses AI to search for early warning signs of retinopathy. Images credit: Getty Images.

What is it? For people with diabetes, high blood-sugar levels can lead to something called diabetic retinopathy — damage to the blood vessels of the retina that may cause vision loss and even blindness. The FDA just approved the marketing of a new device that uses AI to search for early warning signs of retinopathy.

Concord-3: US healthcare typically best

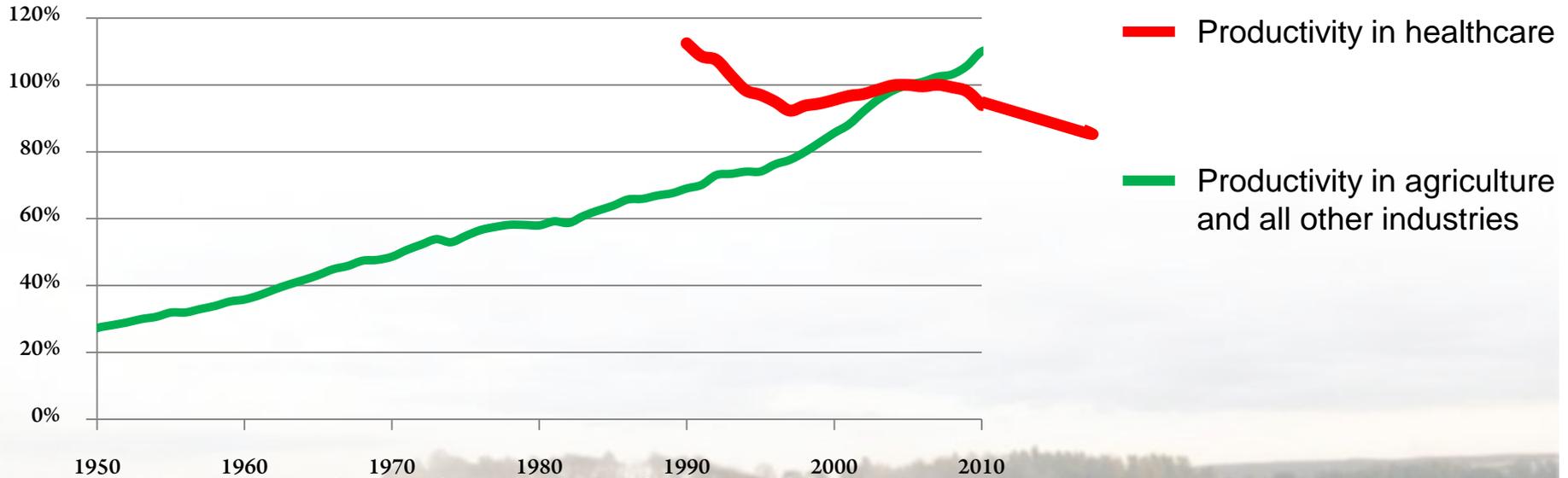


CONCORD-3, Lancet, 2018. Analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. Global distribution by continent and country of age-standardised 5-year net survival for adults (15–99 years) diagnosed during 2010–14 with colon cancer or breast cancer (women) and children (0–14 years) diagnosed with acute lymphoblastic leukaemia. Lancet, 2018



But way too expensive: Healthcare needs Autonomous AI

US Labor Productivity (Output Per Worker Hour)



Source: US Bureau of Labor Statistics
<http://data.bls.gov/pdq/SurveyOutputServlet>

Source: US Bureau of Labor Statistics
<http://data.bls.gov/pdq/SurveyOutputServlet>

So far, automation has lowered physician productivity

Electronic health record impact on productivity and efficiency in an academic pediatric ophthalmology practice

Travis K. Redd, BS,^{a,b} Sarah Read-Brown, BA,^a Dongseok Choi, PhD,^{a,b,c} Thomas R. Yackel, MD,^d Daniel C. Tu, MD PhD,^{a,c} and Michael F. Chiang, MD^{a,d}

PURPOSE To measure the effect of electronic health record (EHR) implementation on productivity and efficiency in the pediatric ophthalmology division at an academic medical center.

METHODS Four established providers were selected from the pediatric ophthalmology division at the Oregon Health & Science University Casey Eye Institute. Clinical volume was compared before and after EHR implementation for each provider. Time elapsed from chart open to completion (OTC time) and the proportion of charts completed during business hours were monitored for 3 years following implementation.

RESULTS Overall there was an 11% decrease in clinical volume following EHR implementation, which was not statistically significant ($P = 0.18$). The mean OTC time ranged from 5.5 to 28.3 hours among providers in this study, and trends over time were variable among the four providers. Forty-four percent of all charts were closed outside normal business hours (30% on weekdays, 14% on weekends).

CONCLUSIONS EHR implementation was associated with a negative impact on productivity and efficiency in our pediatric ophthalmology division. (J AAPOS 2014;18:584-589)

Electronic health records (EHRs) are becoming an

Research

JAMA Otolaryngology-Head & Neck Surgery | Original Investigation

Association Between Electronic Medical Record Implementation and Otolaryngologist Productivity in the Ambulatory Setting

Yarah M. Haidar, MD; Omid Moshtaghi, BS; Hossein Mahboubi, MD; Yaser Ghavami, MD; Kasra Ziai, MD; Houmehr Hojjat, MD; William B. Armstrong, MD; Hamid R. Djalilian, MD

IMPORTANCE In the current health care era, many medical practices are transitioning to a new electronic health record system. Until now, there has been little information published on the

Lam et al. BMC Health Services Research (2016) 16:7
DOI 10.1186/s12913-015-1255-8

BMC Health Services Research

RESEARCH ARTICLE

Open Access

The effect of electronic health records adoption on patient visit volume at an academic ophthalmology department

Jocelyn G. Lam, Bryan S. Lee and Philip P. Chen*

Abstract

Background: Electronic health records (EHRs) have become a mandated part of delivering health care in the United States. The purpose of this study is to report patient volume before and after the transition to EHR in an academic outpatient ophthalmology practice.

Methods: Review of patient visits per half-day and number of support staff for established faculty ophthalmologists between July and October for five consecutive years beginning the year before EHR implementation.

Results: Eight physicians met inclusion criteria for the study. The number of patient visits was lower in each year after EHR adoption compared to baseline ($p \leq 0.027$). Patient volume per provider was reduced an average of 16.9% over the 4 years (range 15.3–18.5%), and during the final year studied, no provider had returned to the pre-EHR number of patients per clinic session. Support staffing was unchanged ($p > 0.05$).

Conclusions: Adoption of EHR was associated with a significantly reduced number of patient visits per clinic session in an academic setting in which support staffing remained stable. Maintaining clinic volume and access in similar settings may require use of additional staffing.

Keywords: Ophthalmology, Electronic health record, Electronic medical record, Health information technology, Medical Informatics, Health care delivery, Health law

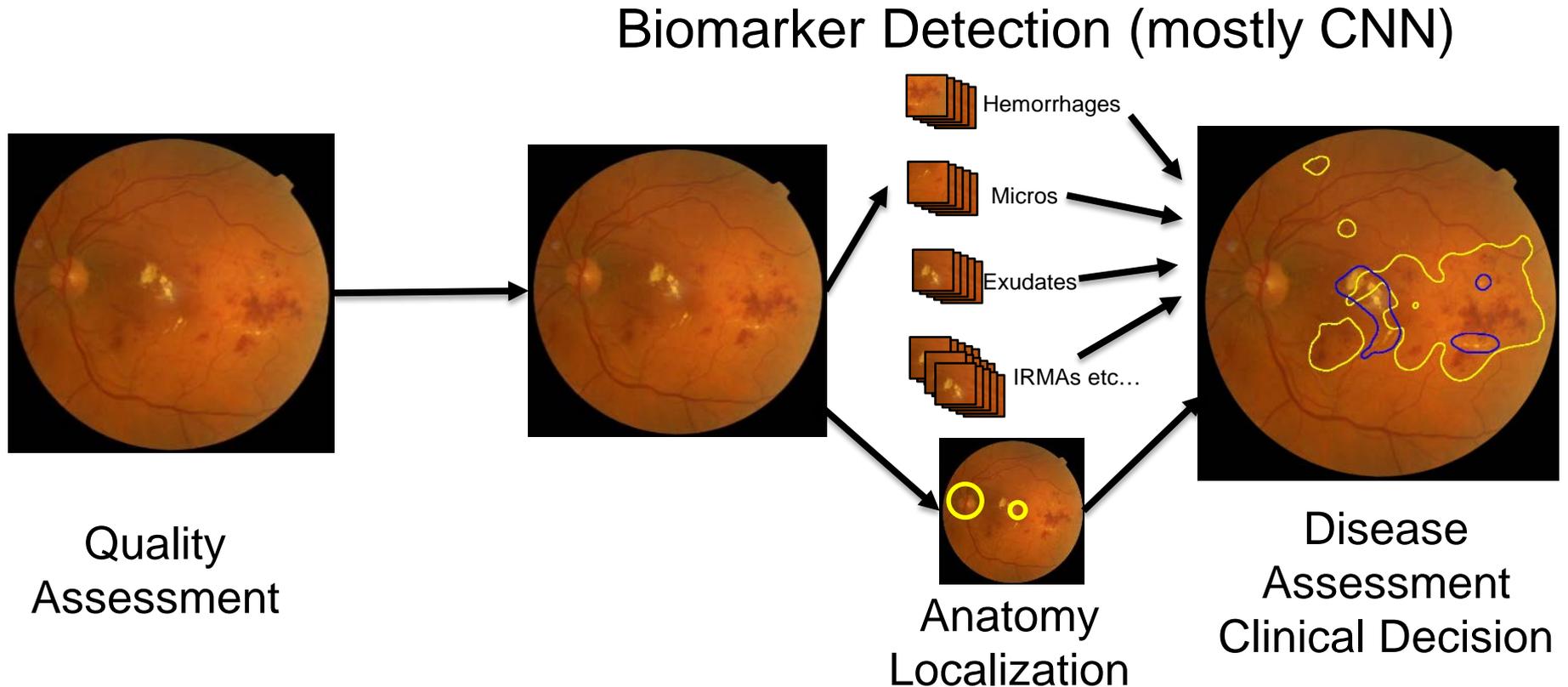
re-penalty phase, ophthalmologists have y less likely to adopt EHRs compared to

Moving specialty diagnostics to primary care

- Autonomous AI system
- Robotic Camera
- Interactive AI for Image Quality
- Realtime Diagnostic Output
- Existing Support Staff (4 hour training only req)
- Aligned with AAO Preferred Practice for DR



Autonomous AI algorithm based on biomarkers



Physiologically plausible: Abramoff et al, IOVS 2007

Diagnostic Accuracy in Context

	Point estimate	95% CI	Superiority Endpoint	Preclinical study	Studies of Ophthalmologists
Primary sensitivity	87.2%	81.8% - 91.2%	85.0%	96.8%	33%, 34%, 70%
Primary specificity	90.7%	88.3% - 92.7%	82.5%	87.0%	100%, 99%, 90%

96% (95.0% CI, 94.0 - 96.8%) of subjects had sufficient quality images

No significant effects for sex, race, ethnicity, HbA1C, lens status, or site

Age > 65 caused a significant increase in specificity ($p = 0.030$), but no change in sensitivity

Thank You

University of Iowa Health Care

