How AI and Digital Health is impacting the way we think about the care we deliver.

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McDonald's Revenue

Share price $212

$24

1997 2019 Estimated

Date: Compiled by Bloomberg

2015 Steve Easterbrook CEO

Bloomberg
2,782,039 followers
2h

McDonald's is turning its restaurants into enormous data processors.

McDonald's CEO Wants Big Macs to Keep Up With Big Tech

In an age of kale salads and fake meat, McDonald's has a new secret sauce
Digital Doesn’t Have to Be Disruptive

The best results can come from adaptation rather than reinvention.

**MYTH**
Digital is about technology.

**REALITY**
It’s about the customer.

**MYTH**
Digital requires radical disruption of the value proposition.

**REALITY**
It usually means using digital tools to better serve the known customer need.

**MYTH**
Digital will replace physical.

**REALITY**
It’s a “both/and.”

**MYTH**
Digital requires overhauling legacy systems.

**REALITY**
It’s more often about incremental bridging.
Building the AI-Powered Organization

Technology isn’t the biggest challenge. Culture is.

Nearly 90% of companies with successful scaling practices spent more than half their analytics budgets on adoption activities.

Because analytics are simply a means of solving business problems, the business units must lead AI projects and be responsible for their success.
Tools with which to solve real world problems

- 3D printing
- Robotics
- Big data, AI and Analytics
- Tele-health
- Sensors
- Virtual/ Augmented/Mx reality
- Gaming and behavior change
- Patient Engagement Platforms
- Natural Language Processing
- Sentiment Analysis
- Social Media
- Internet of Orthopedic Things
- Holograms
- Cybersecurity
- Exoskeletons
- Confluence of Technologies
REFERRAL MANAGEMENT TECHNOLOGY

Invented in 1865

popularized 1980s
Since Launch Luma Health

- Sent 39.3K Messages
- Processed 10.9K Replies
- Engaged 79% of Patients
- Scheduled 619 Referrals
- Created 180 Appointments
Referral Management

1,168 Referrals Created → 619 Referrals Scheduled → 53% Referral Conversion Rate

How did Referral Patients Schedule?

- 62 Patients Self-Scheduled Online (10%)
- 557 Patients Called in to Schedule (90%)
A/B Testing: Self scheduling link had a higher conversion rate
Schedule Management
Smart Waitlists

752 Patients Added to the Waitlist → 212 Offers Sent to Patients → 94 Cancellations Filled from Waitlist

How Were Patients Added to the Waitlist?

- 196 Patients Added by Staff (26%)
- 556 Patients Self-Added (74%)

Text Message:

Good news! UCSF Orthopaedic Institute Arthroplasty has an earlier appointment on [[appointment.date]] with the same provider. Reply YES to book this appointment. Otherwise ignore this message.

[User]: YES

Thanks. We're verifying the details of this appointment and will send you another message when confirmed.

[User]: Thanks. You're all set. Your appointment on [[appt.date]] has been booked.
Impact of a patient engagement platform on clinical practice workflow in an academic arthroplasty practice

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Background

- Higher levels of patient engagement lead to more efficient and effective healthcare.
- Patients with higher levels of engagement are more likely to report a positive care experience.
- Online patient engagement platforms (PEP) provide asynchronous digital communication between surgeons and patients using mobile applications.
  - PEP are web-based mobile applications.
  - Can be accessed via computer or mobile devices.
  - PEP support care management outcomes (PROs).
  - They have also been shown to improve diabetes management.
  - Little is known about the impact of support staff and needs to be studied.

Purpose: to describe the impact of patient engagement platforms (PEP) on clinical practice workflow in an academic arthroplasty practice.

Methods

- Data prospectively collected at a single academic center from January 1, 2016 through December 31, 2016.
- January 2016: UCSF division of arthroplasty introduced a PEP called HealthLoop (Mountain View, CA).
  - HIPAA-compliant, secure platform which can be accessed via mobile and desktop devices.
  - Guides patients through standardized perioperative pathways with daily messages, check-ins, and two-way communication.
- PEP were also used to collect patient-reported outcomes (PROs).
- Variables examined for the purpose of this study include:
  - Check-ins sent by PEP.
  - Number of patient logins.

Results

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<thead>
<tr>
<th></th>
<th>Total</th>
<th>Average ± SD (per patient)</th>
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<tbody>
<tr>
<td>Check-ins</td>
<td>13093</td>
<td>26.1 ± 4.3</td>
</tr>
<tr>
<td>Patient logins</td>
<td>18916</td>
<td>38.8 ± 23.4</td>
</tr>
<tr>
<td>Messages generated</td>
<td>5319</td>
<td>14.2 ± 12.4</td>
</tr>
<tr>
<td>Team logins</td>
<td>4975</td>
<td>415 (per month)</td>
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Discussion

- High patient participation rate using this PEP.
- Each patient averaged 39 PEP logins & 14 messages sent.
  - >30% messaging rate compared to similar study on spine patients with a different app (Force), suggesting variations in how PEPs are designed or implemented may impact patient utilization rates.
  - 25% of staff logins and there was high patient participation rate using this PEP.

References

We collect, report, and benchmark orthopedic patient-reported outcome data as a service.
Digital Scribes
NLP

65% - 70% accurate in 2019
AI in Research

• We used AI to measure cartilage thickness in 145 MRIs of health patients.
• N was not large enough so we decided to include another 20,000 images.
• Net time to review additional 20,000 MRIs?
• 4 days
Wearable Activity Sensors Research:
> 3 Million data points
What can you do with 3 million data points? You can predict 6 week PRO results at 11 days using Machine Learning.
WHAT NEXT?
MEMORA HEALTH
SMS + AI

97% find SMS easy to understand
98% of SMS messages are read

Results:
• 21,000 patients
• 35 hospitals
• 79% of all patient questions and concerns answered automatically by the system
Surgical Scheduling
Surgical Scheduling platforms: DOCSPERA

• Surgical Scheduling
  • Search for *open time* slots
  • Automates and customizes *case scheduling*
  • Track *patient preparedness* with smart checklists
  • Quantify *backlogs*, volumes, block utilization
  • Cross scheduler *access*
  • Communication with *vendors*

• Cancellation management
  • NLP to *search* for patients who are ready, available, right case length, right surgeon

• Surgeon App
  • Links to Google *Calendar*, Outlook, etc
  • Access to Imaging
  • Billing
QUADRUPED ALTERNATE HIP EXTENSION
CLARIFY HEALTH: STRATIFY PATIENT RISK DYNAMICALLY

Patient profiles with 200+ risk factors, including social determinants

<table>
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<tr>
<th>Timeline</th>
<th>History</th>
<th>Episodes</th>
<th>Journey</th>
<th>Profile</th>
<th>Ratings</th>
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Patient Insights

Aafiook, Eldridge
DOB: Dec 31, 1950
Age: 77
Birth Gender: Male
MRN:
Home: BRONX, NY
Marital Status: Unknown
Ethnicity: White

Stratify and track member risk in real-time for cost, quality, and outcomes

Comprehensive personal member profiles comprise 200+ risk factors—clinical, social, and demographic
VARIATION IN COST OF CARE FOR SAME PROCEDURE?

Identify variations in care, episode cost, case-mix, etc.
Transforming Healthcare Operations with Data Science and Machine Learning

80+ Leading Hospitals Rely on iQueue for Operating Rooms to Improve OR Utilization

- UCHealth increased OR utilization by 4%, adding over $10M in revenue
- MultiCare increased available OR minutes by 300%
- OhioHealth repurposes 12 blocks per month using Collect.
- NewYork-Presbyterian Brooklyn Methodist Hospital increased their cases per day by 13%

Learn More

140+ Cancer Centers Rely on iQueue for Infusion Centers to Improve Operations
FUNDING SNAPSHOT: YEAR OVER YEAR

Funding surpassed 2017 numbers by almost $3B, making 2018 the fourth consecutive increase in capital investment and largest since we began tracking digital health funding in 2010. Deal volume decreased from Q3 to Q4, but deal sizes spiked, with $3B invested in Q4 alone. Average deal size in 2018 was $21M, a $6M increase from 2017.
CONFLUENCE

- Voice Recognition
- Avatars
- NLP
- Sentiment Analysis
- Chat Bot technology
- Mobile

- EMOTIONALLY RESPONSIVE AI powered BOTS...
HIPAA Compliant Virtual Digital Assistants

“Alexa, tell my doctor my blood pressure is 125/66.”

- Amazon Alexa
  - 6 healthcare organizations
- “Hey Alexa” can:
  - Contact your physician
  - Schedule an appointment
  - Read and interpret your lab results
  - Reorder medication
  - Access your hospital discharge instructions
Documentation Support Systems

- from 100% Human led
- To Mixed initiatives
- To 100% Computer led
- Add an IoT and:
  - Sensors, devices, cameras... all contributing to and recording the visit
  - Clinical decision support integrated into encounter

Cognitive Computing
CTO
Dept of Orthopedics?

• Role of the CTO
  • Help define and implement a digital technology strategy that supports and optimizes the mission of the department in three key areas

• Operations
• Research
• Innovation
DOCSF 2020
Bridging: Technology + Orthopaedics

Jan 11, 12 2020 San Francisco

AOC members Code: Capra20
TEAM discounts

UCSF Department of Orthopaedic Surgery
THANK YOU

Analog Orthopedics

Digital Orthopaedics

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