Evidence-Based Medicine for Guiding Better Care

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The Need for Evidence-Based Practice

Wasteful Care
- 30% of all healthcare delivered in the US is inappropriate or wasteful\(^1\)

Unwarranted Variations in Care
- Only 55% of appropriate healthcare services are delivered to patients\(^2\)
- Nationwide, there are marked variations in services, costs, effectiveness of care and physician spending without rational explanation, within hospitals and across geographies and venues of care for normalized conditions and procedures\(^3,^4\)

Harm Caused by Healthcare
- There are startling levels of harm and more than 70,000 deaths occur each year due to medical errors\(^4,^5,^6,^7\)

MODERN EVIDENCE-BASED MEDICINE:
“The conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients”\(^8\)

Sources:
5. Building a Safer Health System 2000 Institute of Medicine: To Err Is Human Washington, DC. National Academies Press and
7. Makary MA, Daniel M. Medical error - the third leading cause of death in the US. British Medical Journal 2016;353:i2139
Complexities of Medical Evidence

▸ Volume and Velocity

● More than 6 million articles are published every year, and approximately 75 randomized controlled trials and 11 systematic reviews are published every day1.

● Even as this mass of information was condensed and consolidated into guidelines, those guidelines themselves, created by hosts of governing groups and specialty medical societies, became overwhelming2.

▸ Quality, Transparency, and Conflicts of Interest

● Problems include variable methods of guideline gradation and assessment, qualifications and biases of guideline developers, and variable guideline publication based on positivity or negativity of study outcomes and based on funding sources for studies or affiliation rewards of guideline authors3,4.

▸ Competing Recommendations and Evidence Churn

● A study of articles published in the New England Journal of Medicine over the course of a decade (2001-2010) demonstrated that 17% of the studies testing a new practice showed it was no better or worse than the current practice5.

● Of the studies testing an established practice, 40.2% showed the practice to be no better than what had preceded it. Continued use of widespread practices that are implemented “in error” because of weak or conflicting evidence may be wasteful and expensive, if not harmful to patients5,6.

Sources:
AGGREGATION AND APPRAISAL

Three Principles¹:

► Optimal clinical decision making requires awareness of the best available evidence
► Evidence-based medicine evaluates the totality of evidence and provides guidance to decide whether evidence is more or less trustworthy, based on systematic summaries
► Evidence alone is never sufficient to make a clinical decision: it is a complement to clinical judgment

EMBEDDING IN THE CLINICAL WORKFLOW

► Research has demonstrated that guideline programs, order sets, protocols, and other clinical decision support formats can help to improve safety, efficiency, and clinical outcomes when adherence is achieved.²,³,⁴,⁵,⁶
► Unfortunately, studies show that guideline adherence by clinicians ranges only from 50% to 67%.⁷,⁸,⁹
► Similar lukewarm results have been observed with evidence-based clinical decision support efforts, which seems to indicate that influencing clinical and industrial behavior remains problematic.¹⁰,¹¹

Sources:
OUR NETWORK

fdb

zynxhealth

mcg

homecare

homebase

MEDHOK

OUR REACH¹

85% of discharged patients

205 Million insured individuals

70 Million home health visits

3.2 Billion dispensed prescriptions

OUR MISSION

To guide the most important care moments by delivering vital information into the hands of everyone who touches a person’s health journey

38 YEARS in the health information industry

PIONEERS of new and leading solutions

INDEPENDENT unbiased, evidence-based

¹ Annually in the United States
“Becoming the Best: Recent Developments in Evidence-Based Medicine”

Mitch DeKoven, MHSA
Senior Principal – Health Economics/Outcomes Research
IQVIA

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A better world

More effective health delivery

Focus on value and outcomes

Improved health
Imagine if every healthcare decision was the right decision for you

Bigger picture, bigger data, more precise insights and outcomes
The main sources of data relevant to health...are everywhere
The promise of big data is exciting

Increasing potential to have more data

Proven value of using it

Additional growth of companies applying data-driven decision making compared to competitors*

Productivity

Profitability

The promise of big data is exciting (cont’d)

Clinical trials are designed around the patient

Predictive analytics prevent medical errors

Treatment costs reflect the value they bring

Precision medicines find their way to the right patient

Every medical decision is informed by evidence
Payers and Regulators see the value of Real-World Evidence

**FDA**

“The more widespread use of RWE can make our medical product development process more efficient.... This will ultimately help us achieve better outcomes, and safer and more efficient use of expensive technology.”

Scott Gottlieb, MD, FDA Commissioner

[https://www.fda.gov/NewsEvents/Speeches/ucm576519.htm](https://www.fda.gov/NewsEvents/Speeches/ucm576519.htm)

**EMA**

EMA needs RWE to support adaptive approval pathways

- Intensive monitoring of patients
- Additional indication(s)
- Intensive monitoring of patients
- Initial Approval of niche indication

[![Diagram showing stages of adaptive approval process](https://via.placeholder.com/150)](https://via.placeholder.com/150)
Using RWE for more sophisticated site selection

- Faster recruitment by understanding treatment patterns
- Reduces costs by selecting better sites and reducing non-recruiting sites

**CASE STUDY**
Better execution

Two sites “look” the same

<table>
<thead>
<tr>
<th>Site</th>
<th>Total Crohn’s Patients</th>
<th>Eligible Crohn’s Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE A</td>
<td>353</td>
<td>125</td>
</tr>
<tr>
<td>SITE B</td>
<td>363</td>
<td>16</td>
</tr>
</tbody>
</table>

IQVIA can “see” actual available patients
Finding patients in rare disease

Making diagnosis possible
Diagnosis rates for high-risk patients*

Without the model

0.01%

With the model

5.20%

CASE STUDY
Rare Diseases

- **Machine learning**: 100+ medical and demographic predictors of 100M patients
- **Physician and patient data**: Identifying doctors with high-risk patients to increase diagnosis
- **New tools**: Increase screening, diagnosis

*Group defined as top 5% of undiagnosed rare disease patients*
Evidence hubs in NFL

DATA COLLECTION
- Novel application of registry technology
- Electronic medical record system
- Focus on customized medical staff training

ANALYSIS AND INSIGHTS
- Incidence and trends in injury occurrence
- Injury prevention analyses

REPORTS
- Specialty reports
- Published findings
- Updates to league
Multiple Sclerosis

Collect and link existing MRI and clinical data in the real world

- MS patients under routine clinical management
- Network of public & private neurology practices
- Quantitative MRI data
  - Whole/regional atrophy
  - T1, T2, Gd lesion activity & volume
- Structured EMR data
  - Comorbidities
  - Treatment patterns
  - Clinical assessments (EDSS, relapse, symptoms)
- Data anonymised, extracted, linked, and harmonized across sources
- Structured MRI+EMR Real World Dataset
  - Generation of novel observational research studies in MS
Generating Robust Evidence to Support Innovation
Portfolio transformation has enhanced financial strength, broadened future opportunities

2013\(^1\) Product Mix

- Specialty Brands
- Specialty Generics
- Imaging

2017\(^2,3\) Product Mix

- Specialty Generic
  - Disposal Group\(^5\)
- Specialty Brands

1 Includes Contrast Media and Delivery Systems (CMDS) and Nuclear Imaging (NI) sales
2 Excludes CMDS and NI sales due to discontinued operations classification upon announcement of the divestitures on 7/27/15 and 8/24/16, respectively
3 Represents the 2017 net sales attributed to AMITIZA® which was acquired on 2/13/2018
4 H.P. Acthar® Gel (repository corticotropin), INCIMAX® (nitric oxide) gas, for inhalation; OFIRMEV® (acetaminophen) injection; AMITIZA® (tadalafil); Therakos® immunology platform
5 Represents the 2017 net sales attributed to the Specialty Generic Disposal Group, considered discontinued operations as announced on 2/27/16
Development catalysts and product launches over next five years

19 Scientific Catalysts / Data Releases

9 Expected Product Launches
What is StrataGraft?

- Multi-layer skin substitute in development for the treatment of severe burns
  - Fully developed, multi-layered epidermis
  - Dermal fibroblasts in collagen-rich matrix
- Creates physical barrier
- Cryopreserved to maintain viability and biological activity
- Off-the-shelf availability; being studied as an option to reduce the need for autologous skin graft harvesting
- Shelf life enables on-site or on-demand availability
StrataGraft’s clinical trials builds on evidence-based approach to severe burn care

Surgical excision
Clinical confirmation of DPT

Randomize treatment sites
Prospectively identify donor sites
Apply NIKS tissue and autograft

Wound site assessments
Days 3, 7, 14, and 28

Donor site pain
Days 3, 7, 14, and 28

Test for NIKS tissue DNA
3 months

Immunological parameters
1 and 3 months

Cosmesis assessment
3, 6, and 12 months

Substantial evidence supports early excision and grafting as best approach, but adoption is not universal