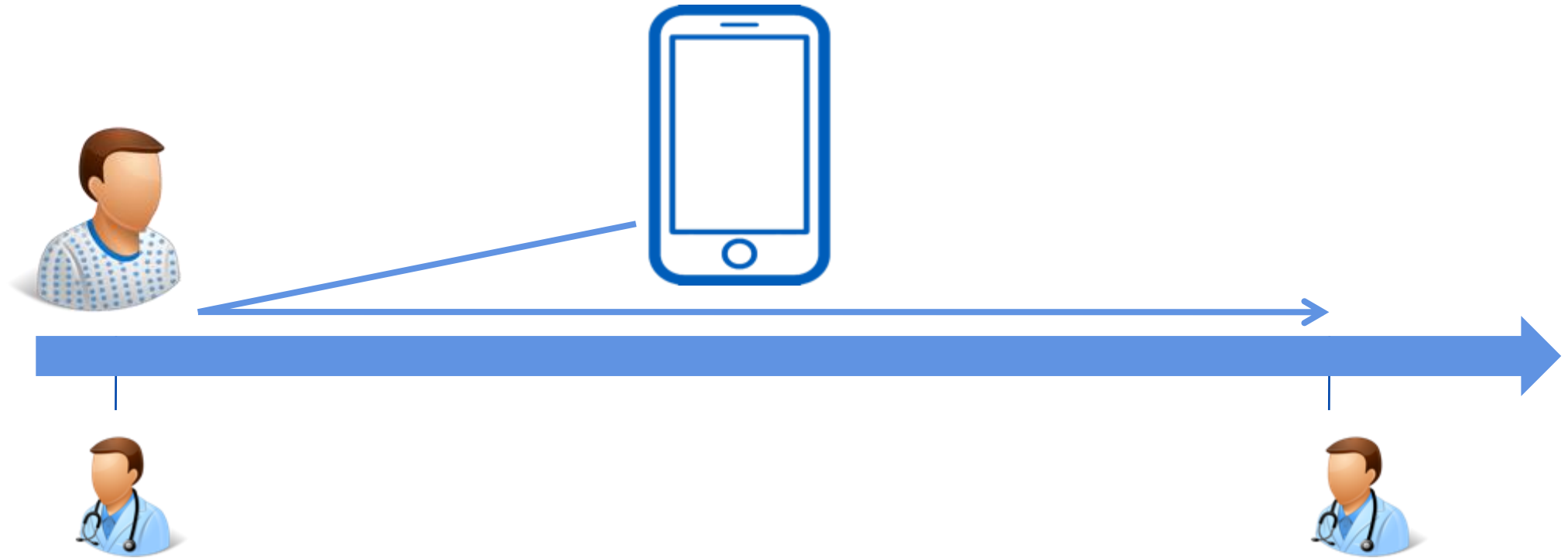




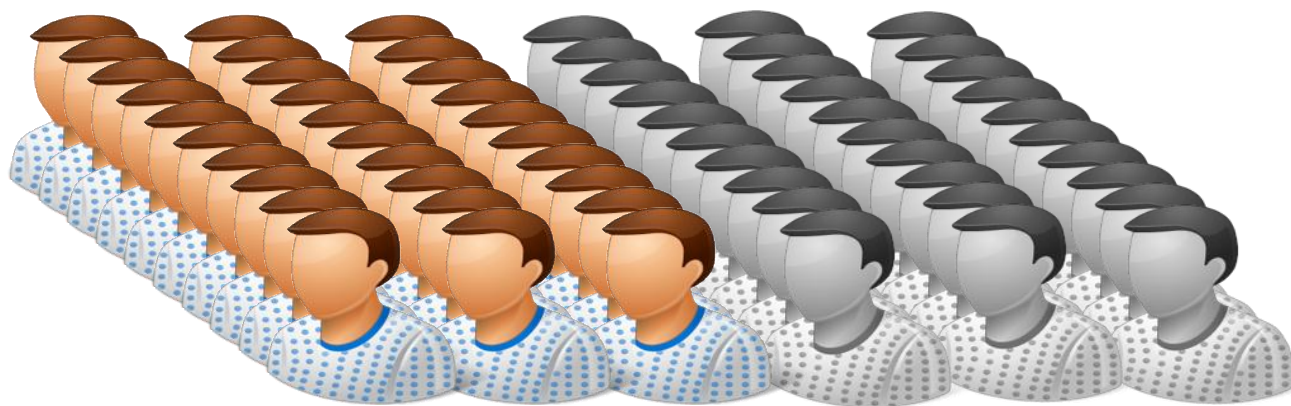
O. GRYSON, PharmD
Digital Marketing Director

PATIENT CENTRICITY & THE DIGITAL TRANSFORMATION OF HEALTH



CHRONIC DISEASE MANAGEMENT



IMPROVING DRUG USE



DRUG NONADHERENCE AFTER MI

Time after discharge	Nonadherent patients (at least 1 drug)
	
1 week	24%
1 month	34%
1 year	> 50%

Jackevicius CA, Li P, Tu JV. Prevalence, predictors, and outcomes of primary nonadherence after acute myocardial infarction. *Circulation*. 2008; 117: 1028–1036.

Ho PM, et al. Impact of medication therapy discontinuation on mortality after myocardial infarction. *Arch Intern Med*. 2006; 166: 1842–1847.

Jackevicius CA, Mamdani M, Tu JV. Adherence with statin therapy in elderly patients with and without acute coronary syndromes. *JAMA*. 2002; 288: 462–467.

CONSEQUENCES

MI: nonadherence to statins

- **Mortality:** +12% to 25%

CAD: nonadherence to treatment

- **CV hospitalizations:** + 10% to 40%
- **Mortality:** + 50% to 85%

Type 2 diabetes: good vs bad medication adherence

- **Mortality:** -28%
- **Hospitalizations:** -10%

Rasmussen JN et al. Relationship between adherence to evidence-based pharmacotherapy and long-term mortality after acute myocardial infarction. JAMA. 2007; 297: 177–186.

Ho PM, Magid DJ, Shetterly SM, et al. Medication nonadherence is associated with a broad range of adverse outcomes in patients with coronary artery disease. Am Heart J. 2008; 155: 772–779.

Khunti K, Seidu S, Kunutsor S, Davies M. Association Between Adherence to Pharmacotherapy and Outcomes in Type 2 Diabetes: A Meta-analysis. Diabetes Care. 2017 Aug 11. [Epub ahead of print] Review.

MEDICATION ADHERENCE

Medication Adherence: WHO Cares?

MARIE T. BROWN, MD, AND JENNIFER K. BUSSELL, MD

treatment of chronic illnesses commonly includes the long-term use of pharmacotherapy. Although these medications are often not used because approximately 50% of patients do not take their medications as prescribed. Factors contributing to poor medication adherence are myriad and include those that are related to patient characteristics (eg, suboptimal health literacy and lack of insight into the importance of adherence), system-related factors (eg, poor patient decision-making process), and provider-related factors (eg, prescription of complex regimens, ineffective patient education, and lack of patient involvement in decision-making).

portant that they partner with patients together.
This review

CARING ABOUT MEDICATION ADHERENCE



European Heart Journal (2013) 34, 2159–2219
doi:10.1093/eurheartj/eh151

ESH AND ESC GUIDELINES

Low adherence is extremely common for lifestyle changes but importantly extends to drug prescriptions, for which it develops quite rapidly: after 6 months, more than one-third and after 1 year about half of the patients may stop their initial treatment;

Josep Redon (Section co-ordinator) (Spain), Alberto Zanchetti (Section co-ordinator) (Italy), Michael Böhm (Germany), Thierry Christiaens (Belgium), Renata Cifkova (Czech Republic), Guy De Backer (Belgium), Anna Dominiczak (UK),

CARING ABOUT MEDICATION ADHERENCE

ACCEPTED MANUSCRIPT

Whelton PK, et al.

2017 High Blood Pressure Clinical Practice Guideline

Up to 25% of patients do not fill their initial prescription for antihypertensive therapy. During the first year of treatment, the average patient has possession of antihypertensive medications only 50% of the time, and only 1 in 5 patients has sufficiently high adherence to achieve the benefits observed in clinical trials

Cheryl Dennison Himmelfarb, RN, ANP, PhD, FAHA§

Sondra M. DePalma, MHS, PA-C, CLS, AACC||

Samuel Gidding, MD, FACC, FAHA¶

Kenneth A. Jamerson, MD#

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Randal J. Thomas, MD, MS, FACC, FAHA|||

Kim A. Williams, Sr, MD, MACC, FAHA†

Jeff D. Williamson, MD, MHS¶¶

CARING ABOUT MEDICATION ADHERENCE

Antihypertensive Medication Adherence Strategies

COR	LOE	Recommendations for Antihypertensive Medication Adherence Strategies
I	B-R	In adults with hypertension, dosing of antihypertensive medication once daily rather than multiple times daily is beneficial to improve adherence.
Ila	B-NR	Use of combination pills rather than free individual components can be useful to improve adherence to antihypertensive therapy.

CARING ABOUT MEDICATION ADHERENCE

Clinician's Sequential Flow Chart for the Management of Hypertension

Clinician's Sequential Flow Chart for the Management of Hypertension
Measure office BP accurately
Detect white coat hypertension or masked hypertension by using ABPM and HBPM
Evaluate for secondary hypertension
Identify target organ damage
Introduce lifestyle interventions
Identify and discuss treatment goals
Use ASCVD risk estimation to guide BP threshold for drug therapy
Align treatment options with comorbidities
Account for age, race, ethnicity, sex, and special circumstances in antihypertensive treatment
Initiate antihypertensive pharmacological therapy
Insure appropriate follow-up
Use team-based care
Connect patient to clinician via telehealth
Detect and reverse nonadherence
Detect white coat effect or masked uncontrolled hypertension
Use health information technology for remote monitoring and self-monitoring of BP

= 50% of patients!

ASCVD indicates atherosclerotic cardiovascular disease; BP, blood pressure; CVD, cardiovascular disease; and SBP, systolic blood pressure.



WHY DO DOCTORS SMOKE?





CARING ABOUT MEDICATION ADHERENCE



European Heart Journal (2013) **34**, 2159–2219
doi:10.1093/eurheartj/eh151

ESH AND ESC GUIDELINES



2013 ESH/ESC Guidelines for the management of ~~arterial hypertension~~ — the hypertensive patient

The Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC)

Authors/Task Force Members: Giuseppe Mancina (Chairperson) (Italy)*, Robert Fagard (Chairperson) (Belgium)*, Krzysztof Narkiewicz (Section co-ordinator) (Poland), Josep Redon (Section co-ordinator) (Spain), Alberto Zanchetti (Section co-ordinator) (Italy), Michael Böhm (Germany), Thierry Christiaens (Belgium), Renata Cifkova (Czech Republic), Guy De Backer (Belgium), Anna Dominiczak (UK),

DOES THE PHARMA INDUSTRY REALLY CARE?

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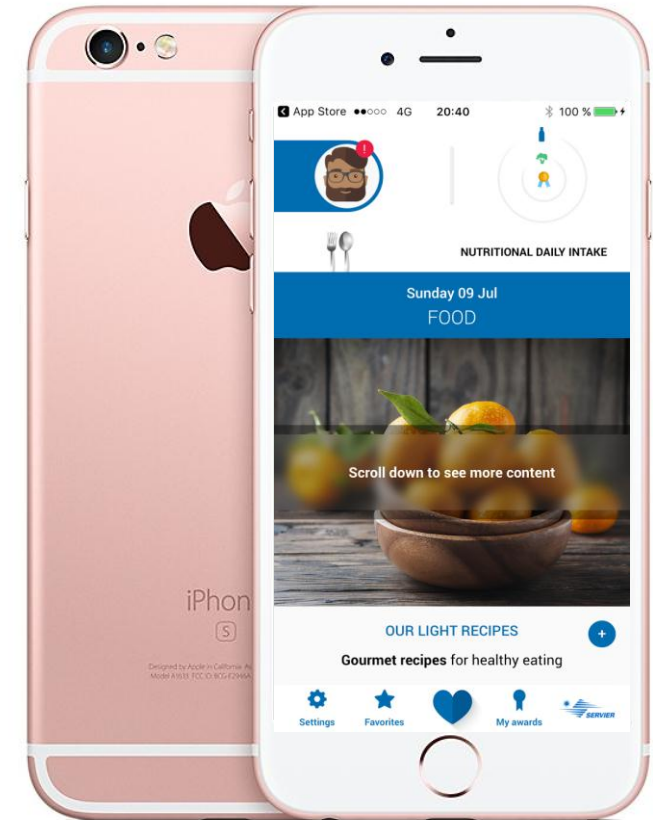
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HEALTH

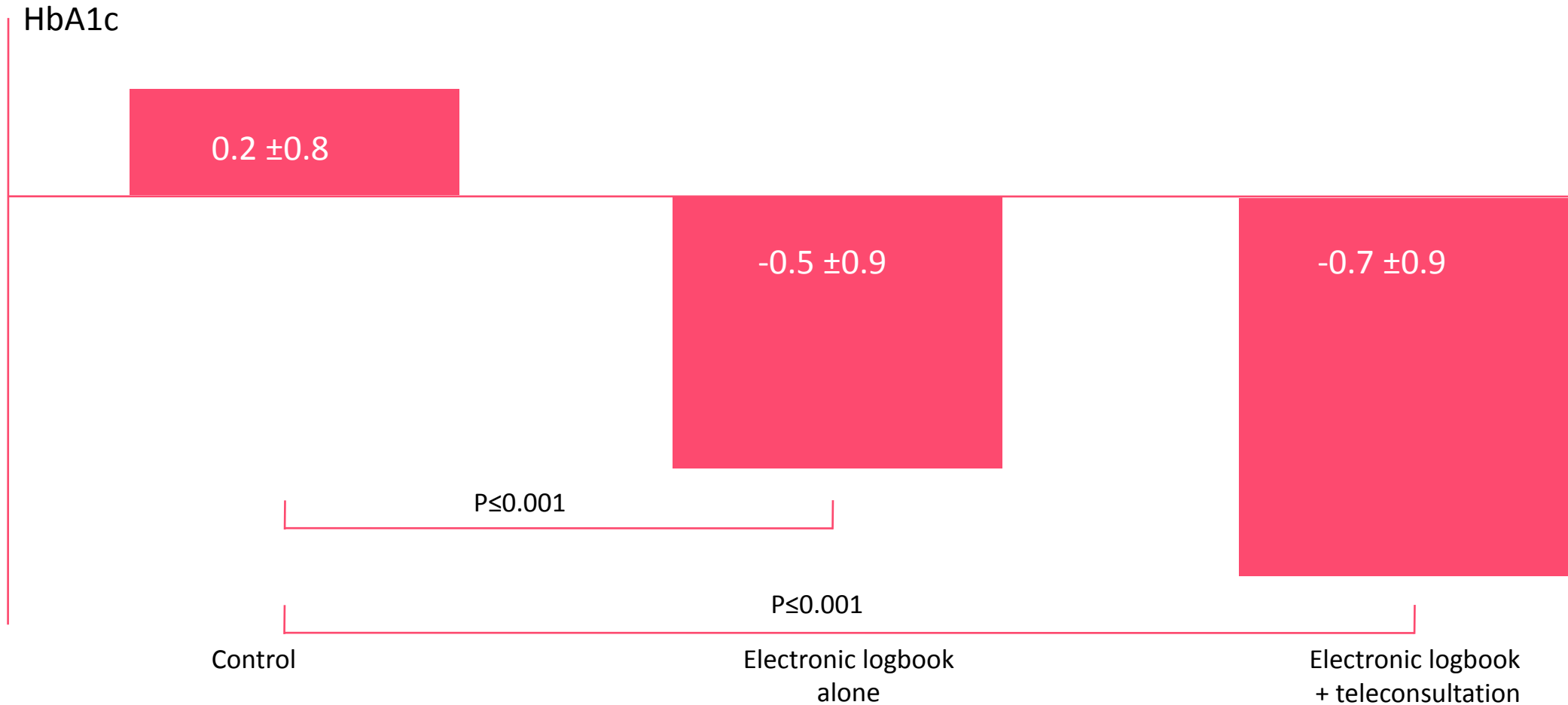
Cost to Develop New Pharmaceutical Drug Now Exceeds \$2.5B

A benchmark report estimates that the cost of bringing a drug to market has more than doubled in the past 10 years

By Rick Mullin, Chemical & Engineering News on November 24, 2014 6



EFFICACY OF ELECTRONIC LOGBOOK ± TELECONSULTATION FROM 3 MONTHS BEFORE BASELINE TO MONTH 6



NEW BUSINESS MODELS

Sanofi gets FDA clearance for insulin dose calculator app

By **Jonah Comstock** | April 06, 2017

Following in the footsteps of Eli Lilly, which has quietly received FDA clearance with a built-in insulin dose calculator app, Sanofi's new app, called My Dose Coach. A pending trademark application also suggests some kind of database of diabetes-related information. Sanofi reached out to Sanofi for comment on the story if they reply.

While there are a number of insulin apps available, not many are FDA-cleared. Sanofi's app has FDA-cleared guidance from the FDA that insulin premarket approval. A 2015 study from the FDA and the Centers for Disease Control and Prevention (CDC) found that 10% of the apps included in the study were not FDA-cleared, and that 10% of the apps are the minimal requirements for FDA clearance.

Eli Lilly has quietly received FDA clearance with a built-in insulin dose calculator app, called My Dose Coach. A pending trademark application also suggests some kind of database of diabetes-related information. Sanofi reached out to Sanofi for comment on the story if they reply.

The screenshot shows a TechCrunch article from July 7, 2017, by Mike Butcher. The article title is "Diabetes platform mySugr exits to Roche for as much as \$100M". The article features three smartphone screens displaying the mySugr app interface, which includes a home screen with a camera icon, a data entry screen, and a dashboard with various charts and graphs. The article also includes social media sharing icons and a "Next Story" button.

DA green light



lin dose

SHARE 500

5 Steps to Take Control of Your Personal Finances
Dollars

Crunchbase

BIG DATA & HEALTHCARE ANALYTICS FORUM
A HIMSS EVENT

SAN FRANCISCO, CA
MAY 15-16, 2017

Reimagine pharma players as solutions companies, not asset companies
How pharma can win in a digital world, McKinsey, December 2015

London offices activity levels and works in cooperation with insurers. It has been working with Roche since blood glucose values entered by the patient." Calculator, Diabetes Coach, Doctor Reports and a connected blood sugar meter with home-delivered

A SMART INITIATIVE IN SOUTH AFRICA



SMS

Original Paper

Improving Refill Adherence in Medicare Patients and Interactive Mobile Text Messaging

Brar Prayaga et al

Rena Brar Prayaga¹
BA, D

There was a significant difference in medication refill rates between the 2 groups, with a 14.07 percentage points higher refill rate in the text messaging group ($P < .001$).

Author:
Rena Brar Prayaga, MA, JD
mPulse Mobile, Inc
16530 Ventura Blvd
Encino, CA

Permanente Southern California, Downey, CA
Noble³, BA; Magdalen Kmiec¹

INFLUENCING LIFESTYLE



AS SEEN ON
TV



MHEALTH AND CV RISK FACTORS

Circulation

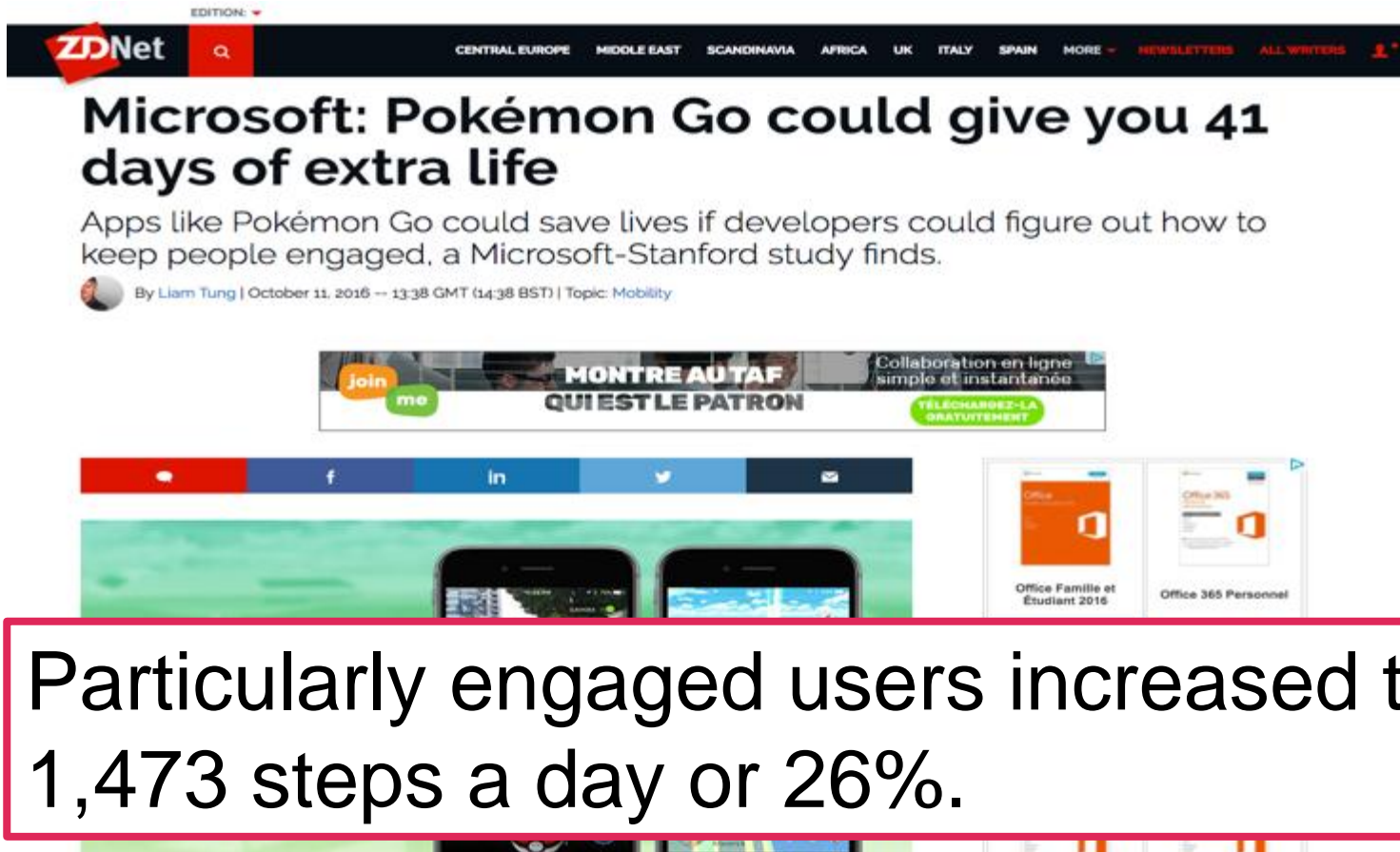
An American Heart Association Journal

AHA Scientific Statement

Current Science

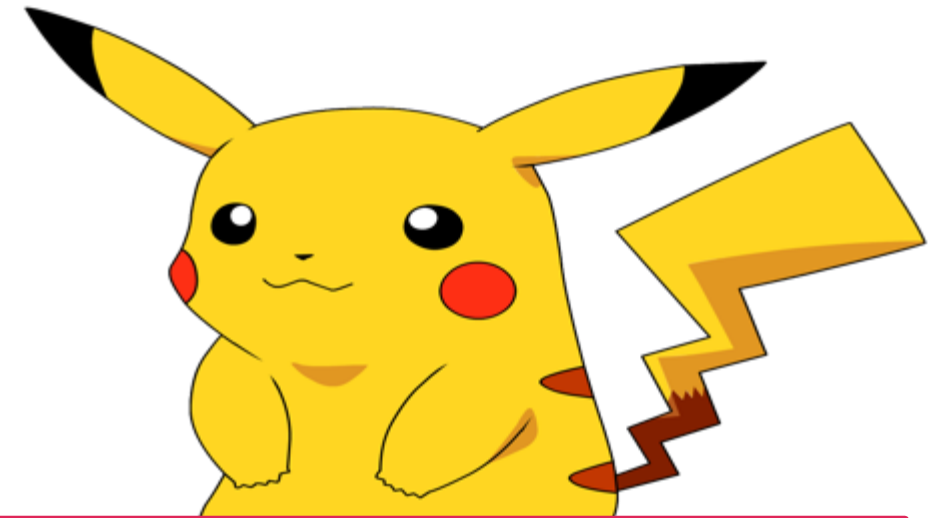
"The current absence of evidence should not be used as evidence of an absence of effectiveness. Instead, we need to embrace the challenge of producing this needed evidence on how effective these new technologies are and how we can best adopt them in our practice to promote better patient health."

INSIGHTS FROM THE VIDEO GAME INDUSTRY



The screenshot shows a ZDNet article with the following details:

- Header:** ZDNet logo, search icon, and navigation links for CENTRAL EUROPE, MIDDLE EAST, SCANDINAVIA, AFRICA, UK, ITALY, SPAIN, MORE, NEWSLETTERS, and ALL WRITERS.
- Title:** Microsoft: Pokémon Go could give you 41 days of extra life
- Sub-headline:** Apps like Pokémon Go could save lives if developers could figure out how to keep people engaged, a Microsoft-Stanford study finds.
- Author:** By Liam Tung | October 11, 2016 -- 13:38 GMT (14:38 BST) | Topic: Mobility
- Advertisement:** A banner for 'MONTRE AUTAF QUI EST LE PATRON' with a 'TELECHARGEZ-LA GRATUITEMENT' button.
- Content Preview:** A social media bar with Facebook, LinkedIn, and Twitter icons, and a preview of a mobile app interface.



Particularly engaged users increased their average activity by 1,473 steps a day or 26%.

PSYCHOLOGY BEFORE TECHNOLOGY

≡ TIME

TECHNOLOGY & MEDIA

Candy Crush Saga: The Science Behind Our Addiction

A year after the game's mobile launch, we still can't stop playing. The app's designer and psychology experts weigh in on exactly what makes it so irresistible

By Eliana Dockterman @edockterman | Nov. 15, 2013

f Share Like 19K Tweet G+ 199 in Share 210 Pin it Read Later



'A must-read for everyone who cares about driving customer engagement'

ERIC RIES, author of *The Lean Startup*

HOOKED

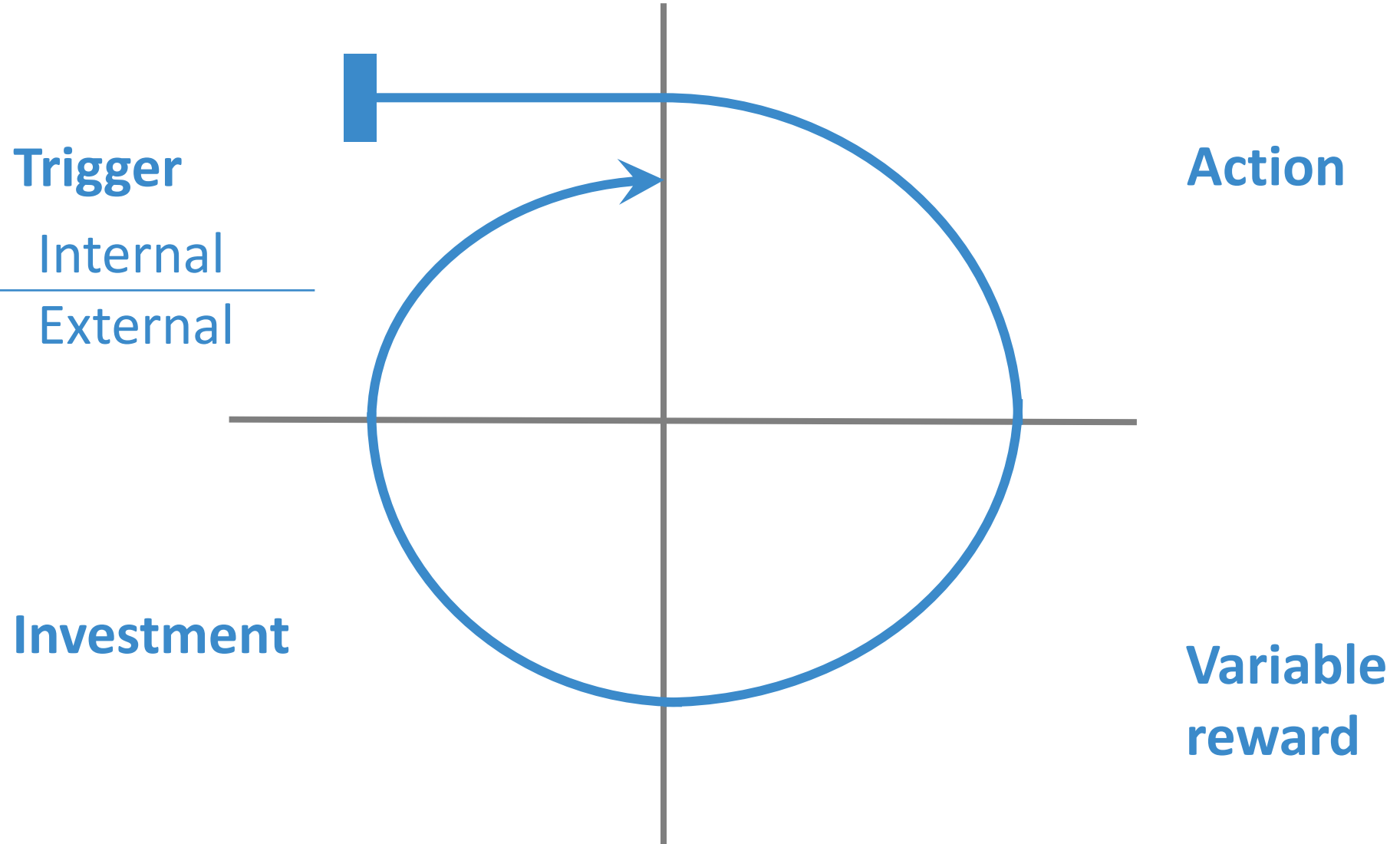


How to Build
Habit-Forming Products

NIR EYAL

WITH RYAN HOOVER

THE 4 STEPS OF THE HOOK MODEL



FOLLOW-UP



ONCOLOGY

Overall Survival Improvement



The median overall survival of patients who used the application was 19 months, compared to 12 months for those who received standard follow-up care.





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News Releases



Web-Based System for Self-Reporting Symptoms Helps

Download News Release



Patients with metastatic cancer who used the tool to regularly report symptoms while receiving chemotherapy lived a median of 5 months longer than those who did not use the tool.

ASCO Perspective

"Online technologies have transformed communications in practically every aspect of our lives, and now we're seeing they're also allowing patients to take an active role in their care and get immediate

Women

June 5, 2017

Alectinib Halts Lung Cancer Growth More Than a Year Longer Than Crizotinib

June 5, 2017

DIGITAL THERAPIES



DEPREXIS 24



DEPREXIS 24 (COGNITIVE BEHAVIORAL THERAPY)

- Positive outcomes

- Efficacy proven through 12 randomized clinical trials

- Challenges

- Acceptance by healthcare professionals and psychotherapists
- Reimbursement

The screenshot shows the Deprexis 24 app interface. At the top, the app name 'deprexis' is displayed on the left, and 'Your area' and 'Olivier' are on the right. The main content area contains a text-based conversation with a character named Olivier. The text reads: 'I understand. That's not at all unusual, depression can happen on it's own, without any clear or obvious reason. Let me ask a general question so that I can get to know you better: There are people who are very **sensitive and gentle**. Others often perceive them as **shy, clingy or dreamy**... There's nothing wrong with that - these are perfectly normal characteristics. What would you say about yourself, Olivier: Are you this shy, sensitive kind of person?'. Below the text is an illustration of a hand pointing towards a woman's face. Underneath the illustration, it says 'Sensitive people often react strongly to harsh criticism...'. At the bottom, there are two response options, each with a radio button: 'Yes, that sounds like me.' and 'I'd say the opposite: I'm a pretty "tough" type of person... not particularly sensitive.'

DEPREXIS 24 (COGNITIVE BEHAVIORAL THERAPY)

Messerli-Bürgey et al. *Trials* 2012, **13**:24
<http://www.trialsjournal.com/content/13/1/24>

Research

STUDY

The |
psyc
depr
cont

Regular Article

Psychother Psychosom 2016;85:218–228
DOI: 10.1159/000445355

Received: August 1, 2015
Accepted after revision: March 9, 2016
Published online: May 27, 2016



Open Access



A rand

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^a University Me
^b University Me

A R T I C L E

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Received 8 Oct
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5 April 2012
Accepted 20 A

Keywords:
Depression
Intervention

Effects of an Internet interv
symptoms: Randomized cc

Björn Meyer ^{a,b,*}, Julia Bierbrodt ^c, J
Gitta Jacob ^{a,f}, Christina Späth ^g, Ge
Matthias Rose ^{n,o}, Fritz Hohagen ^g,

Nadine Me

Effects of a Psychological Internet Intervention in the Treatment of Mild to Moderate Depressive Symptoms: Results of the EVIDENT Study, a Randomized Controlled Trial

Abstract

Background
rehabilitat
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proven to
treatment
effective |

Methods

Jan Philipp Kleinⁱ Thomas Berger^j Johanna Schröder^a Christina Späthⁱ Björn Meyer^{d,m}
Franz Caspar^j Wolfgang Lutz^e Alice Arndt^e Wolfgang Greiner^f Viola Gräfe^f
Martin Hautzinger^g Kristina Fuhr^g Matthias Rose^{h,n} Sandra Nolte^{h,o} Bernd Löwe^b
Gerhard Andersson^{k,l} Eik Vettorazzi^c Steffen Moritz^a Fritz Hohagenⁱ

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Eberhard Karls University Tübingen, Tübingen, ^hDepartment of Psychosomatic Medicine, Charité University
Medical Center, Berlin, and ⁱDepartment of Psychiatry and Psychotherapy, Lübeck University, Lübeck, Germany;
^jDepartment of Clinical Psychology and Psychotherapy, University of Bern, Bern, Switzerland; ^kDepartment of

A B S T R A C T

Background: Studies have shown that certain Internet in
many such interventions contain personal support element

receiving regular psychotherapy. Adults with a depressive disorder (N = 800) will be recruited in routine secondary
care from therapists over the course of their initial sessions and will then be randomized within therapists to one of

A R T I C L E I N F O

Article history:
Received 22 July 2014

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omas Berger¹

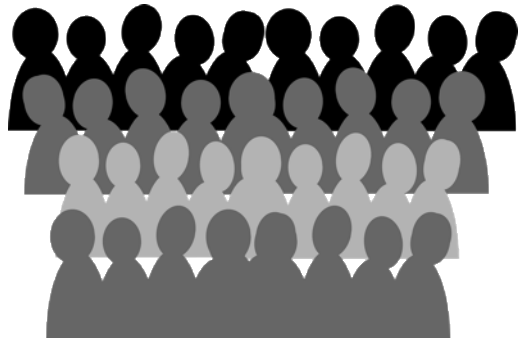
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NEXT CHALLENGES



WHY DO DOCTORS TRUST AND PRESCRIBE A DRUG?



Clinical trials involving thousands of patients



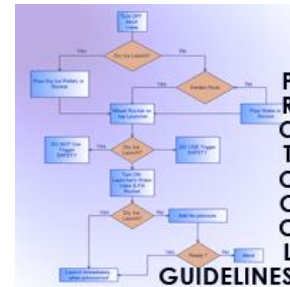
Medical congresses



Pharmacovigilance



Peer-reviewed publication

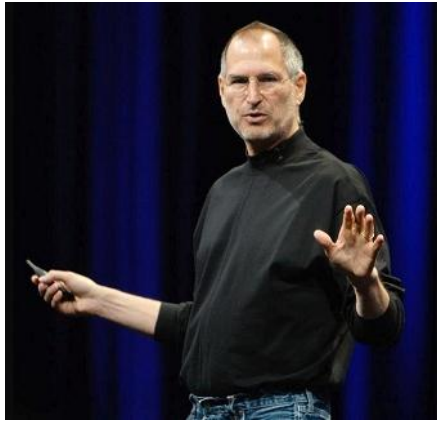


Medical guidelines

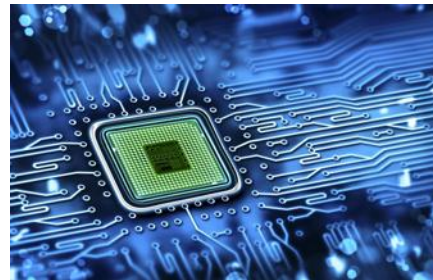


EUROPEAN MEDICINES AGENCY
SCIENCE MEDICINES HEALTH
Health authorities

WHY WOULD THEY TRUST AND PRESCRIBE A DIGITAL SERVICE?



Because it's cool!



High-tech



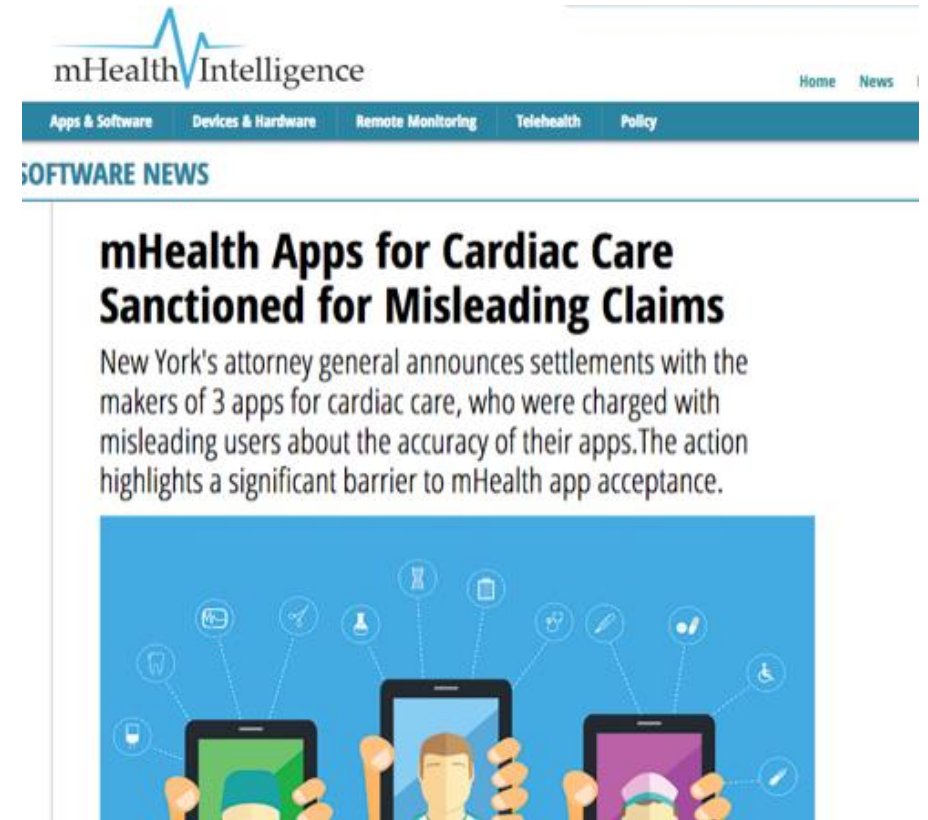
And the rep is convincing

THEREFORE, MANY DOCTORS DON'T PRESCRIBE THEM AT ALL!



FROM E-GADGETS TO E-DRUGS

- Evidence-based e-medicine
- Regulatory guidances
- Integration into the health care system

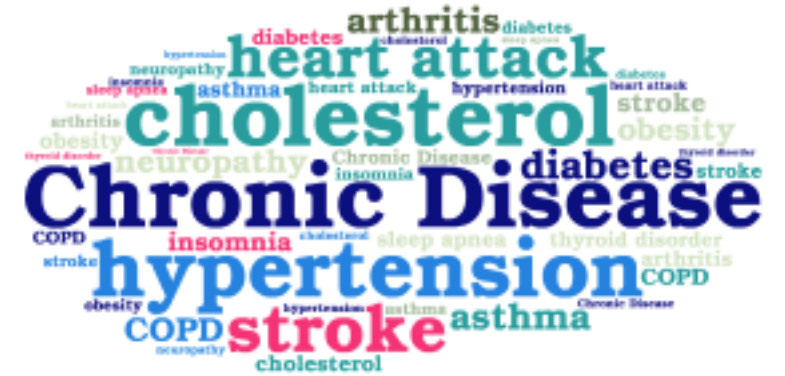
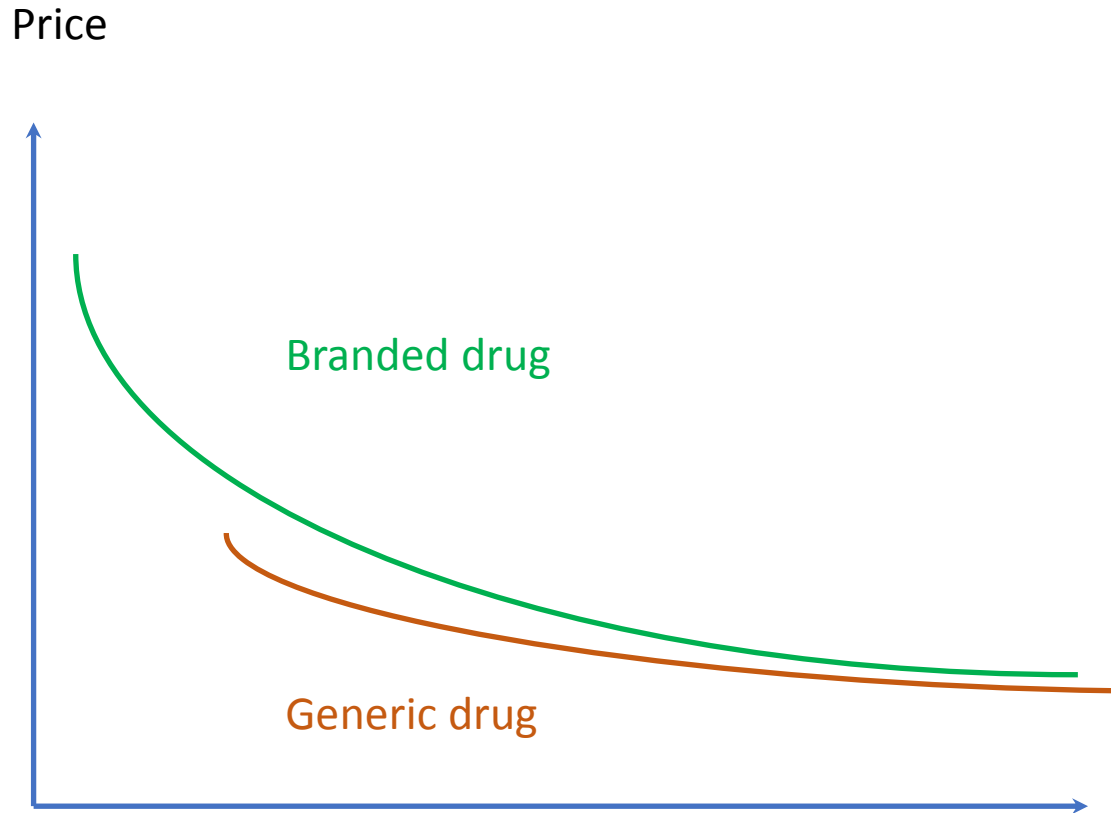


The screenshot shows the mHealth Intelligence website. The logo is at the top left, and navigation links for 'Home' and 'News' are at the top right. A dark blue navigation bar contains links for 'Apps & Software', 'Devices & Hardware', 'Remote Monitoring', 'Telehealth', and 'Policy'. Below this is a 'SOFTWARE NEWS' section. The main article is titled 'mHealth Apps for Cardiac Care Sanctioned for Misleading Claims' and includes a sub-headline: 'New York's attorney general announces settlements with the makers of 3 apps for cardiac care, who were charged with misleading users about the accuracy of their apps. The action highlights a significant barrier to mHealth app acceptance.' Below the text is an illustration of three hands holding smartphones, with various medical and technology icons floating around them.

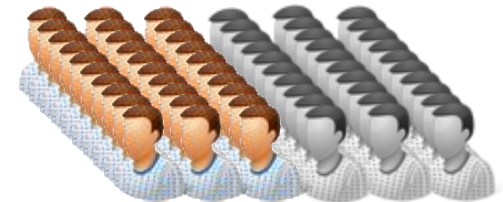
NEW OPPORTUNITIES

- **More efficient drugs**
- **Impact on the life cycle of drugs**
- **New real-world outcomes-based business models**

CHRONIC DISEASES



Unmet needs are about drug adherence & lifestyle issues



THE FUTURE OF PHARMA COMPANIES

**From drug providers
to
global care offer providers**

YES BUT IT'S SOOOOO COMPLICATED...



DIGITAL DISRUPTORS ARE CUSTOMER-CENTRIC AND THEY DON'T CARE ABOUT EXISTING SILOS

