INNOVATION AND AMR

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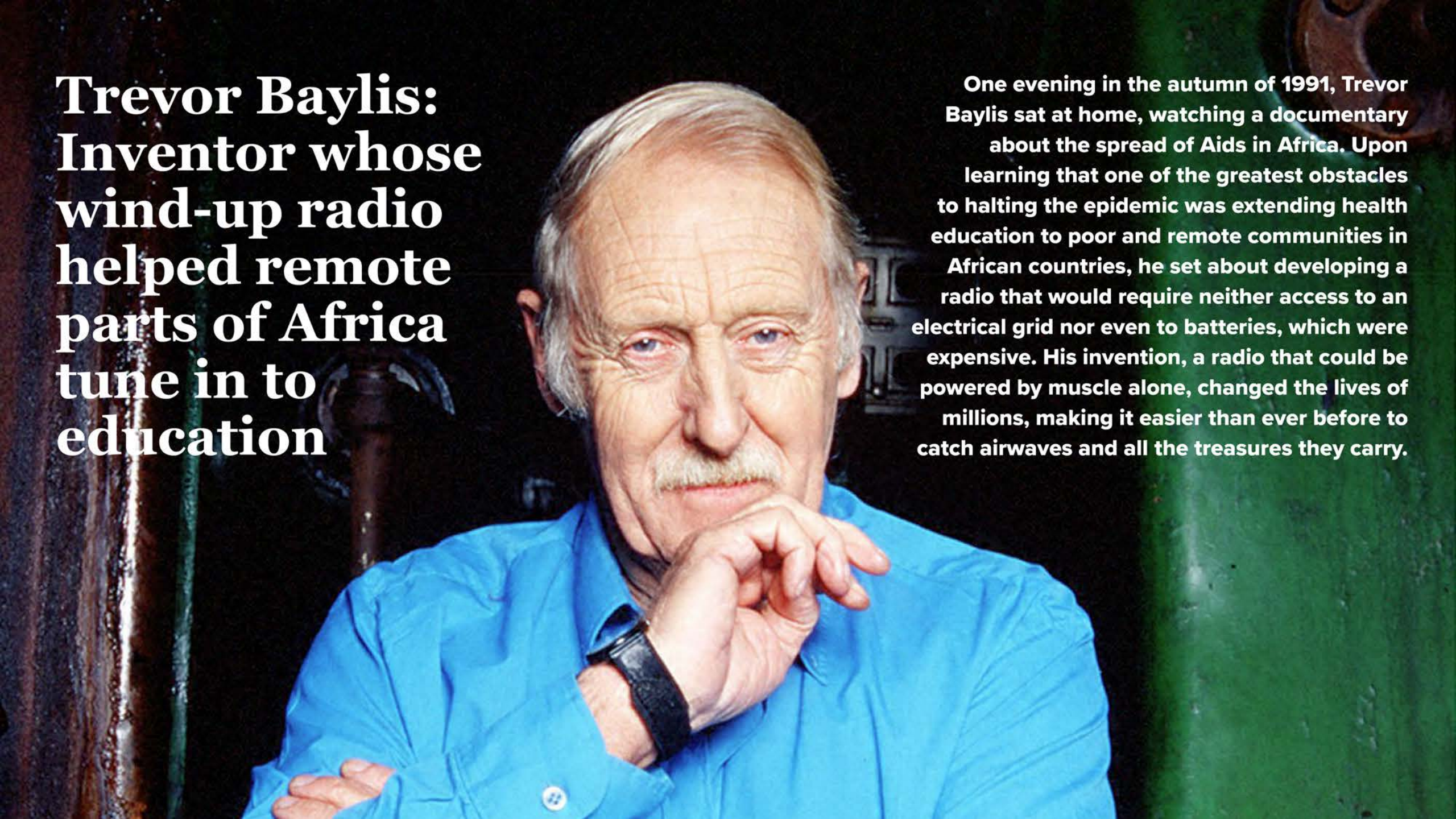
Deloitte.

Top 10 Health care innovations:
Achieving more for less

INNOVATION:
Any combination of activities or technologies that breaks existing performance tradeoffs in the attainment of an outcome, in a manner that expands the realm of the possible. Defined in health care as providing "more or less" – more value, better outcomes, greater convenience, access and simplicity; all for less cost, complexity, and time required by the patient and the provider, in a way that expands what is currently possible.

Source: https://www2.deloitte.com/global/en/pages/life-sciences-and-healthcare/articles/top-10-health-care-innovations.html

Trevor Baylis: Inventor whose wind-up radio helped remote parts of Africa tune in to education



One evening in the autumn of 1991, Trevor Baylis sat at home, watching a documentary about the spread of Aids in Africa. Upon learning that one of the greatest obstacles to halting the epidemic was extending health education to poor and remote communities in African countries, he set about developing a radio that would require neither access to an electrical grid nor even to batteries, which were expensive. His invention, a radio that could be powered by muscle alone, changed the lives of millions, making it easier than ever before to catch airwaves and all the treasures they carry.

03 | CHAPTER THREE

"Innovative finance mechanisms and partnerships have been developed not only to facilitate developing country procurement of new and existing products but also to ensure the continued mobilization of the financial resources necessary for innovations."

CREATING AN ENVIRONMENT TO ENHANCE DELIVERY AND UPTAKE OF INNOVATIONS

One of the great concerns of innovators in health is how to make sure the products they have developed have maximum impact on the health of those in need. Innovations in demand creation are underway in many communities to make sure there is an understanding about when to seek health care using existing and newer technologies.

At the same time, innovative finance mechanisms and partnerships have been developed not only to facilitate developing country procurement of new and existing products but also to ensure the continued mobilization of the financial resources necessary for innovations.

This chapter provides an overview of several community-based demand-creating innovations, and of many different financial mechanisms that mobilize and provide funding so that developing countries are able to provide best practice in health care. It also provides examples of how partnerships in advocacy can justify global health financing, and mobilize the resources needed. Some of these mechanisms provide opportunities for private and corporate social investment and are increasing in demand in G20 and other countries around the world. Others demonstrate how innovative contracting models between governments and the biopharmaceutical industry can help contain costs and better sustain health care.

Source: https://www.finddx.org/wp-content/uploads/2019/03/G20-Report_Health_Nations_Sustainable_Economies_G20HDP-reduced_MB.pdf

TACKLING ANTIMICROBIAL RESISTANCE 2019-2024

The UK's five-year national action plan

Ambition 1: Continue to be a good global partner

Ambition 2: Drive innovation

Ambition 3: Minimise infection

Ambition 4: Provide safe and effective care to patients

Ambition 5: Protect animal health and welfare

Ambition 6: Minimise environmental spread

Ambition 7: Support sustainable supply and access

Ambition 8: Demonstrate appropriate use of antimicrobials

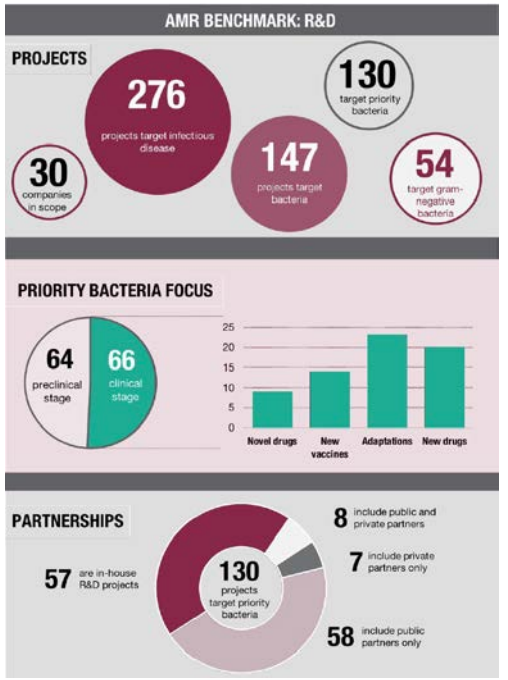
Ambition 9: Engage the public on AMR

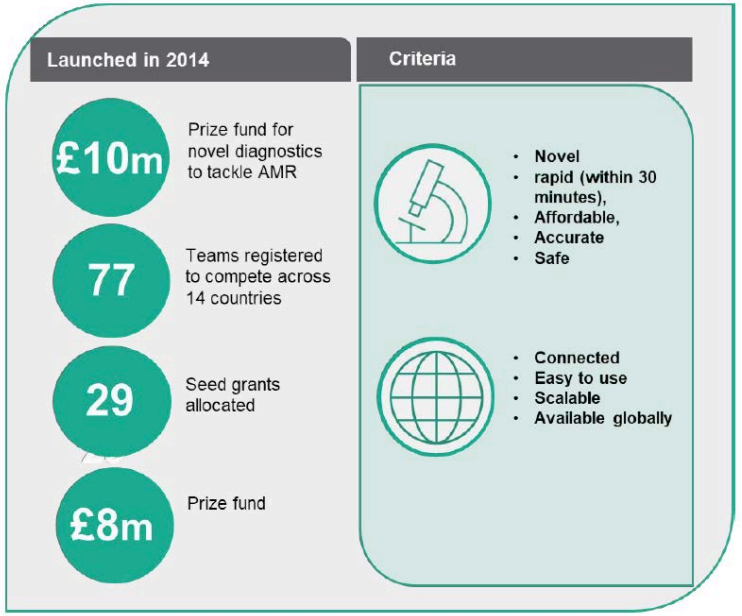
4.1 Sustainable investment in basic research

4.2 Development of new therapeutics

4.4 Development of, and access to, diagnostics

4.5 Development of, and access to, vaccines





Top 10 innovations

- Next-generation sequencing (NGS)
- 3D-printed devices
- Immunotherapy
- Artificial intelligence (AI)
- Point-of-care (POC) diagnostics
- Virtual reality (VR)
- Leveraging social media to improve patient experience
- Biosensors and trackers
- Convenient care: Retail clinics and urgent care
- Telehealth
- Popular innovations that didn’t make the list

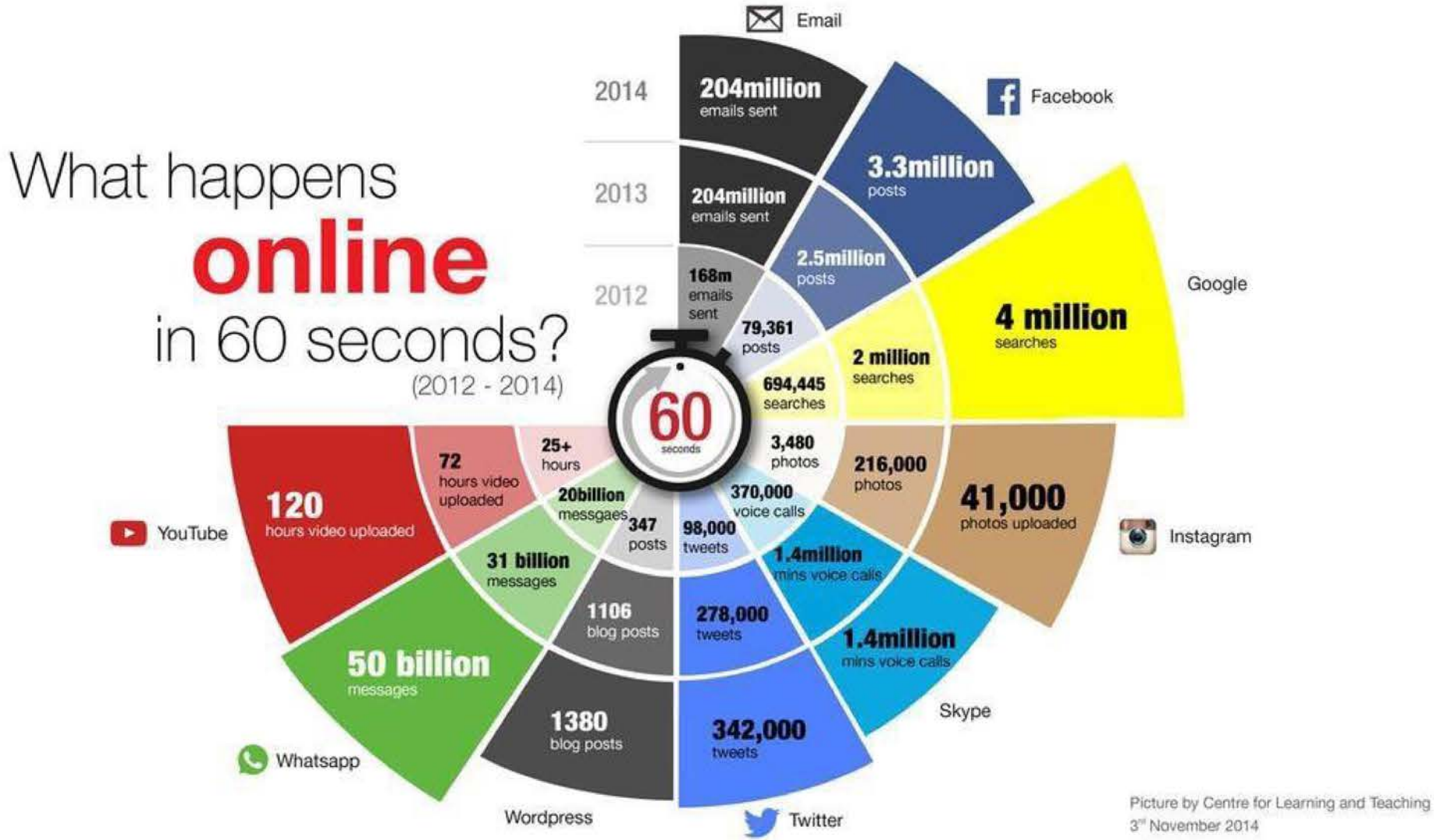


Fig: Growth of online social media activity between 2012 and 2014

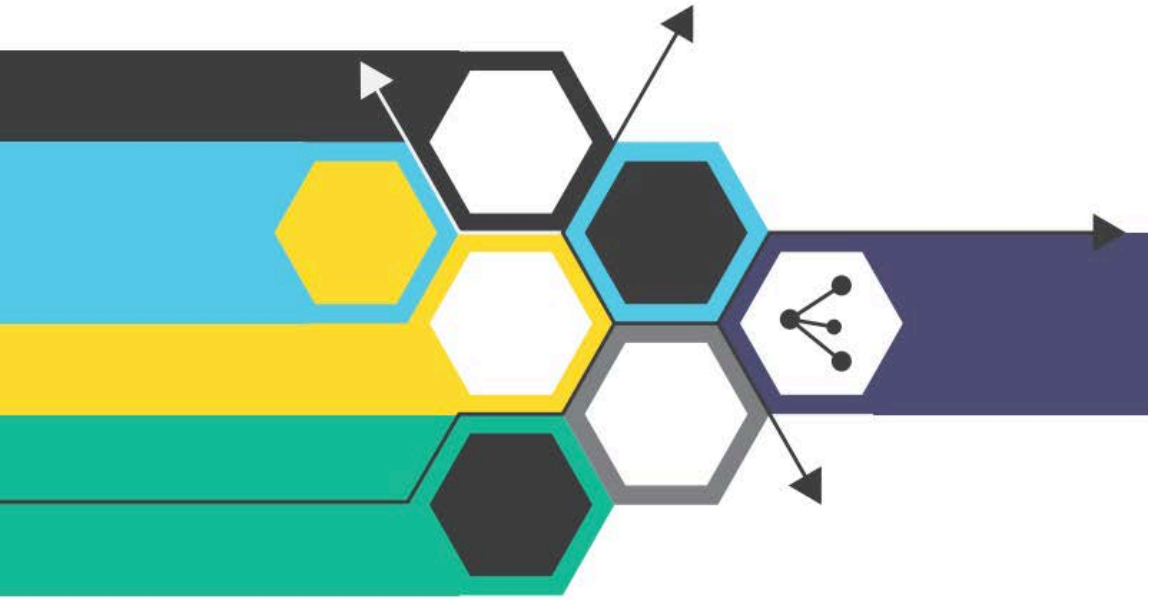
NEJM Catalyst

Insights Report · November 2017

Patient Engagement Survey

Social Networks to Improve Patient Health

Kevin G. Volpp, MD, PhD University of Pennsylvania
Namita S. Mohta, MD NEJM Catalyst



Leveraging social media to improve patient experience

NEJM GROUP

Advisor Analysis

Social networks—both face-to-face and virtual—have been shown to positively impact behaviors such as weight loss and smoking cessation. Is the health care industry ready to more widely leverage this mechanism for increasing healthy behaviors among patients?

What are the top three situations in which social networks are most useful in health care delivery?

Base = 601 (multiple responses)

Social Networks Will Have a Major or Moderate Impact on Health Care's Quadruple Aim

When social networks are mature, what level of impact will they have on different aspects of health care?

	Major impact	Moderate impact	Slight impact	No impact
Patient engagement	44%	47%	8%	0%
Quality of care	29%	49%	20%	2%
Provider engagement	18%	44%	33%	5%
Cost of care	18%	36%	37%	9%

Base = 601

"When social networks mature, nearly all respondents think they will have a major to moderate impact on patient experience

WHAT MAKES PEOPLE TALK ABOUT ANTIBIOTICS ON SOCIAL MEDIA? A RETROSPECTIVE ANALYSIS OF TWITTER USE

Oliver J. Dyar[1], Enrique Castro-Sanchez and Alison[2]* H. Holmes[2]

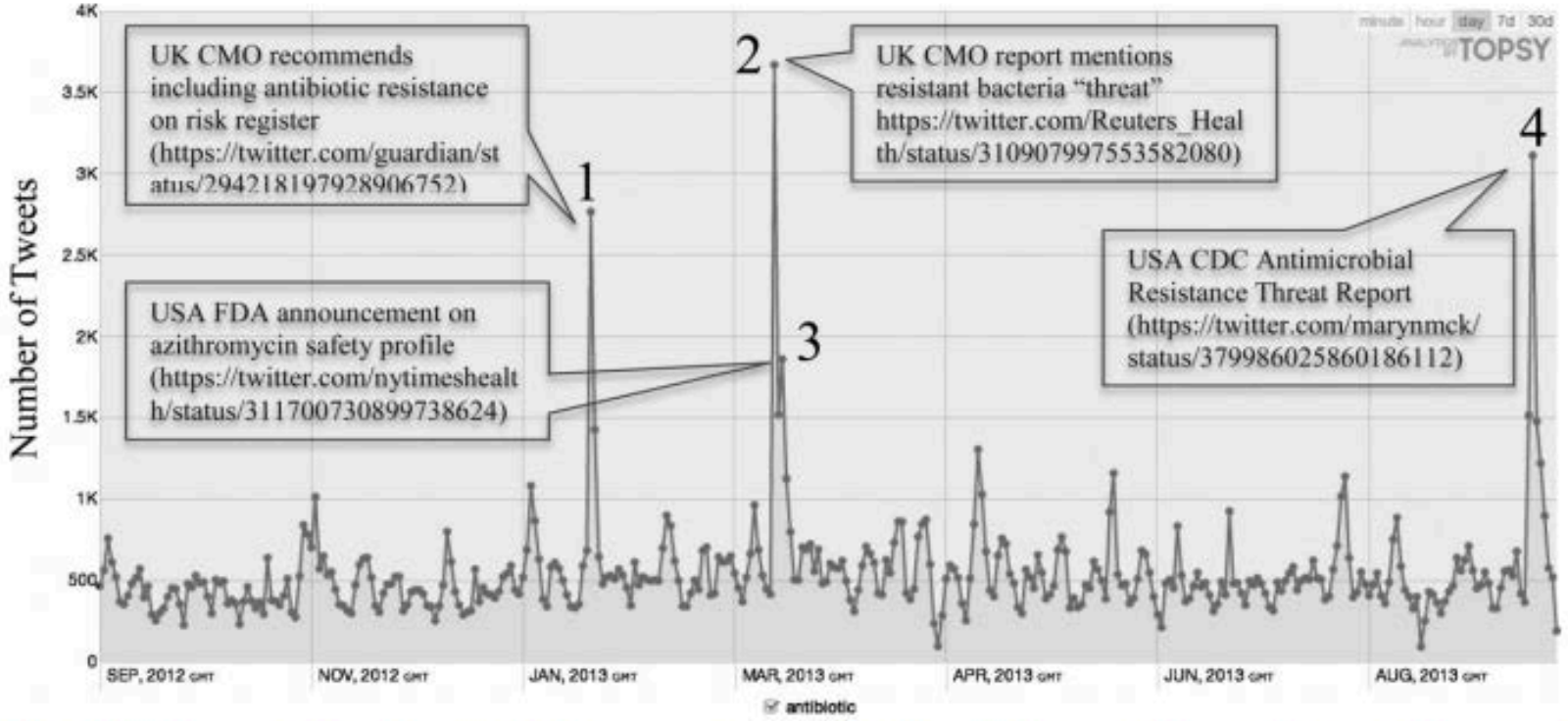
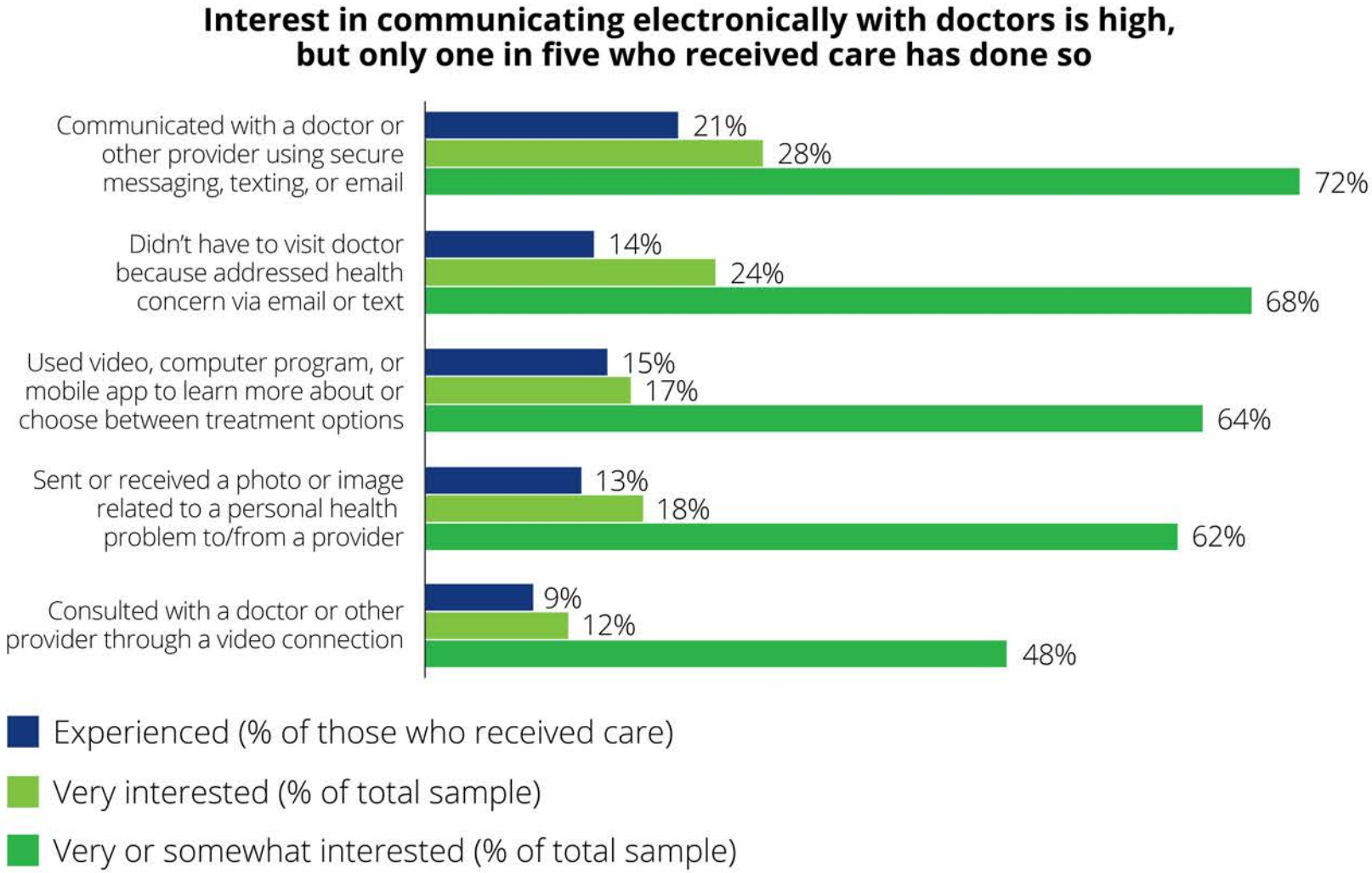


Figure 2. Daily frequency of public Tweets containing the term 'antibiotic' over the study period (24 September 2012 to 23 September 2013) with content of peak antibiotic Tweets. Reproduced with permission from Topsy.

CONCLUSIONS: Institutional events can rapidly amplify antibiotic discussions on social media, but their short life-span may hinder their public impact. Multipronged strategies may be required to prolong responses. Developing methods to refine social media monitoring to evaluate the impact and sustainability of societal engagement in the antimicrobial resistance agenda remains essential.

Figure 4. Consumer interest in communicating electronically with doctors is high[46]



Source: Deloitte Center for Health Solutions 2015 Survey of US Health Care Consumers.

Source: https://www2.deloitte.com/global/en/pages/life-sciences-and-healthcare/articles/top-10-health-care-innovations.html

Antimicrobial stewardship through telemedicine and its impact on multi-drug resistance

Journal of Telemedicine and Telecare
0(0) 1–7

DOI: 10.1177/1357633X18767702
journals.sagepub.com/home/jtt

Hospital Regional Alto Vale is a 220-bed hospital that serves clinical and surgical patients in Rio do Sul, southern Brazil. It has an intensive care unit for clinical, cardiac, pediatric and neonatal patients. The teleinfectology base was located in Porto Alegre, which is located 400 km from the remote hospital.

We conducted a quasi-experimental study to assess the impact of an antimicrobial stewardship program incorporating immediate post-prescription reviews and the provision of feedback through telemedicine tools. A web-based platform designed to facilitate the review of clinical data and provision of feedback to physicians working at the remote hospital was created and has been described elsewhere.[9]

The consultation service was available from May 2014. Hospital physicians were trained on how to use the platform, and remote professionals (four infectious disease (ID) specialists) provided feedback through the platform, e-mails and text messages. The ID specialists were divided according day-shifts and responded to all consultation during their work shifts. All initiated antimicrobial prescriptions had to be reported, and patient data were entered into the web platform to be evaluated remotely by the ID specialists. The web platform enabled every case to be discussed, and the suggestions provided by ID specialists could be refuted. Therefore, medical staff had the choice to accept or reject the specialist advice. The physicians had unlimited access to the ID specialist either through the web platform or by phone (as needed) 7 days a week.

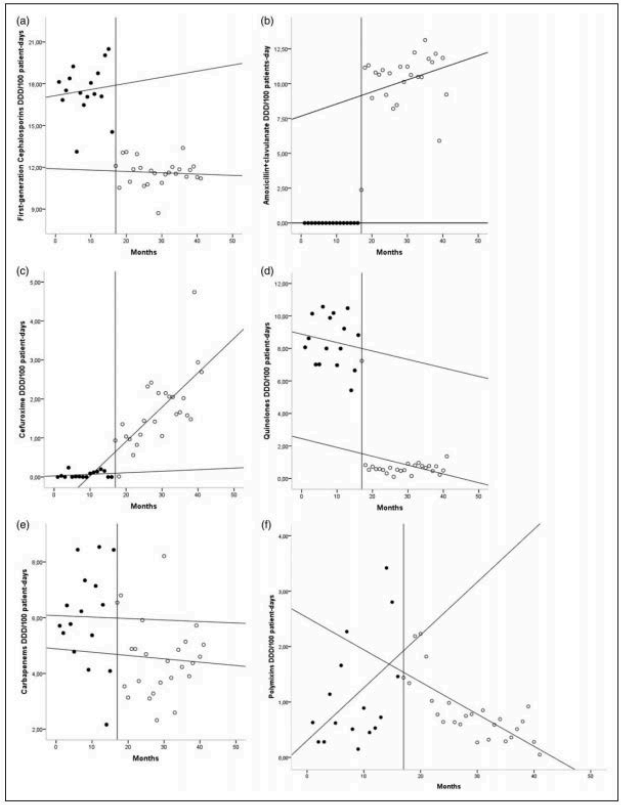


Figure 2. Pre- and post-intervention consumption of antimicrobials in DDD/100 patient-days. (a) DDD per 100 patient-days for first-generation cephalosporins; (b) DDD per 100 patient-days for amoxicillin +clavulanate; (c) DDD per 100 patient-days for cefuroxime; (d) DDD per 100 patient-days for quinolones; (e) DDD per 100 patient-days for carbapenems; (f) DDD per 100 patient-days for polymyxins.

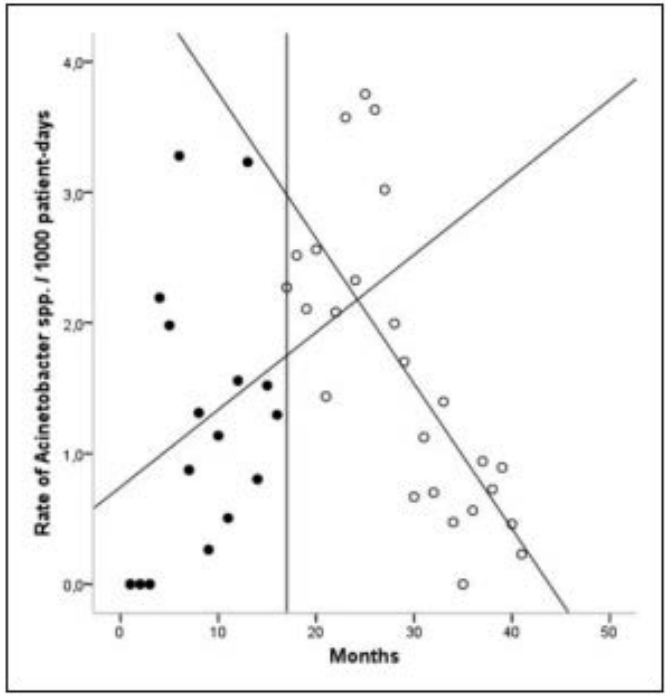


Figure 3. Pre- and post-intervention rates of positive culture results (infection or colonization) for carbapenem-resistant *Acinetobacter* spp. per 1000 patient-days.

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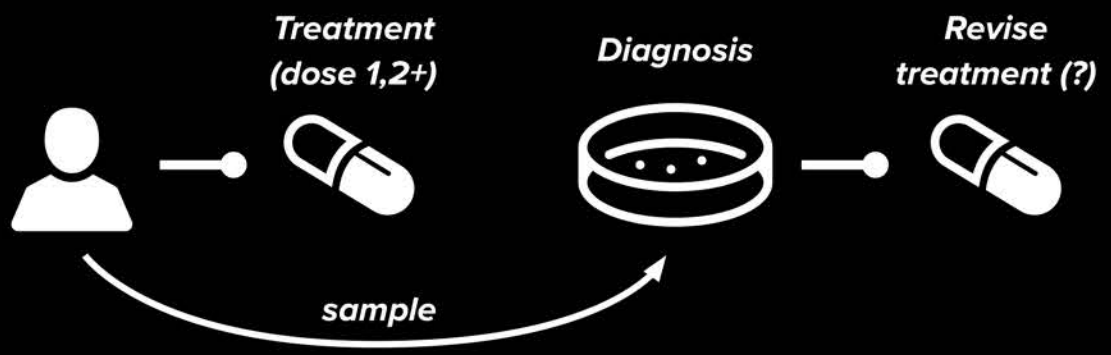
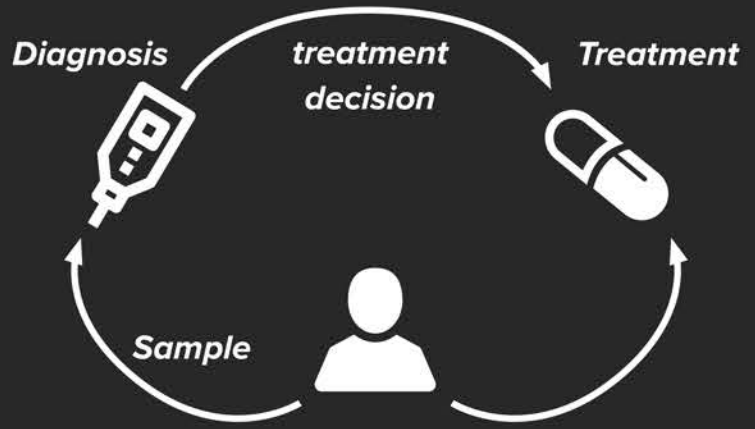
Speeding up the availability and uptake of diagnostic results would yield both treatment and stewardship benefits

At present, empiric treatment relies on initial physician judgment



- Empiric treatment based on symptoms, physicians knowledge about the patient & trends in infection & resistance
- First (and subsequent) dose prior to diagnosis
- Bias toward broad-spectrum coverage
- May treat unnecessarily, contributing to resistance
- May treat the wrong pathogen/resistance profile, leading to poor patient outcome
- Physician may be reluctant to de-escalate treatment if patient seen to be doing well

The integration of repid diagnostics into treatment decisions would have several benefits



- Rapid, point of care diagnostics would provide positive knowledge to physician of what to treat
- Enable targeted treatments if sufficient trust in diagnosis
- Reduce over-broad and unnecessary treatment
- Avoid failure to treat right pathogen / resistance profile
- Could be confirmed by culture
- Assumes diagnostic technology is available, sufficiently accurate, and integrated into treatment pathway.

DAYZERO DIAGNOSTICS

Using genome sequencing & machine learning to modernize infectious disease diagnosis and treatment

Antibiotic resistance is creating a public health crisis. Patients with a severe infection can die within hours, but current diagnostics for antibiotic resistance can take 2-5 days or never return a result at all. At DZD, we are developing a rapid, whole genome sequencing-based diagnostic that identifies the species and antibiotic resistance profile of a bacterial infection within hours. Our machine learning algorithm Keynome™ uses MicrohmDB®, a proprietary microbial resistance database, to determine antibiotic resistance from genomic data. In a severe infection, faster treatment with the right antibiotic saves lives and reduces costs.

https://www.youtube.com/watch?v=a09B4MuiMH0&feature=youtu.be

Directorate-General for Health & Consumers

Challenges

- *In delivery*
  - Communication
    - Lack of awareness of influenza
    - Lack of education on the disease
    - Lack of trust towards authorities
    - Lack of adequate advice
    - New media
  - Doubts on vaccine safety & effectiveness
  - Involvement of healthcare workers
    - Zurich University - 79% of people likely to be vaccinated if recommended by healthcare provider

9. Promoting vaccination - Communication and Investigating Behavioural Aspects

Updating Communicaion Tool kit
Annual ‘Spotlights’

Developing and evidence based approach to behavioural interventions

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What do you need to make innovation happen?

Build ecosystems:

Adopting many of these innovations requires capabilities that fall beyond the traditional purview of health care organizations. They should identify partners which can complement their existing capabilities or fill gaps. Some of these complementary capabilities could include technology development, data capture, or patient engagement.

Embrace nontraditional sources of knowledge:

The democratization of innovation and the rise of the makers movement, where individuals or groups of individuals use existing materials to build solutions to health care's challenges, could create new sources of knowledge and talent. Organizations might consider looking outside their walls and crowdsourcing fresh ideas to challenging problems.

Pilot, experiment, and scale:

Given the rapid pace of change, organizations would benefit from embarking on small-scale pilots before entering into full-scale contracts with new technology providers. Small-scale pilots would allow organizations to experiment with new approaches or technologies. If they are successful, then expand to scale. If not, then quietly pivot to adjust the strategy.

Experiment with new business models:

Traditional health care business models are changing and, as a result, organizations could benefit from expanding beyond traditional revenue sources. Many health care organizations are growing venture capital investments or engaging in joint ventures with nontraditional partners.

Focus on change management:

Many times an organization knows it needs to change and wants to do so but simply doesn't have the ability. This is evident in the low success rate of many transformational initiatives. Successful change requires dedicated focus and effort.

Be agile:

Leading organizations should learn to anticipate and swiftly address emerging innovation. They should disrupt their own business models before someone else does.

Source: https://www2.deloitte.com/global/en/pages/life-sciences-and-healthcare/articles/top-10-health-care-innovations.html

NICE Technology Appraisals in the NHS in England (Innovation Scorecard):

to September 2017

Published 10 April 2018

The Innovation Scorecard reports on the use of medicines and medical technologies in the NHS in England, which have been positively appraised by the National Institute for Health and Care Excellence (NICE).

Key findings

What do we measure?

125 medicines

6 medical technologies

- Debrisoft ® monofilament debridement pads
- Spinal cord stimulations
- Cardiac rhythm management devices*
- 3M Tegaderm® CHG IV securement dressing

6 groups of medicines used to treat major conditions

- Acute coronary syndrome
- Diabetes
- Hepatitis C
- Multiple sclerosis
- Stroke**

What have we found?

For the 12 months from October 2016 to September 2017*** (compared to the previous 12 months)

70% medicines prescribed more

All medical technologies were used more

All medicine groupings were used more

NHS England

Innovation and Technology Payment (ITP) 2019/20

Launched at Expo 2018 on 5 September 2018 and as part of NHS England's commitment to the Five Year Forward View, NHS England has developed the Innovation and Technology Payment (ITP) 2019/20.

We need to work with companies to explore
All options for adopting AMR related innovation

The ITP aims to deliver on the commitment detailed within the Five Year Forward View – supporting the NHS to adopt innovative market-ready medical devices, diagnostics, digital platforms and technologies which have demonstrated improvement to the quality and efficiency of patient care, by removing financial or procurement barriers to uptake.