Behaviour change strategies to improve antibiotic stewardship

Alison Holmes
• Understanding prescribing behaviour and context is needed

• Opportunities for greater stakeholder engagement

• Need to frame within quality of care, patient safety and patient experience

• The potential role of ‘mhealth’
Antibiotic Stewardship in Acute Care

- A marriage of infection control and antibiotic management

However....
- 30-40% of patients do not receive care according to evidence
- 1/3 of patients in acute care receive antibiotics
- Significant proportion of antibiotic prescribing in acute setting is sub-optimal
- Hand hygiene compliance sub-optimal
- Staff adherence to best practice needs to be improved
Chapter 5.
Infection prevention and control in health-care facilities
Integration of AS and IPC

‘Are you ready to prevent the spread of antimicrobial resistant germs?’
For 5 May 2014, WHO asks you to join us in highlighting the role of hand hygiene in combating antimicrobial resistance (AMR).
Report on Point Prevalence Survey of Antimicrobial Prescribing in European Hospitals 2009 ESAC-3:

- 30% of inpatients were treated with antibiotics
- The proportion for treating HAI was 35%

Figure 17 Proportion of Hospital acquired infections
The Chennai Declaration

The declaration also has a much broader scope stretching beyond antibiotic stewardship to improve patient care and patient safety, as it promotes the important role of the infection control committee and team by mandating that there must be one in every hospital. The roadmap states that it will be these infection control committees that should deliver the hospitals antibiotic stewardship agenda, and this integration of infection control and antimicrobial stewardship is a critical component of the action plan. A lack of infection prevention and control activity and committees in Indian hospitals has been recognized as a cause for concern.

The new UK antimicrobial resistance strategy and action plan
A major societal, political, clinical, and research challenge

<table>
<thead>
<tr>
<th>Seven key areas of focus</th>
<th>Stakeholders</th>
</tr>
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<tbody>
<tr>
<td>Promote responsible evidence based prescribing</td>
<td>Individual prescribers, NHS providers, national and local commissioning boards, ARHAI, PHE, Department of Health, professional bodies</td>
</tr>
<tr>
<td>Improve infection prevention and control</td>
<td>Individual clinical staff, NHS providers, and local commissioning boards, ARHAI, Department of Health, PHE, professional bodies</td>
</tr>
<tr>
<td>Raise public and professional awareness of antimicrobial resistance threat and promote behaviour change</td>
<td>Professional bodies, Department of Health, ARHAI, patient groups</td>
</tr>
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<td>Research programme into new diagnostics, alternatives to antibiotics (such as antiseptics), pathogens, effective behavioural change to improve infection prevention and control and prescribing practice</td>
<td>NIHR, universities, Department of Health, ARHAI</td>
</tr>
<tr>
<td>Facilitate development of new antimicrobials, vaccines, and immunomodulators</td>
<td>Department of Health, drug industry, European Union</td>
</tr>
<tr>
<td>Improve surveillance and data linkage</td>
<td>PHE, ARHAI, Department of Health</td>
</tr>
<tr>
<td>Encourage international collaboration and data sharing and learning from best practice</td>
<td>Department of Health, PHE</td>
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</tbody>
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## Seven key areas of focus

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Seven key areas of focus

Promote responsible evidence based prescribing

Improve infection prevention and control

Raise public and professional awareness of antimicrobial resistance threat and promote behaviour change

Research programme into new diagnostics, alternatives to antibiotics (such as antiseptics), pathogenesis, effective behavioural change to improve infection prevention and control and prescribing practice

Facilitate development of new antimicrobials, vaccines, and immunomodulators

Improve surveillance and data linkage

Encourage international collaboration and data sharing and learning from best practice internationally
Antibiotic Stewardship in Acute Care

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- Significant proportion of antibiotic prescribing in acute setting is sub-optimal
- Hand hygiene compliance sub-optimal
- Staff adherence to best practice needs to be improved
Policies and guidelines **not** enough

- Guidelines, policy help with decision-making, by providing knowledge and awareness. But, they may not shift attitudes or change practice.  
  
  *J Carthey et al BMJ 2011; 343*

- Make optimal antibiotic prescribing default, routine practice.

- ‘**Mindlines**’ **not guidelines**’  

  *Gabbay, Le May. 2004; BMJ 329*
What is missing?

- Understanding factors that influence prescribing behaviour and decisions
- Address human factors
- Adopt a whole-system approach to support optimal prescribing choices
- Supporting choice architecture

‘Decision Architecture’
What is missing?

- Understanding factors that influence prescribing behaviour and decisions
- Address human factors
- Adopt a whole-system approach to support optimal prescribing choices
- Supporting choice architecture
What is missing?

- Understanding factors that influence prescribing behaviour and decisions
- Address human factors
- Adopt a whole-system approach to support optimal prescribing choices
- Supporting choice architecture
Prescribing is a ‘behaviour’

- Antibiotic prescribing is complex
- A social process.
- Under influence of many determinants
- Collateral impact not tangible at prescriber/patient level
- Expertise maybe required but not universally used
- Principles of optimal prescribing need reinforcing/sharing
- Unwritten rules of prescribing need recognising
- Social sciences and qualitative perspective needed
- Consider human factors and supporting choice architecture, and some small changes to existing systems
- Whole-systems approach to support optimal prescribing choices
Understanding what Interventions work
Understanding what Interventions work

Systematic Review of Antimicrobial Drug Prescribing in Hospitals

The results show that interventions to reduce excessive antibiotic prescribing to hospital inpatients can reduce antimicrobial resistance or hospital-acquired infections, and interventions to increase effective prescribing can improve clinical outcome. This update provides more evidence about unintended clinical consequences of interventions and about the effect of interventions to reduce exposure of patients to antibiotics. The meta-analysis supports the use of restrictive interventions when the need is urgent, but suggests that persuasive and restrictive interventions are equally effective after six months.
Interventions to optimize antimicrobial prescribing behaviour are of poor quality and are not based on robust theoretical science.

Behaviour and social science research is underutilized in the development of antimicrobial prescribing interventions.

Qualitative evidence highlights the influence of social norms, attitudes, and beliefs on antimicrobial prescribing behaviour.

When designing and evaluating interventions in antimicrobial prescribing, these influences on prescribing are generally not considered.

Systematic review findings

- These findings stress the need for multidisciplinary research to explore the use of behavioural and social sciences to assess prescribing behaviour and set standards.

- The lack of this approach may be a contributing factor to the challenges that beset interventions aiming to influence prescribing behaviour and optimize antimicrobial prescribing.
Interestingly, findings echoed in IPC Psychological and social marketing frameworks are applied in qualitative studies, but rarely in intervention studies

1. Experiential and habitual nature of IPC behaviours: cannot be addressed as rational processes

2. Need to consider socio-cultural factors affecting behaviour in the design, implementation and reporting of interventions

3. Need to target the intervention to segmented groups of HCWs

Successful interventions based on:

- Social process
- The sense of community
- Bottom up approach
- Importance of systems with network and teams
Understanding the Determinants of Antimicrobial Prescribing Within Hospitals: The Role of “Prescribing Etiquette”

E. Charani, E. Castro-Sanchez, N. Sevdalis, Y. Kyratis, L. Drumright, N. Singh, and A. Holmes

The National Centre for Infection Prevention and Management, Hammarskiöld Hospital, and Department of Surgery and Oncology, and National Hospital, Imperial College London, United Kingdom

Background. There is limited knowledge of the key determinants of antimicrobial prescribing behavior (APB) in hospitals. An understanding of these determinants is required for the successful design, adoption, and implementation of quality improvement interventions in antimicrobial stewardship programs.

Methods. Qualitative semistructured interviews were conducted with doctors (n = 10), pharmacists (n = 10), and nurses and midwives (n = 10) in 4 hospitals in London. Interviews were conducted until thematic saturation was reached. Thematic analysis was applied to the data to identify the key determinants of antimicrobial prescribing behaviors.

Results. The APB of healthcare professionals is governed by a set of cultural rules. Antimicrobial prescribing is performed in an environment where the behavior of clinical leaders or seniors influences practice of junior doctors. Senior doctors consider themselves exempt from following policy and practice within a culture of perceived autonomous decision making that relies more on personal knowledge and experience than formal policy. Prescribers identify with the clinical groups in which they work and adjust their APB according to the prevailing practice within these groups. A culture of “noninterference” in the antimicrobial prescribing practice of peers prevents intervention into prescribing of colleagues. These sets of cultural rules demonstrate the existence of a “prescribing etiquette,” which dominates the APB of healthcare professionals. Prescribing etiquette creates an environment in which professional hierarchy and clinical groups act as key determinants of APB.

Conclusions. To influence the antimicrobial prescribing of individual healthcare professionals, interventions need to address prescribing etiquette and use clinical leadership within existing clinical groups to influence practice.

Keywords. prescribing etiquette; antimicrobial prescribing; prescribing behavior.
Understanding the Determinants of Antimicrobial Prescribing Within Hospitals: The Role of “Prescribing Etiquette”

1. Non-interference with the prescribing decisions of colleagues: Reluctance to interfere with the prescribing decisions of colleagues. In the case of antimicrobial prescribing there is a reluctance to intercept antimicrobial prescriptions started by colleagues. This recognises the autonomous decision making process of prescribing.

2. Accepted non-compliance to policy: Deviations from policy recommendations are tolerated and put in the context of the prescriber’s experience, expertise and the specific clinical scenario. This leads to hierarchy and expertise, and not policy as determinants of prescribing practice behaviours.

3. Hierarchy of prescribing: Prescribing as an activity is performed by junior doctors. But it is the senior doctors who decide what is prescribed.
Greater stakeholder involvement

Multidisciplinary approach to antibiotic stewardship in acute care has largely included:

- Microbiologists, ID physicians, Pharmacists
- The Chennai declaration: harnessed multiple medical specialities

Broaden stakeholder involvement:

- Involve clinical specialities and leaders
- Frame antibiotic stewardship with infection control as key aspect of quality of care and patient safety
- Promote the principles of optimal prescribing in healthcare
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Multidisciplinary approach to antibiotic stewardship in acute care has largely included:

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Broaden stakeholder involvement:

- Involve clinical specialities and leaders
- Frame antibiotic stewardship as key aspect of quality of care and patient safety
- Promote the principles of optimal prescribing in healthcare
How can Nurses Contribute to AS?

- Duration of Treatment
- Route of antimicrobial administration
- Timing of antimicrobial administration
- Therapeutic drug monitoring
- Outpatient Antibiotic Therapy (OPAT)
- Relatively stable work force/organisational memory

*Edwards et al. 2011*

The potential for greater multi-disciplinary involvement needs to be considered, particularly to address:
- prescribing principles
- patient safety
- sustained quality improvement in clinical care
Published in final edited form as:

Covering more Territory to Fight Resistance: Considering Nurses’ Role in Antimicrobial Stewardship

R Edwards(1), LN Drumright(1), M Kiernan(2),(3), and A Holmes(1),(4)

1. The National Centre for Infection Prevention and Management, Division of Infectious Diseases, Imperial College London, London, W12 OHS, UK
2. Infection Prevention Society, UK
3. Southport and Ormskirk Hospital NHS Trust, UK
4. Imperial College Healthcare NHS Trust, London, UK

Abstract

The potential contribution nurses can make to the management of antimicrobials within an in-patient setting could impact on the development of antimicrobial resistance (AMR) and healthcare associated infections (HCAIs). Current initiatives promoting prudent antimicrobial prescribing and management have generally failed to include nurses, which subsequently limits the extent to which these strategies can improve patient outcomes. For antimicrobial stewardship (AS) programmes to be successful, a sustained and seamless level of monitoring and decision making in relation to antimicrobial therapy is needed. As nurses have the most consistent presence as patient carers, they are in the ideal position to provide this level of service. However, for nurses to truly impact on AMR and HCAIs through increasing their profile in AS, barriers and facilitators to adopting this enhanced role must be contextualized in the implementation of any initiative.
Covering more Territory to Fight Resistance: Nurses’ Role in Antimicrobial Stewardship

R Edwards(1,)*, LN Drumright(1), M Kiernan(2,3), and A Holmes
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Abstract

The potential contribution that nurses can make to the management of antimicrobials within an inpatient setting could impact on the development of antimicrobial resistance (AMR) and healthcare-associated infections (HAIs). Current initiatives promoting prudent antimicrobial prescribing and management have generally failed to include nurses, which subsequently limits the extent to which these strategies can improve patient outcomes. For antimicrobial stewardship (AMS) programs to be successful, a sustained and seamless level of monitoring and decision making in relation to antimicrobial therapy is needed. As nurses have the most consistent presence as patient carers, they are in a ideal position to provide this level of service. However, for nurses to truly impact on AMR and HAIs through increasing the uptake of AMS, structural and educational tools adopting this enhanced role must be contextualised in the implementation of any initiative.
The Role of Nurses

- Enhancing the nurses role in improving antibiotic prescribing
- Building on established skills
- Reinforcing principles of best prescribing
- Role as knowledge brokers
The Role of Nurses

- Enhancing the nurses role in improving antibiotic prescribing

Do you prescribe, administer or check antibiotics? If so are you ready to START SMART then FOCUS? Visit the Start Smart Then Focus pages of the Source for further details.
Antimicrobial stewardship programmes: the need for wider engagement

Esmita Charani, Alison H Holmes

Antimicrobial resistance has been recognised as a major global health threat and is now on the political agenda with world leaders recognising the necessity to act to preserve the potency of antimicrobial agents. It is envisaged that some of the available antimicrobial agents may be lost for future use. Despite the majority of antimicrobial resistance being acquired and consumed in clinical settings, in primary care and in hospitals, populations experience the full extent of antimicrobial resistance and difficulty in treating multidrug-resistant organisms.

To optimise antimicrobial prescribing, reduce healthcare-associated infections and minimise the emergence of antimicrobial resistance, hospitals in both developed and developing healthcare systems are increasingly implementing initiatives ranging from targeted interventions to antimicrobial stewardship programmes. Antimicrobial stewardship is the umbrella term used to define comprehensive quality improvement activities that together represent a cohesive programme aiming to optimise the use of centres in the developed world and it follows that the solutions to these problems cannot be limited to them. The increasing globalisation of the world and population mobility ensures the rapid spread of new resistant organisms and infectious diseases making them shared global problems. It is therefore encouraging to see antimicrobial stewardship initiatives being implemented across the globe.

EMBEDDING PRACTICE WITHIN EXISTING SYSTEMS AND RESOURCES

Wide disparities exist in the availability of resources to implement antimicrobial stewardship initiatives in hospitals in both developed and developing healthcare systems. As an example of this disparity, Andersen and Knudsen report in the current issue of this journal an intervention they implemented in a 300-bed Danish University hospital that did not have onsite clinical microbiology service or staff. They report on the steps undertaken to tackle multidrug-resistant infec-
Antimicrobial stewardship programmes: the role of engagement

Esmita Charani, Alison H Holmes

Antimicrobial resistance has been recognized as a major global health threat and is now on the political agenda with world leaders recognizing the necessity to act to preserve the potency of antimicrobial agents and invest funds to discover new ones. Despite the majority of antimicrobial resistance occurring in hospitals, global health strategies are primarily focused on global population initiatives.

To optimise antimicrobial prescribing, reduce healthcare associated infections and minimise the emergence of antimicrobial resistance, hospitals in both developed and developing healthcare systems are increasingly implementing initiatives ranging from targeted interventions to antimicrobial stewardship programmes. Antimicrobial stewardship is the umbrella term used to define comprehensive quality improvement activities that together represent a cohesive programme aiming to optimise the use of antimicrobial agents.
Global perspective

Tanzania and Uganda

Vietnam

Thailand

• Adoption by Siriraj hospital – acceptability
  - Training and group discussions
  - Herbal medicine substitution
  - Local/provincial policy
  - Positive competition
  - Vertical Scaling up of intervention – P4P
  - Horizontal scaling up – materials

Photo by Pharmacists Sanda Channyvong

ESCMID Online Lecture Library © by author
• The need for greater role of public, political and societal engagement in addressing AS and the AMR agenda

• The intense media and public concern and demonstrated for HCAI not replicated

• Health literacy in general needs considering

• Opportunities with improved communications and social media
Opportunities with improved communications, social media and ‘mHealth’
Societal engagement
In summary

- Interventions need to be guided by hypothesis
- Better understanding of the determinants of antimicrobial prescribing
- Needs to be out into the social context
- No gold standard stewardship model
  - Must be shaped around local resources
- Successful interventions need to be based on theories
- Need to construct theories that are
  - Generalisable
  - Achievable
  - Evidence-based
I think I need antibiotics for my col...

IT'S A VIRUS!
PATIENTS ARE TRANSFORMING CARE WITH SOCIAL MEDIA: 19-21
What makes people talk about antibiotics on social media? A retrospective analysis of Twitter
What is the discourse about antibiotics on Twitter?

- Social media has reshaped individual and institutional communication.

- The unrestricted access to spontaneous views and opinions of society can enrich the evaluation of healthcare interventions.

- Antimicrobial resistance has been identified as a global threat to health requiring collaboration between clinicians and healthcare users.
Methods

Free, commercial, web-based tool (www.topsy.com) used to detect daily occurrences of word & hashtag ‘antibiotic’, 24th September 2012 - 23rd September 2013 worldwide tweets, English language, any geolocation

Activity peaks (message frequency over twice that of baseline) analysed to identify events leading to increase
What makes people talk about antibiotics on social media and what are they saying?

People reveal their thoughts on subjects on social media every day

Using Twitter as a model platform, we sought to discover contexts in which people use ‘antibiotic’, and to identify events leading to increases in conversations about antibiotics.

Methods

Daily occurrences of the word ‘antibiotic’ in messages (tweets) from October 2012 to September 2013 were detected using a free web-based tool (www.topsy.com).

Single day peaks (frequency over twice that of baseline) were analysed to identify events leading to the increase.

Separately, all tweets including the term ‘antibiotic’ were prospectively extracted from www.topsy.com for content analysis for two pragmatic seven-day periods in August and September 2013.

243,000 tweets about antibiotics

0.000002% of total 100bn tweets

Conclusions

- People talk about antibiotics on social media in many contexts
- Institutional events can rapidly amplify discussions
- Their short lifespan may hinder their public impact.

We are developing methods to refine the use of social media monitoring to evaluate the impact and sustainability of societal engagement in the antimicrobial resistance agenda.
Conclusion

• People talk about antibiotics on social media

• Institutional events can rapidly amplify antibiotics discussions on social media, but their short lifespan may hinder their public impact

• Developing methods to refine social media monitoring to evaluate the impact and sustainability of societal engagement in the antimicrobial resistance agenda remains essential

• How to maintain sustainability of message?
What about mHealth within Healthcare?
Majority of physicians use smartphones & apps

80% of physicians use some sort of smartphone and use apps in their work every day

Majority of physicians use smartphones & apps

80% of physicians use some sort of smartphone and use apps in their work every day.

The role of mHealth

..from paper pocket guide

...to smartphone app

...to boundary object

Clear impact on prescribing

Increased knowledge: 84%
Influenced prescribing: 95%
Clear impact on prescribing

Increased knowledge

84%

An analysis of the development and implementation of a smartphone application for the delivery of antimicrobial prescribing policy: lessons learnt

E. Charani1*, Y. Kyratsis1, W. Lawson2, H. Wickens2, E. T. Brannigan2, L. S. P. Moore2 and A. H. Holmes1

1The National Centre for Infection Prevention and Management, Imperial College London, London, UK; 2Imperial College Healthcare NHS Trust, London W12 0HS, UK
Maintaining engagement?
Increased interest on gamification as behaviour change tool

Interactive Games to Promote Behavior Change in Prevention and Treatment

JAMA, April, 2011
Increased interest on gamification as behaviour change tool

**Gamification**: Influencing health behaviours with games

Dominic King - Felix Greaves - Christopher Exeter - Ali Dada

Institute of Global Health Innovation, Imperial College London, 199 Fulham Road, London, SW6 6LD

Correspondence to: Dominic King Email: dominic.king@imperial.ac.uk

Every month at Google Labs in London, dozens of software developers, academics, health and behaviour scientists and investors get together to discuss new strategies to influence health behaviours. The collective aim of these networking events is to develop digital games or web applications that can improve knowledge, engage users in software design and game mechanics with public health theory and behavioral insights. Gamification is a purpose built medium designed to encompass the principles of real-world gamifying elements in a fun and engaging way in seamless contexts. Behavioral opportunities need to be incorporated into change interventions through game platforms on new smartphone devices.

In a secondary metropolitan area, people across demographics boundaries now play video games with a wide range of digital devices. Whilst such games continue to be primarily used for entertainment purposes, there is increasing interest in their potential to influence positive changes in health behaviours. Gamification will become an increasingly familiar concept in healthcare as a consequence of these trends. The first builds on the consumer's appetite for new smartphone devices that provide games designers with a wider audience to target and more attractive tools to use in designing interactive health interventions. The second factor is the enthusiasm and willingness of developers to incorporate the latest behavioural insights into electronic interventions.

**Incorporating lessons from behavioural economics in game design**

Behavioral economics applies insights from psychology to understand how people make real-life economic decisions. In designing such applications, designers have identified numerous strategies to counter sub-optimal decision-making. Video games are designed to motivate users by making the game experience more engaging and rewarding. This is achieved through the use of user interface (UI) design, such as visual and audio feedback, which enhances the player's experience. Gamification and behavioral economics can be used together to create a more effective and engaging experience for the user, leading to positive changes in health behaviors.
Increased interest on gamification as behaviour change tool

Gamification: Influencing health behaviours with games

Dominic King • Felix Greaves • Christopher Exeter • Andy Daugs

Institute of Global Health Innovation, Imperial College London, 193 Fulham Road, London, SW6 1N
Email: Dominic.King@imperial.ac.uk

To develop digital games with the purpose of improving health through a software design and game mechanics allows the public to be engaged in constructive ways and influence health outcomes. This was previously known as gamification and it is becoming an increasingly popular tool for behaviour change. Mobile phones as a conduit to behaviour change

Mobile phones have been shown to be effective platforms for delivering health interventions that are low-cost and readily available to people. This is particularly true for developing countries where the majority of the population will own smartphones. The interface of the games allow for enhanced interactive features of smartphones that make them a useful delivery vehicle for gamification in healthcare include GPS services, infrared accelerometers that measure movement and external sensors that can measure heart rate and blood pressure.

Incorporating lessons from behavioural economics in game design

Behavioural economics applies insights from psychology to understand how people make real-life economic decisions. In doing so, behavioural economists have identified numerous strategies to counter sub-optimal decision making. Video games are designed to motivate users to achieve a goal, and whether learning or not, insights from behavioural economics are related to many of these features. For example, many games provide conditional rewards (e.g. points and prizes) that reward the player if they complete a task, and these rewards can be used to influence the player's behaviour.

SCHED for Games for Health 2013

Games for Health 2013

Schedule: Speakers, Sponsors, Exhibitors, Attendees

Sign up or log in to bookmark your favorites and sync them to your phone or calendar.

Wednesday June 26

08.30

A Serious Game for Learning Medical Team Communication Skills

The Year in Mobile Games for Health

09.45

Avatar-Based Role-Play Conversations to Increase Patient Engagement: A Case Study

Improving emotional well-being one scientifically proven app and game at a time

10.00

Games for Global Health: What Exists So Far?

Games to improve Hospital Responses to Mass Casualty Incidents

Pocket Ritual: Developing A Phone App For Self-Exploration Based On The Hero's Journey

10.30

Discussion: What are the top 10 issues in global health games could best address?

10.45

Technology Innovation Centers vs. Technology Service Centers

11.00

RESERVED FOR PANEL

11.40

Serious Gaming for Central Line Placement

11.45

The Global Health Response Engine Project

12.00

Lunch
NHS is spending money in serious behavioural games
Emerging interest on effectiveness, return-on-investment
Evidence of serious game use in health?
Literature review: games, gamification and health

36 with enough quality criteria

Educational games
Commercial games useful to gain med-surg skills

No games in infection prevention and control or antimicrobial prescribing

1151 papers reviewed
The role of mHealth

..from paper pocket guide

The role of mHealth

..from paper pocket guide

...to smartphone app

...to boundary object

..to incentives and gaming

“The Game”
Product development with experts

- Prescribing options for virtual patients

- Options 1) oral antibiotics, 2) broad- or 3) narrow-spectrum intravenous (IV) antibiotics, 4) request further tests or 5) discharge without treatment

- Immediate feedback on performance, considering clinical accuracy, impact on other professionals, wider hospital environment (delayed consequences of prescribing)

Timers, scores, leader-boards, increasing difficulty

Launch 5/5/14 for WHO Hand Hygiene/AMS day
“The Game”
Product development with experts

- Prescribing options for virtual patients

- Options 1) oral antibiotics, 2) broad- or 3) narrow-spectrum intravenous (IV) antibiotics, 4) request further tests or 5) discharge without treatment

- Immediate feedback on performance, considering clinical accuracy, impact on other professionals, wider hospital environment (delayed consequences of prescribing)

Timers, scores, leader-boards, increasing difficulty

Launch 5/5/14 for WHO AMR day
Simple, focused, responsive clinical cases

Mr Bassett - 18yo

An 18 year old University fresher presents to A&E.

CONTINUE

PHARMACISTS
PATIENTS
NURSES
DOCTORS
PERFORMANCE
Simple, focused, responsive clinical cases
Mr Bassett - 18yo

- Fever
- No rigors
- Nausea
- No vomiting
- Headache
- Neck stiffness
- CSF raised white cell count
- CSF raised protein
- Blood culture negative
Mr Bassett - 18yo

- Fever
- No rigors
- Nausea
- No vomiting
- Headache
- Neck stiffness
- CSF raised white cell count
- CSF raised protein
- Blood culture negative
- Raised white cell count

< Sexually transmitted infection

< Send Home with tablets

DIAGNOSE & TREAT

PHARMACISTS
PATIENTS
NURSES
DOCTORS
PERFORMANCE
Simple, focused, responsive clinical cases
# Behavioural Nudges

<table>
<thead>
<tr>
<th>Week 1 of 2 - Thu 4pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Guevara</td>
</tr>
<tr>
<td><strong>Patients</strong></td>
</tr>
<tr>
<td>That antibiotic has a bad smell.</td>
</tr>
<tr>
<td>Doctor, just ignore that smell.</td>
</tr>
<tr>
<td>you should avoid this antibiotic.</td>
</tr>
<tr>
<td>you're putting your patients to danger.</td>
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<table>
<thead>
<tr>
<th>Week 2 of 2 - Mon 12pm</th>
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</thead>
<tbody>
<tr>
<td>Dr. Tester</td>
</tr>
<tr>
<td><strong>Patients</strong></td>
</tr>
<tr>
<td>Do broad spectrum antibiotics make me better faster?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Week 2 of 2 - Tue 2pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Tester</td>
</tr>
<tr>
<td><strong>CQC</strong></td>
</tr>
<tr>
<td>A glowing report for you: your antimicrobial prescribing is in great shape.</td>
</tr>
</tbody>
</table>

- PHARMACISTS
- PATIENTS
- NURSES
- DOCTORS
- PERFORMANCE

- PHARMACISTS
- PATIENTS
- NURSES
- DOCTORS
- PERFORMANCE

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Taking antimicrobial stewardship initiatives to the next level: development of a serious prescribing game for acute care

Castro-Sánchez E, Charani E, Moore LSP, Gharani M, Holmes A
Centre for Infection Prevention and Management, Imperial College London, London (UK)

Introduction
Increasing antimicrobial resistance has been identified as a global threat to health. A variety of antimicrobial stewardship measures have been implemented with varying success rates to improve the quality of antimicrobial prescribing. Whilst prescriber knowledge and skills are important, attention to behavioral and social aspects in prescribing appears essential to sustain any improvement initiatives. Serious games and gamification have been successfully introduced in other clinical settings to maintain clinician’s engagement with desired behavior. We propose to investigate if a serious smartphone prescribing game will be effective in supporting and encouraging the prudent use of antimicrobials in acute care.

Materials and Methods: Game Mechanics and Gamification

Figure 1: Elements of the user interface promote engagement with the game. Gamification components (personas, avatars, zones) encourage continued interaction.

Figure 2: Clinical information appears in order of relevance. Unfamiliar patient management is penalised.

Figure 3: Immediate feedback on performance is provided after each case (left) and at key time points during the game (right). Such feedback considers clinical accuracy and the impact on other professionals and the wider hospital environment.

Figure 4: Behavioral nudges are offered to professionals, patients, and hospital management, depending on each player’s performance.

Figure 5: Delayed consequences of therapeutic decisions are presented as follow-up tasks, increasing player workload.

Evaluation
Time-series comparing defined daily doses before and after game introduction will identify changes on prescribing decisions.

Figure analysis exploring engagement with the game and any dose-effect relations (i.e., increased game time results in improved prescribing decisions).

Influence of games by different professionals on prescribing decisions.

Conclusions
Sustaining appropriate prescribing behaviors remains a challenge for antimicrobial stewardship initiatives worldwide. Serious games delivered on mobile devices can complement the educational learning of prescribers. Games can be used to reinforce desired behaviors and highlight any unintended consequences of antimicrobial prescribing. Serious games may be an affordable and feasible solution to address the behavioral and social influences on prescribing.
Immediate feedback that can be linked to training records, social networks, Continuing Professional Development (CPD)…
Immediate feedback that can be linked to training records, social networks, and behavioral nudges also embedded.
The role of mHealth

Global potential for improving antibiotic use...

In 2012, 80% in Africa owned a mobile phone
The role of mHealth

Global potential for improving antibiotic use...

In 2012, 80% in Africa owned a mobile phone
• Understanding prescribing behaviour and context is needed
• Opportunities for greater stakeholder engagement
• Need to frame within quality of care, patient safety and patient experience
• The potential role of ‘mhealth’
"Across much of the region studied, especially the newly independent states [2], the researchers found substantially higher levels than expected of parenteral (injected or infused) antibiotic administration, which suggests that antibiotics may be being inappropriately used outside hospital settings in some countries.

"The purpose of collecting indicators of antibiotic use is to identify inappropriate prescribing and to provide a means to measure the effect of interventions," say the authors. "These data will raise awareness of inappropriate antibiotic use and stimulate policy makers to develop action plans. The established surveillance system provides a method to develop quality indicators of antibiotic use and to assess the effect of policy and regulatory actions."