

27 April 2022

Transforming Lives with Digital Medicine: research nuggets

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Illustrating the complexity of the digital transformation of health services.

Source: Expert Panel on Investing in Health, European Commission





Report

by the Comptroller
and Auditor General

**Department of Health & Social Care, NHS England &
NHS Improvement, NHS Digital**

Digital transformation in the NHS

Utilizing health information technology in the treatment and management of patients during the COVID-19 pandemic: Lessons from international case study sites

Stephen Malden , Catherine Heeney, David W Bates, Aziz Sheikh

Journal of the American Medical Informatics Association, Volume 28, Issue 7, July 2021,
Pages 1555–1563, <https://doi.org/10.1093/jamia/ocab057>

Published: 19 April 2021 **Article history** ▼

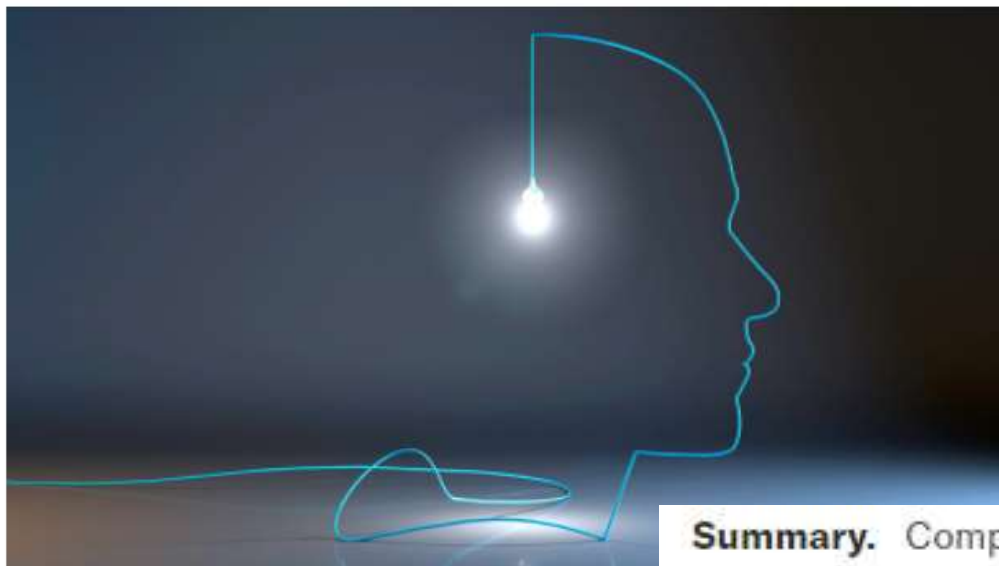
Results

Three themes and 6 subthemes were identified. HITs were employed to manage time and resources during a surge in patient numbers through fast-tracked governance procedures, and the creation of real-time bed capacity tracking within electronic health records. Improving the integration of different hospital systems was identified as important across sites. The use of hard-stop alerts and order sets were perceived as being effective at helping to respond to potential medication shortages and selecting available drug treatments. Utilizing information from multiple data sources to develop alerts facilitated treatment. Finally, the upscaling/optimization of telehealth and remote working capabilities was used to reduce the risk of nosocomial infection within hospitals.

Digital Transformation Is Not About Technology

by Behnam Tabrizi, Ed Lam, Kirk Girard, and Vernon Irvin

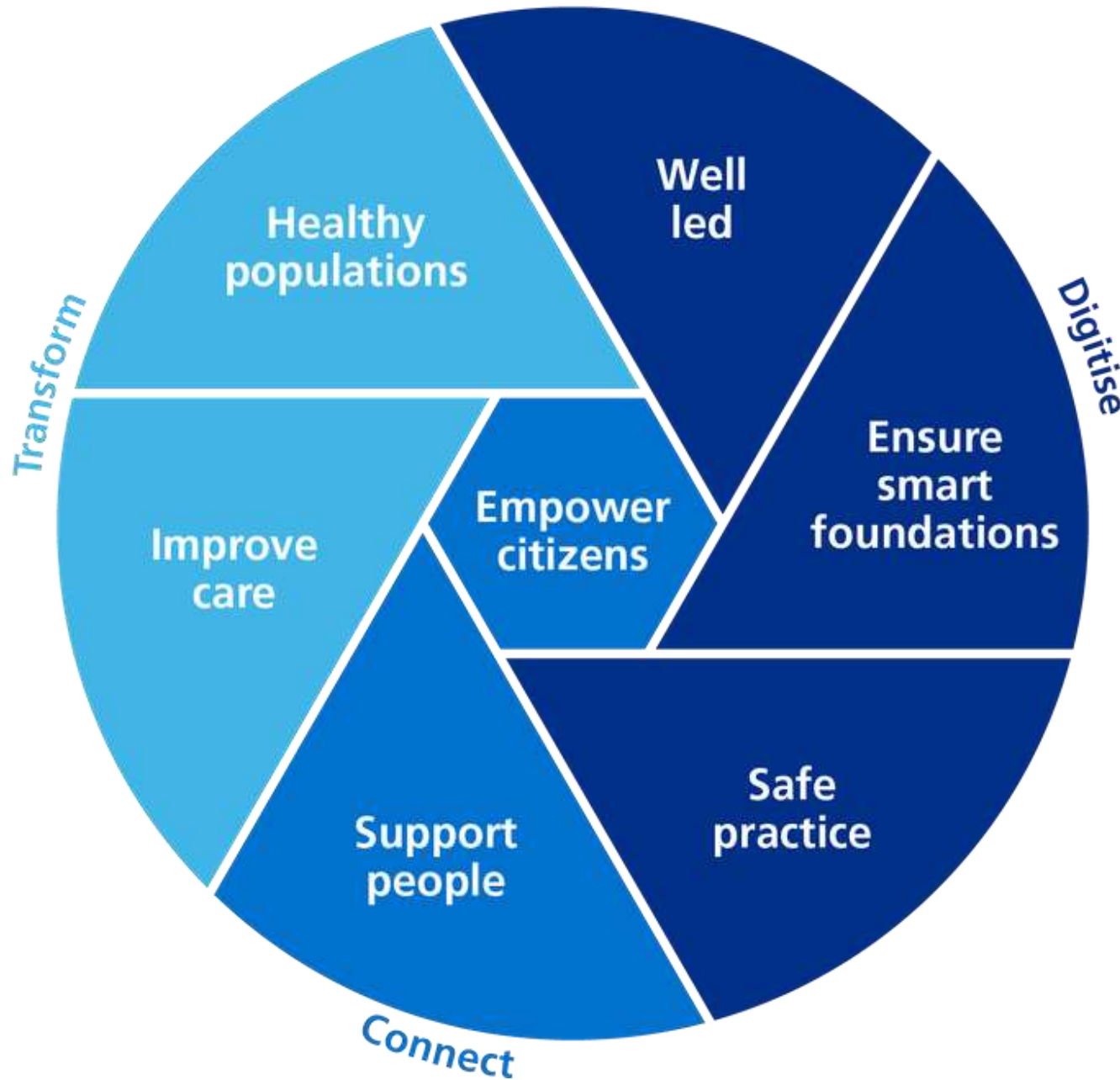
March 13, 2019



Colin Anderson Productions pty Ltd/Getty Images

**Harvard
Business
Review**

Summary. Companies are pouring millions into “digital transformation” initiatives — but a high percentage of those fail to pay off. That’s because companies put the cart before the horse, focusing on a specific technology (“we need a machine-learning strategy!”) rather than doing the hard work of fitting the change into the overall business strategy first. Not only should they align tech investments with business goals — they should also lean more on insider knowledge than outside consultants, acknowledge fears about job loss that those insiders may have, develop deep knowledge of how changes will affect customer experience, and use process techniques borrowed from the tech world (experimentation, prototyping, etc.) to facilitate change. [close](#)



[What Good Looks Like framework - What Good Looks Like - NHS Transformation Directorate \(nhsx.nhs.uk\)](https://nhsx.nhs.uk)

Digital transformation in healthcare: analysing the current state-of-research

Emphasis on patient-centred approaches

Operational efficiencies of healthcare organisations

Organizational factors and managerial implications

Impact on workforce practices

Socio-economic aspects

Sustained impact of a computer-assisted antimicrobial stewardship intervention on antimicrobial use and length of stay FREE

Vincent Nault, Jacques Pepin, Mathieu Beaudoin, Julie Perron, Jean-Marie Moutquin, Louis Valiquette ✉

Journal of Antimicrobial Chemotherapy, Volume 72, Issue 3, March 2017, Pages 933–940, <https://doi.org/10.1093/jac/dkw468>

Published: 15 December 2016 **Article history** ▼


Innovation

Infection Control & Hospital Epidemiology (2020), 45, 1022–1027
doi:10.1017/ice.2020.213



Original Article

Machine learning for the prediction of antimicrobial stewardship intervention in hospitalized patients receiving broad-spectrum agents

Rachel J. Bystritsky MD¹ , Alex Beltran BS², Albert T. Young BA³, Andrew Wong BA³, Xiao Hu PhD² and Sarah B. Doernberg MD, MAS⁴

¹Department of Medicine, Infectious Diseases, University of California–San Francisco, San Francisco, California, ²Department of Biengineering, University of California–San Francisco, San Francisco, California and ³School of Medicine, University of California–San Francisco, San Francisco, California



From technology transformation to digital transformation

Pandolfo et al. *Antimicrob Resist Infect Control* (2021) 10:95
<https://doi.org/10.1186/s13756-021-00961-4>


Antimicrobial Resistance and Infection Control

RESEARCH

Open Access



Intensivists' beliefs about rapid multiplex molecular diagnostic testing and its potential role in improving prescribing decisions and antimicrobial stewardship: a qualitative study

Alyssa M. Pandolfo¹ , Robert Horne^{1*}, Yogini Jani², Tom W. Reader³, Natalie Bidad¹, David Brealey⁴, Virve I. Erne⁵, David M. Livermore⁶, Vanya Gant⁷, Stephen J. Brett⁸, and the INHALE WP2 Study Group

Digital Healthcare

EHR | Technology | Data and analytics

Driving digital health transformation in hospitals: a formative qualitative evaluation of the English Global Digital Exemplar programme

Marta Krasuska,¹ Robin Williams,² Aziz Sheikh,¹ Bryony Franklin,³ Susan Hinder,² Hung TheNguyen,² Wendy Lane,⁴ Hajar Mozaffar,⁵ Kathy Mason,⁴ Sally Eason,⁴ Henry Potts,⁶ Kathrin Cresswell¹

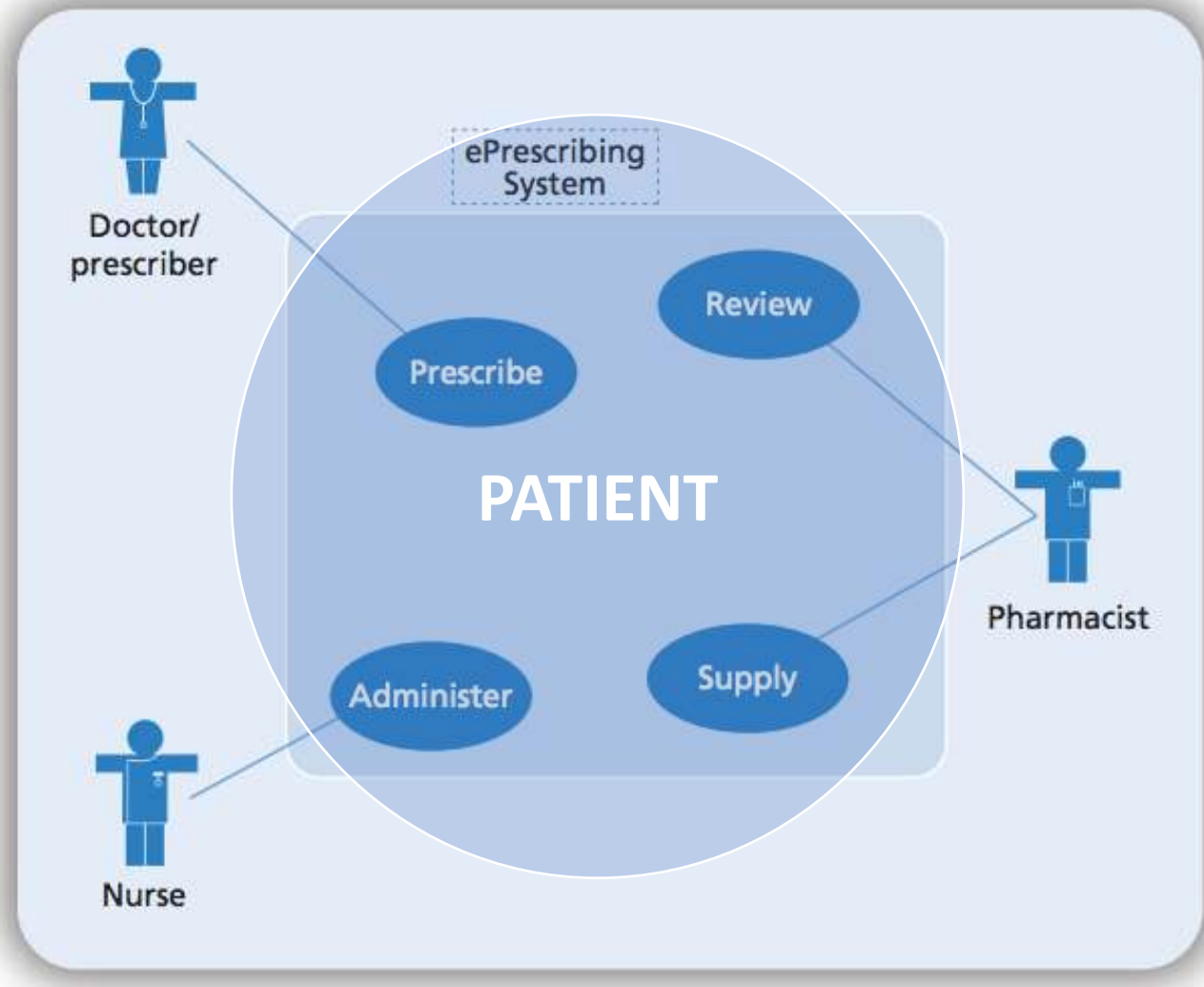
- ▶ Leadership focus on digitally-enabled transformation of services (rather than merely Information Technology deployment).
- ▶ Digital transformation expertise at Board level.
- ▶ Clinical engagement and dedicated intermediary roles between clinical and digital areas.
- ▶ Activity surrounding envisioning benefits/targets and measuring progress.
- ▶ Demonstrating benefits for individual users early on in the process.
- ▶ Strong and experienced project management structures dedicated to digital transformation.
- ▶ Willingness to share experiences and learn from others.
- ▶ Open and transparent decision-making and communication across the organisation.
- ▶ A conceptualisation of digital maturity as a continuous quality improvement process.

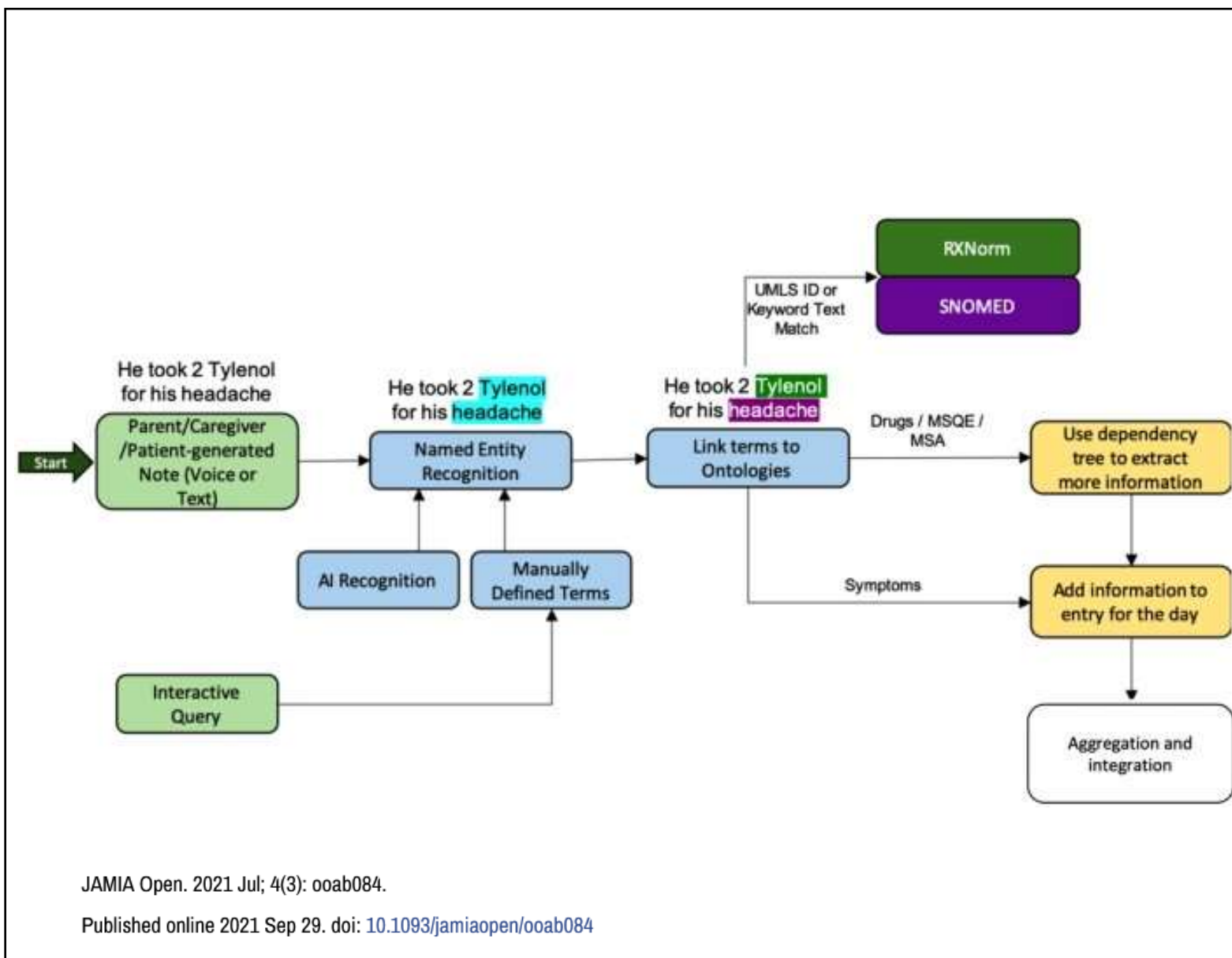
Scoping review exploring the impact of digital systems on processes and outcomes in the care management of acute kidney injury and progress towards establishing learning healthcare systems

Qian Ka Tze Chew¹, Hean Hogan,² Yogeni Jari^{1*}



Review question	Definition of concepts
At which level is the real-time data intended to generate action: what is the digital information designed to change?	<p>Micro: patient-level</p> <ul style="list-style-type: none"> ▶ Clinical care and treatment at the patient level. <p>Meso: organisation/specialty/service/unit management-level</p> <p>For example,</p> <ul style="list-style-type: none"> ▶ Management of cohorts of renal patients by specialist e.g. pharmacist or renal specialist. ▶ Allocation of patients to a particular care pathway or ward. ▶ Staffing levels or skill mix. ▶ Resource distribution e.g. across diagnostic services or educational support or between harm management and risk assessment interventions. <p>Macro: population-level</p> <p>For example,</p> <ul style="list-style-type: none"> ▶ Targeting of interventions at particular populations e.g. primary or secondary care. ▶ Population management processes or the range of services that are available across the health and care system. <p><i>NB: Some studies report on interventions where impact is intended at multiple levels. These were extracted to the higher level i.e. macro, meso then micro.</i></p>
How integrated is the intervention into workflow?	<p>Efferent arm (the alerting mechanism)</p> <ul style="list-style-type: none"> ▶ Interruptive within workflow. ▶ Interruptive outside workflow. ▶ Non-interruptive within workflow. ▶ Non-interruptive outside workflow. ▶ Undefined. <p>Level of digital maturity</p> <p>Level 1: Stand-alone afferent arm that requires human intervention for efferent mechanism e.g. by sending an email or text to raise an alert.</p> <p>Level 2: Integrated afferent and efferent arms in a single system with a specific focus e.g. pharmacy medicines management systems.</p> <p>Level 3: Integrated afferent and efferent arms that link alert data to wider response group across organisation or system but are not integrated into clinical workflow.</p> <p>Level 4: Integrated afferent and efferent arms that link alert data to wider response group across organisation or system and into clinical workflow.</p> <p>Level 5: Multi-organisation and cross-sectional (but otherwise same as 4).</p>





ORIGINAL RESEARCH



How can patient-held lists of medication enhance patient safety? A mixed-methods study with a focus on user experience

Sara Garfield^{1,2,3}, Dominic Furniss⁴, Fran Husson¹, Mike Etkind¹, Marney Williams¹, John Norton³, Della Ogunleye³, Barry Jubraj^{5,6}, Hanaa Lakhdari³, Bryony Dean Franklin^{1,2,3}

JAMIA Open, 2021, 4(3), 00ab084
doi: 10.1093/jamiaopen/ooab084
Advance Access Publication Date: 5 December 2020
Review



Review

Patient-generated health data and electronic health record integration: a scoping review

Victoria L. Tiasse¹, William Hull², Mary M. McFarland³, Katherine A. Sward², Guilherme Del Fiol⁴, Catherine Staes², Charlene Weir⁴, and Mollie R. Cummins²

JAMIA Open, 2021, 4(3), 00ab084
doi: 10.1093/jamiaopen/ooab084
Research and Applications



Research and Applications

A natural language processing pipeline to synthesize patient-generated notes toward improving remote care and chronic disease management: a cystic fibrosis case study

Syed-Amad Hussain¹, Emre Sezgin¹, Katelyn Krivchenia^{2,3}, John Luna¹, Steve Rust¹, and Yungui Huang¹

Electronic transmission of prescriptions in primary care: transformation, timing and teamwork

Chloë Campbell BPharm(Hons), PhD, FNZHPA, RegPharmNZ;^{1,2} Caroline Morris BPharm(Hons), MSc, PhD, MRPharmS, RegPharmNZ;¹ Lynn McBan BSc, MD, Dip Obst, Dip GP, FRNZCGP¹

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J PRIM HEALTH CARE
2021;13(4):340–350.
doi:10.1071/HC21050



> J Am Med Inform Assoc. 2022 Apr 13;29(5):891–899. doi: 10.1093/jamia/ocab292.

The potential for leveraging machine learning to filter medication alerts

Siru Liu¹, Kensaku Kawamoto¹, Guilherme Del Fiol¹, Charlene Weir¹, Daniel C Malone², Thomas J Reese^{1,3}, Keaton Morgan¹, David ElHalta⁴, Samir Abdelrahman^{1,5}

Received: 19 June 2021 | Revised: 23 August 2021 | Accepted: 9 September 2021

DOI: 10.1002/cam4.4316

RESEARCH ARTICLE

Cancer Medicine WILEY

Evidence to guide the optimal timing for pre-chemotherapy blood tests for early breast, colorectal cancer and diffuse large B-cell lymphoma

Pinkie Chambers¹ | Li Wei^{1,2} | Martin D. Forster³ | Emma Kipps⁴ | Ian C. K. Wong^{1,2} | Yogini Jani^{1,2}

Research Award

Optimising ePrescribing in Hospitals

Plain English Summary:



Medicines have important health benefits, but they can also result in accidental harm to patients. This risk of harm can be particularly high in patients who are in hospital. Some of these medication-related harms are due to errors that health professionals make. Our work has shown that comput...



[Read more](#) ▾

Abstract:

Background: There is now a growing body of work that demonstrates that electronic prescribing (henceforth ePrescribing) systems can substantially reduce the risk of medication errors in hospitals. This evidence has however largely come from evaluations of “home-grown” extensively cu...

[Read more](#) ▾

 **Chief Investigator(s):**
Professor Aziz Sheikh 

 **Co-investigators:**
Mr Antony Chuter , Professor David Bates

ORIGINAL ARTICLE

Optimizing Hospital Electronic Prescribing Systems: A Systematic Scoping Review

Williams, Jac MBChB¹; Malden, Stephen PhD²; Heeney, Catherine PhD³; Bouamrane, Matt PhD⁴; Holder, Mike MBChB⁵; Perera, Uditha MD⁶; Bates, David W. MD, MSc⁷; Sheikh, Aziz MD⁸

[Author Information](#) 

Journal of Patient Safety: March 2022 - Volume 18 - Issue 2 - p e547-e562
doi: 10.1097/PTS.0000000000000867 

Policy and Practice



Policy parameters for optimising hospital ePrescribing: An exploratory literature review of selected countries of the Organisation for Economic Co-operation and Development

Uditha T Perera , Catherine Heeney and Aziz Sheikh

Digital Health
Volume 8: 1-15
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DOI: 10.1177/10502018221088074
journals.sagepub.com/home/dh



Changes in medication administration error rates associated with the introduction of electronic medication systems in hospitals: a multisite controlled before and after study

Johanna I Westbrook , Neroli S Sunderland, Amanda Woods, Magdalena Z Raban , Peter Gates, Ling Li

<https://informatics.bmj.com/content/27/3/e100170.long>






Article

An Evaluation of the Impact of Barcode Patient and Medication Scanning on Nursing Workflow at a UK Teaching Hospital

Sara Barakat¹ and Bryony Dean Franklin^{1,2,*} 

BMJ Open Interdisciplinary systematic review: does alignment between system and design shape adoption and use of barcode medication administration technology?

Rachel Williams ,¹ Reham Aldakhil,² Ann Blandford ,³ Yogini Jani ^{1,4}

<https://bmjopen.bmj.com/content/bmjopen/11/7/e044419.full.pdf>



A cross-country time and motion study to measure the impact of electronic medication management systems on the work of hospital pharmacists in Australia and England



Johanna I. Westbrook^{a,*}, Ling Li^b, Sonal Shah^b, Elin C. Lehnbohm^{a,c}, Mirela Prgomet^a, Behnaz Schofield^d, Kathrin Cresswell^d, Ann Slee^e, Jamie J. Coleman^{b,d}, Lucy McCloughan^d, Aziz Sheikh^d

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^b Institute of Clinical Sciences, College of Medical and Dental Sciences, University of Birmingham, United Kingdom

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^d Centre of Medical Informatics, Usher Institute of Population Health Sciences and Informatics, The University of Edinburgh, Medical School, The Old Medical School, Edinburgh, United Kingdom

^e Department of Strategic Systems and Technology, Patients and Information, NHS England, London, United Kingdom

^f University Hospitals Birmingham NHS Foundation Trust, Birmingham, United Kingdom

Highlights

- Australian and English pharmacists' work patterns significantly differed at baseline.
- Electronic medication management systems changed the work patterns of pharmacists.
- The same magnitude of effect on pharmacists' work in each country was found.
- Cross-country studies help understand how systems integrate in different contexts.



McLeod et al. *BMC Health Services Research* (2019) 19:156
<https://doi.org/10.1186/s12913-019-3986-4>

(2019) 19:156

BMC Health Services Research

RESEARCH ARTICLE

Open Access



The impact of implementing a hospital electronic prescribing and administration system on clinical pharmacists' activities - a mixed methods study

Monsey McLeod¹, Georgios Dimitrios Karamatakis², Lore Heyligen³, Ann McGinley⁴ and Bryony Dean Franklin^{1,5*}

What next?



What is smart insulin?

Smart insulin is a next-generation **insulin** that automatically responds to changing blood glucose levels. The lower or higher blood sugar levels are, less or more insulin is released, respectively.

The insulin, whether taken as an injection or pill, keeps blood glucose levels normal throughout the day. This eliminates not just **hypoglycemia** and **hyperglycemia** but also **multiple daily injections** and carb counting.

All smart insulin projects are at a very early stage and, in some cases, the drug is still being tested in animal studies.



Article

Development and Validation of a Digital Image Processing-Based Pill Detection Tool for an Oral Medication Self-Monitoring System

Jannis Holtkötter ^{1,2}, Rita Amaral ^{1,2,3,4}, Rute Almeida ^{1,2}, Cristina Jácome ^{1,2}, Ricardo Cardoso ⁵, Ana Pereira ^{1,2}, Mariana Pereira ^{1,2,5}, Ki H. Chon ⁶ and João Almeida Fonseca ^{1,2,5,*}

Technological advances impacting healthcare and the magnitude of disruption.

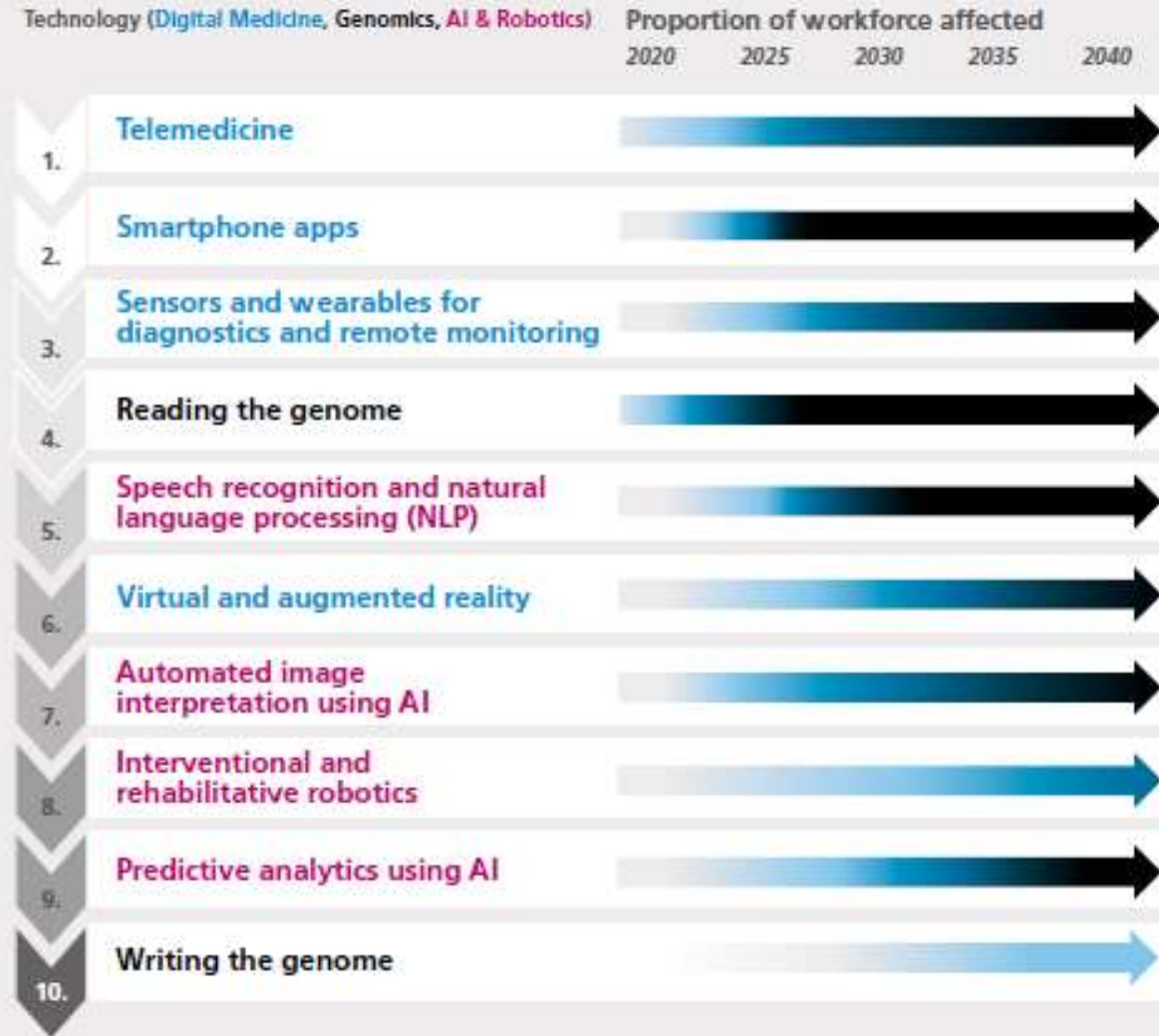


Figure 1: Top 10 digital healthcare technologies and their projected impact on the NHS workforce from 2020 to 2040

