

<b>Name</b>	<b>Curriculum Vitae Esmita Charani, PhD, MSc, MPharm, MRPS, ESCMID Fellow</b>	
<b>Address</b>	Dept. of Infectious Diseases, Imperial College, Hammersmith Hospital Site, Du cane Rd, London W12 0NN	
<b>E-mail</b>	<a href="mailto:e.charani@imperial.ac.uk">e.charani@imperial.ac.uk</a>	
<b>Phone No</b>	+44 20 3313 2732/ +44 795 831 7570	
<b>Short Bio</b>	<p>I am the Lead Pharmacist within the faculty of Medicine at Imperial College London at the NIHR Health Protection Research Unit for Healthcare Associated Infections and Antimicrobial Resistance. I am a visiting Researcher at Haukeland University Hospital, Bergen Norway, and adjunct faculty at Amrita Institute of Medical Sciences, Kerala India, where I am involved in helping implement and investigate national antibiotic stewardship programmes. My doctoral thesis investigated the impact of culture and team dynamics on the implementation of antimicrobial stewardship across India, Norway, France, Burkina Faso and England. In my academic career the focus of my research has been the influence of cultural determinants on antibiotic prescribing behaviours and behaviour change interventions in the field of antimicrobial stewardship. I am a co-investigator on the ESRC award (2017-2021): <i>Optimising antibiotic use along surgical pathways: addressing antimicrobial resistance and improving clinical outcomes</i> (in England, Scotland, Rwanda, India &amp; South Africa). This project has provided me the opportunity to develop capacity building for research in India and South Africa. I am also developing research collaborations with Sudan and Bangladesh investigating the role of infection in maternal and neonatal pathways. In my role as adjunct faculty at Amrita Institute of Medical Sciences I am a co-supervisor of PhD studentship investigating the role of pharmacists in antimicrobial stewardship programmes in India. I have acted as examiner for PhD candidates.</p>	
<b>Current Appointments</b>	Post-doctoral Researcher NIHR Health Protection Research Unit Antimicrobial Resistance and Healthcare Associated Infection Honorary Clinical Pharmacist, Imperial College Healthcare NHS Trust Visiting researcher Haukeland University, Bergen Norway Adjunct Faculty Amrita Institute of Medical Sciences, Kerala India	
<b>Previous Appointments</b>	2009 – 2014 Research Pharmacist, Imperial College London 2008 – 2009 Scientific Secretariat to Department of Health Advisory Board on Antimicrobial Resistance and Healthcare Associated Infections 2008 – 2009 Senior Antimicrobial Stewardship Pharmacist, The Royal Free Hospital London 2007 – 2008 Manager of Medicines Information Department, North Middlesex Hospital, London 2006 – 2007 Antimicrobial Stewardship Pharmacist, Cambridge University Teaching Hospitals, Cambridge 2002 – 2007 Clinical Pharmacist, Cambridge University Teaching Hospitals, Cambridge	
<b>Higher Education</b>	2002 MPharm London 2004 Cert Clinical Pharmacy London 2005 Diploma Infect Dis LSHTM London 2006 MSc Infect Dis LSHTM London 2014 PG Cert ULT 2018 PhD Imperial College London	
<b>Membership of Professional</b>	2002 - present	Member of the Royal Pharmaceutical Society

<b>Bodies/national appointments</b>	2008 - 2009	Pharmacist Lead to Department of Health Committee on Antimicrobial Resistance and Healthcare Associated Infection (ARHAI), Department of Health and the Health Protection Agency
	2014	National Institute for Care and Health Excellence – Expert Member on Antibiotic Guidelines Panel
	2016 - Present	Member of the British Society for Antimicrobial Chemotherapy
	2016 – 2019	Expert Adviser for the NICE Centre for Guidelines
	2018	Member of European Society for Clinical Microbiology and Infectious Diseases (ESCMID) Education Committee
	2018	Member of ESCMID Study Group for Antimicrobial Stewardship (ESGAP) Research Working Group
<b>Awards/ Grants</b>	2019	International Society for Infectious Diseases Emerging Leader in International Infectious Diseases
	2019	Chief Pharmaceutical Officer's Global Health Fellowship
	2018	Improving surgical outcomes and reducing mortality and morbidity in maternal, neonatal and paediatric populations: optimising antibiotic use and infection prevention. GCRF £147743 Co-Investigator
	9 months	
	2018	Economic and Social Research Council (ESRC) Impact Acceleration Award: International and local narratives on the experiences of healthcare professionals diagnosing and treating infections and implementing antimicrobial stewardship £21000
	12 months	
	2018	ESRC theme 4: Delivering cross-project educational workshops and e-learning programmes on social science research methodologies to tackle antimicrobial £82,412
	12 months	
	2017	ESRC grant awarded to investigate Antimicrobial Stewardship across Surgical Pathways: Investigating, Redesigning, and Evaluating Systems (ASPIRES). £1.9 Million Co-Investigator
	48 months	
	2015	American Society for Microbiology Student and Post-Doctoral Fellows Travel Grant
	2015	NIHR Enhanced point of care infection management policy application in critical care and therapeutics. (£650,406) Co-Investigator
	48 months	
	2014	Haukeland University Hospital. The implementation of a national antimicrobial stewardship programme for hospitals in Norway. 500,000 Krone (£56,247) Co-Investigator
	12 months	
	2013	CSO Research Grant. Systematic review and meta-analysis of interventions to improve antibiotic prescribing practices for hospital inpatients. £7,155.00.
	3 months	
	2013	Enhanced prescribing through CBR-based Imperial Antibiotic Prescribing Policy smartphone application (ENIAPP). £20,000.00 Co-Investigator
	12 months	
	2013	Imperial Charitable Trust. Investigating the impact of cross sector smartphone applications which provide point of care antimicrobial prescribing support to doctors and antimicrobial therapy information to patients. £56,000.00 Co-Investigator
	12 months	
	2012	Outstanding Service Care & Research Award 2012 Imperial College Healthcare NHS Trust
	2011	The Galen Award Recipient 2011 £10,000 for the Antimicrobial Dosing in Obesity Study (ADIOS) Royal Pharmaceutical Society of Great Britain practice Research Awards PI
	12 months	
	2011	UKCPA Novartis Antimicrobial Management Award 2011 £1500 for

## Esmita Charani Publications

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1. *A behavioural approach to specifying interventions: what insights can be gained for the reporting and implementation of interventions to reduce antibiotic use in hospitals?* Duncan EM, **Charani E**, Clarkson JE, Francis JJ, Gillies K, Grimshaw JM, Kern WV, Lorencatto F, Marwick CA, McEwen J, Möhler R, Morris AM, Ramsay CR, Rogers Van Katwyk S, Rzewuska M, Skodvin B, Smith I, Suh KN, Davey PG. *J Antimicrob Chemother.* 2020 Feb 4. pii: dkaa001. doi: 10.1093/jac/dkaa001. PMID:32016346
2. *Strengthening strategic management approaches to address antimicrobial resistance in global human health: a scoping review.* Ahmad R, Zhu NJ, Leather AJM, Holmes A, Ferlie E; ASPIRES study co-investigators. *BMJ Glob Health.* 2019 Sep 11;4(5):e001730. doi: 10.1136/bmjgh-2019-001730. eCollection 2019. PMID:31565417
3. *Antibiotic prescribing in general medical and surgical specialties: a prospective cohort study.* **Charani E**, de Barra E, Rawson TM, Gill D, Gilchrist M, Naylor NR, Holmes AH. *Antimicrob Resist Infect Control.* 2019 13;8:151. PMID:31528337.
4. *In transition: current health challenges and priorities in Sudan.* **Charani E**, Cunninton A, AlaEldin HAY, Mohammed SA, Ammar EMA et al. *BMJ Global Health.* 2019;4:E001723.
5. *The AWaRe point prevalence study index- simplifying surveillance of antibiotic use in paediatrics.* Islam S, **Charani E**, Holmes AH. *Lancet Global Health.* 2019;7(7):e811-e812. PMID:31200876
6. *The association between adherence to national antibiotic guidelines and mortality, readmission and length of stay in hospital inpatients: Results from a Norwegian multicentre, observational cohort study.* Wathne JS, Harthug S, Kleppe LSK, Blix HS, Nilsen RM, **Charani E**, Smith I. *Antimicrob Resist Infect Control.* 2019;8:63. PMID 31011417.
7. *Use of microbiology tests in the era of increasing AMR – a multicentre hospital cohort study.* Skodvin B, Wathne JS, Lindemann PC, Harthug S, Nilsen RM, **Charani E**, Syre H, Kittang BR, Kleppe LKS, Smith I. *Antimicrob Resist Infect Control.* 2019;8:28. eCollection 2019. PMID: 30740221
8. *The state of education and training for antimicrobial stewardship programs in Indian hospitals – a qualitative and quantitative assessment.* Singh S, **Charani E**, Wattal C, Arora A, Jenkins A, Nathwani D. *Antibiotics (Basel).* 2019;8(1). pii: E11. doi: 10.3390/antibiotics8010011. PMID: 30704037 (Article part of the Special Issue Tackling Challenges Associated with Antibiotic Resistance: Social, Economic and Policy Perspectives).
9. *Implementation of antibiotic stewardship in different settings - results of an international survey.* **Charani E**, Castro-Sánchez E, Bradley S, Nathwani D, Holmes AH, Davey P. *Antimicrob Resist Infect Control.* Feb 2019;8:34. eCollection 2019. PMID: 30805181
10. *Investigating the cultural and contextual determinants of antimicrobial stewardship programmes across low-, middle- and high-income countries-A qualitative study.* **Charani E**, Smith I, Skodvin B, Perozziello A, Lucet JC, Lescure FX, Birgand G, Poda A, Ahmad R, Singh S, Holmes AH. *PLoS One.* Jan 2019;14(1):e0209847. PMID: 30650099
11. *Antibiotic Stewardship-Twenty Years in the Making.* **Charani E**, Holmes A. *Antibiotics (Basel).* Jan 2019 24;8(1). pii: E7. doi: 10.3390/antibiotics8010007. PMID: 30678365 (Article part of the Special Issue Tackling Challenges Associated with Antibiotic Resistance: Social, Economic and Policy Perspectives)
12. *Prioritizing research areas for antibiotic stewardship programmes in hospitals: a behavioural perspective consensus paper.* Rzewuska M, **Charani E**, Clarkson JE, Davey PG, Duncan EM, Francis JJ, Gillies K, Kern WV, Lorencatto F, Marwick CA, McEwen J, Möhler R, Morris AM, Ramsay CR, Rogers Van Katwyk S, Skodvin B, Smith I, Suh KN, Grimshaw JM; Joint Programming Initiative on Antimicrobial Resistance (JPIAMR) Working Group on Behavioural Approaches to Antibiotic Stewardship Programs. *Clin Microbiol Infect.* 2019;25:163-168. PMID:30195471
13. *Developing core elements and checklist items for global hospital antimicrobial stewardship programmes: a consensus approach.* *Clin Microbiol Infect.* Pulcini C, Binda F, Lamkang AS, Trett A, **Charani E**, Goff DA, Harbarth S, Hinrichsen SL, Levy-Hara G, Mendelson M, Nathwani D,

- Gunturu R, Singh S, Srinivasan A, Thamlikitkul V, Thursky K, Vlieghe E, Wertheim H, Zeng M, Gandra S, Laxminarayan R. *Clin Microbiol Infect.* 2019;25:20-25. PMID:29625170
14. *The effect of antibiotic stewardship interventions with stakeholder involvement in hospital settings: a multicentre, cluster randomized controlled intervention study.* Wathne JS, Klepe LKS, Harthug S, Blix HS, Nilsen RM, **Charani E**, Bergen Intervention Teams, Smith I. *Antimicrob Resist Infect Control.* 2018;7:109. eCollection 2018. PMID:30214718
  15. *The Differences in Antibiotic Decision-making Between Acute Surgical and Acute Medical Teams: An Ethnographic Study of Culture and Team Dynamics.* **Charani E**, Ahmad R, Rawson TM, Castro-Sanchèz E, Tarrant C, Holmes AH. *Clin Infect Dis.* Nov 2019; 69(1):12-20. doi: 10.1093/cid/ciy844. PMID: 30445453
  16. *Investigating the impact of poverty on colonization and infection with drug-resistant organisms in humans: a systematic review.* Alividza V, Mariano V, Ahmad R, **Charani E**, Rawson T, Holmes A, Castro Sanchez EM. *Inf Dis of Poverty.* Aug 2018;7(1):76. PMID: 30115132
  17. *Driving sustainable change in antimicrobial prescribing practice: how can social and behavioural sciences help?* Lorencatto F, **Charani E**, Sevdalis N, Tarrant C, Davey P. *J Antimicrob Chemother.* 2018;73:2613-2624. PMID:30020464
  18. *Exploring the Use of C-Reactive Protein to Estimate the Pharmacodynamics of Vancomycin.* Rawson TM, **Charani E**, Moore LSP, Gilchrist M, Georgiou P, Hope W, Holmes AH. *Ther Drug Monit.* 2018 Jun;40(3):315-321. PMID: 29561305
  19. *Development of a patient-centred intervention to improve knowledge and understanding of antibiotic therapy in secondary care.* Rawson TM, Moore LSP, Castro-Sanchez E, **Charani E**, Hernandez B, Alividza V, Husson F, Toumazou C, Ahmad R, Georgiou P, Holmes AH. *Antimicrob Resist Infect Control.* 20 Mar 2018 20;7:43. (eCollection 2018). PMID:29568516
  20. *The experiences and perspectives of implementing antimicrobial stewardship in five French hospitals: a qualitative study.* Perozziello A, Routelous C, **Charani E**, Truel A, Birgand G, Yazdanpanah Y, Lescure FX, Lucet JC; CEFECA Study Group. *Int J Antimicrob Agents.* 2018;51:829-835. PMID:29339297
  21. *Involving citizens in priority setting for public health research: Implementation in infection research.* Rawson TM, Castro-Sánchez E, **Charani E**, Husson F, Moore LSP, Holmes AH, Ahmad R. *Health Expect.* Feb 2018, Volume 21, Issue 1, 222–229 p. PMID: 28732138
  22. *Addressing the key communication barriers between microbiology laboratories and clinical units: a qualitative study.* Skodvin B, Aase K, Brekken AL, **Charani E**, Lindemann PC, Smith I. *J Antimicrob Chemother.* 2017;72:2666-2672. PMID:28633405
  23. *Understanding antibiotic decision making in surgery - a qualitative analysis.* **Charani E**, Tarrant C, Moorthy K, Sevdalis N, Brennan L, Holmes AH. *Clin Microbiol Infect.* 2017 Oct;23(10):752-760. PMID: 28341492
  24. *A systematic review of clinical decision support systems for antimicrobial management: Are we failing to investigate these interventions appropriately?* Rawson TM, Moore LS, Hernandez B, **Charani E**, Castro-Sanchez E, Herrero P, Hayhoe B, Hope W, Georgiou P, Holmes AH. *Clin Microbiol Infect.* 2017 Aug;23(8):524-532. PMID: 28268133
  25. *Data-driven Web-based Intelligent Decision Support System for Infection Management at Point-Of-Care: Case-Based Reasoning Benefits and Limitations.* Hernandez B, Herrero P, Rawson TM, Moore LSP, **Charani E**, Holmes AH, Georgiou P. *Volume 5: HEALTHINF*, 119-127, 2017. *Proceedings of the 10th International Joint Conference on Biomedical Engineering Systems and Technologies*. doi: 10.5220/0006148401190127
  26. *Opportunities for system level improvement across antibiotic use in the surgical pathway.* **Charani E**, Ahmad R, Tarrant C, Birgand G, Leather A, Mendelson M, Moonesinghe SR, Sevdalis N, Singh S, Holmes A. *Int J Infect Dis.* Jul 2017. p29-34. PMID: 28483725
  27. *Blogging in Infectious Diseases and Clinical Microbiology: Assessment of 'Blogosphere' Content.* Birgand G, Troughton R, Moore LSP, **Charani E**, Rawson TM, Castro-Sánchez E, Holmes AH. *Infect Control Hosp Epidemiol.* 2017 Jul;38(7):832-839. PMID: 28516820
  28. *Effect of adding a mobile Health Intervention to a Multimodal Antimicrobial Stewardship Programme Across Three Teaching Hospitals – An Interrupted Time Series Study.* **Charani E**, Gharbi M, Moore LSP, Castro-Sánchez E, Lawson W, Gilchrist M, Holmes AH. *J Antimicrob Chemother.* Jun 2017 ;72(6):1825-1831. PMID: 28333297

29. *Interventions to improve antibiotic prescribing practices for hospital inpatients.* Davey P, Marwick CA, Scott CL, **Charani E**, McNeil K, Brown E, Gould IM, Ramsay CR, Michie S. *Cochrane Database Syst Rev.* 2017;2:CD003543. PMID: 28178770.
30. *Behaviour change interventions to influence antimicrobial prescribing: a cross-sectional analysis of reports from UK state-of-the-art scientific conferences.* Rawson TM, Moore LS, Tivey AM, Tsao A, Gilchrist M, **Charani E**, Holmes AH. *Antimicrob Resist Infect Control.* Jan 2017;6:11. PMID: 28101333
31. *Mapping the decision pathways of acute infection management in secondary care among UK medical physicians: a qualitative study.* Rawson TM, **Charani E**, Moore LSP, Hernandez B, Castro-Sanchez E, Herrero P, Georgiou P, Holmes AH. *BMC Medicine,* Dec 2016, 14(1):208. PMID: 27938372.
32. *Information provision for antibacterial dosing in the obese patient: a sizeable absence?* Boyd SE, **Charani E**, Lyons T, Frost G, Holmes AH. *J Antimicrob Chemother.* Dec 2016;71(12):3588-3592. PMID: 27538956
33. *Patient engagement with infection management in secondary care: a qualitative investigation of current experiences.* Rawson TM, Moore LSP, Hernandez B, Castro-Sanchez E, **Charani E**, Georgiou P, Ahmad R, Holmes AH. *BMJ Open* Oct 2016; 6:e011040. PMID: 27799238
34. *An Evidence-Based Antimicrobial Stewardship Smartphone App for Hospital Outpatients: Survey-based Needs Assessment Among Patients.* Micaleff C, McLeod M, Castro-Sanchez E, Gharbi M, **Charani E**, Moore LSP, Gilchrist M, Husson F, Costelloe C, Holmes AH, et al. *JMIR mHealth and uHealth.* Jul 2016; 4(3):e83 PMID: 27383743
35. *Antimicrobial therapy in obesity: a multicentre cross-sectional study.* **Charani E**, Gharbi M, Frost G, Drumright L, Holmes A. *J of Antimicrobial Chemotherapy,* Oct 2015. 70(10), 2906-2912. PMID: 26174720
36. *An antimicrobial stewardship program initiative: a qualitative study on prescribing practices among hospital doctors.* Skodvin B, Aase K, **Charani E**, Holmes A, Smith I. *Antimicrobial Resistance and Infection Control.* June 2015 4;4:24. PMID: 26075065
37. *Towards changing healthcare workers' behaviour: a qualitative study exploring non-compliance through appraisals of infection prevention and control practices.* Shah N, Castro-Sánchez E, **Charani E**, Drumright LN, Holmes AH. *J of Hosp. Inf.,* June 2015; 90(2):126-34 PMID: 25820128
38. *Time for action-Improving the design and reporting of behaviour change interventions for antimicrobial stewardship in hospitals: Early findings from a systematic review.* Davey P, Peden C, **Charani E** et al. *Int J Antimicrob Agents* 2015 Mar;45(3):203-12. PMID: 25630430
39. *Lack of weight recording in patients being administered narrow therapeutic index antibiotics: a prospective cross-sectional study.* **Charani E**, Gharbi M, Hickson M, Othman S, Alifituri A, Frost G, Holmes A. *BMJ Open.* Apr 2015 2;5(4):e006092. PMID:25838504
40. *Longitudinal trends and cross-sectional analysis of English national hospital antibacterial use over 5 years (2008–13): working towards hospital prescribing quality measures.* Cooke J, Stephens P, Ashiru-Oredope D, **Charani E**, Dryden M, Fry C, Hand K, Holmes A, Howard P, Johnson AP, Livermore DM, Mansell P, McNulty CAM, Wellsteed S, Hopkins S, Sharland M. *J of Antimicrobial Chemotherapy,* Jan 2015; 70(1):279-85. PMID: 25304646
41. *The Role of Behavior Change in Antimicrobial Stewardship.* **Charani E**, Castro-Sanchez E, Holmes A. *Infectious Disease Clinics of North America.* June 2014; 28(2):169-75. PMID: 24857386
42. *Redesigning the 'choice architecture' of hospital prescription charts: a mixed methods study incorporating in-situ simulation.* King D, Jabbar A, **Charani E**, Bicknell C, Wu Z, Miller G, Gilchrist M, Vlaev I, Franklin BD, Darzi A. *BMJ Open* 2014 Dec 4;4(12): e005473. PMID:25304646
43. *Do smartphone applications in healthcare require a governance and legal framework? It depends on the application!* **Charani E**, Castro-Sanchez E, Moore LSP, Holmes A. *BMC Medicine.* Feb 2014;12(29). PMID: 24524344
44. *Fragmentation of Care Threatens Patient Safety in Peripheral Vascular Catheter Management in Acute Care - A Qualitative Study.* Castro-Sanchez E, **Charani E**, Drumright LN, Sevdalis N, Shah N, Holmes AH. *PLoS One.* Jan 2014; 9(1):e86167. PMID: 24454958
45. *Antimicrobial stewardship programmes: the need for wider engagement.* **Charani E**, Holmes A. *BMJ Quality & Safety.* 2013; 22(11):885-7. PMID: 24046440

46. *Interventions to improve antibiotic prescribing practices for hospital inpatients.* Davey P, Brown E, **Charani E**, Fenelon L, Gould I M, Holmes A, Ramsay CR, Wiffen PJ, Wilcox M. *Cochrane Database of Systematic Reviews.* 2013; 4:CD003543. PMID: 23633313
47. *Understanding the determinants of antimicrobial prescribing within hospitals: The role of "prescribing etiquette".* **Charani E**, Castro Sanchez E, Sevdalis N, Kyratsis Y, Drumright L, Shah N, Holmes A. *Clinical Infectious Diseases.* 2013; 57(2):188-96. PMID 23572483
48. *An analysis of the development and implementation of a smartphone application for the delivery of antimicrobial prescribing policy: Lessons learnt.* **Charani E**, Kyratsis Y, Lawson W, Wickens H, Brannigan E, Moore L, Holmes A. *J of Antimicrobial Chemotherapy.* 2013; 68(4):960-7 PMID: 23258314
49. *Optimisation of infection prevention and control in acute healthcare by use of behaviour change: A Systematic Review.* Edwards R, **Charani E**, Sevdalis N, Alexandrou B, Sibley E, Mullett D, Loveday H, Drumright L, Holmes A. *Lancet Infect Dis.* 2012;12(4):318-29 PMID: 22342325
50. *Improving the quality of antibiotic prescribing in the NHS by developing a new Antimicrobial Stewardship Programme - Start Smart - Then Focus.* Oshiru-Oredope D, Sharland M, **Charani E**, McNulty C, Cooke J; ARHAI Antimicrobial Stewardship Group. *J Antimicrob Chemother.* 2012 Jul;67 Suppl 1:i51-63. PMID:22855879
51. *Behaviour Change Strategies to Influence Antibiotic Prescribing in Acute Care: A Systematic Review* **Charani E**, Edwards R, Sevdalis N, Alexandrou B, Sibley E, Mullett D, Dean Franklin B, Holmes A. *CID* 2011; 53 (7):651–662. PMID 21890770
52. *Antibiotic stewardship programmes – what’s missing?* **Charani E**, Cooke J, Holmes A. *J Antimicrob Chemother.* 2010; 65(11):2275-7. PMID: 20851812

#### **Selected Letters:**

- *Vancomycin therapy in secondary care; investigating factors that impact therapeutic target attainment.* Rawson TM, **Charani E**, Moore LS, Herrero P, Baik JS, Philip A, Gilchrist M, Brannigan ET, Georgiou P, Hope W, Holmes AH. *J Infect.* Mar 2017;74(3):320-324. PMID: 28043826

#### **Book Chapters:**

- 1 **Charani E**, Birgand G. "Managing behaviours social, cultural, and psychological aspects of antibiotic prescribing and use." In Laundry M, Gilchrist M, and Whitney L (ed). *Antimicrobial Stewardship.* Oxford University Press 2016, pp 20-29
- 2 Castro-Sánchez E, **Charani E**, Moore L, Gharbi M, Holmes A. "On call: antibiotics"- development and evaluation of a serious antimicrobial prescribing game for hospital care ". In Schouten B, Fedtke S, Schijven M, Vosmeer M, Gekker A (ed). *Games for Health 2014. Proceedings of the 4<sup>th</sup> conference on gaming and playful interaction in healthcare.* Springer Oct 2014, pp 1-7