### DR KEN CATCHPOLE

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#### AFFILIATIONS AND QUALIFICATIONS

Full Member, The Human Factors and Ergonomics Society, USA

1/2012Registered Member of the Institute of Ergonomics and Human Factors, UK

2/2000PhD in Psychology and Physiology, University of Leeds, West Yorkshire, UK

10/95-9/99

• Thesis: The Use of Complex Auditory Stimuli for Localizable Alarms

BSc (Hons) Ergonomics with DPS, Loughborough University, Leicestershire, UK 10/91-7/95

### RESEARCH INTERESTS (\*denotes currently active area)

- Measuring, modelling and reducing human error in surgical care\*.
- Task, team, environmental and organizational contributions to error\*.
- Development, implementation and evaluation of safety solutions\*.
- The translation of safety expertise between industries\*.
- Ethnographic, observational and data mining methods for systemic safety and quality analysis\*.
- Methods for innovation and change in complex socio-technical systems\*
- Auditory perception, localization, warning design, and 3D audio simulation.
- Domains: healthcare\*; road transport; aviation; maritime; military.

#### **EMPLOYMENT HISTORY**

### **SmartState Endowed Chair in Clinical Practice and Human Factors**

1/16 - Present

Department of Anesthesia and Perioperative Medicine, Medical University of South Carolina, SC, USA.

- Aim: Integrating research and practice in clinical human factors for improved safety and performance.
- *Main Duties:* Developing human factors research capability, and applying human factors methods to safety and performance improvement across the hospital.
- Key Projects: Operating Room Design (AHRQ); Trauma Communication Technology (SCTR); Improving Robotic Surgery (AHRQ); Sterile Services Systems Analysis (AHRQ); Reducing Anesthesia Medication Errors (AHRQ); Incident investigations and root cause analysis (MUSC); Quality improvement and patient safety projects (MUSC).

### **Director of Surgical Safety and Human Factors Research**

8/11 - 11/15

Department of Surgery, Cedars-Sinai Medical Center, Los Angeles, USA.

- Aim: studying and reducing the opportunity for inadvertent patient injury in surgical care.
- Main duties: Leading development of human factors practice and research capability.
- Key Projects: Operating Room of the Future I and II (Department of Defense); Improving Robotic Surgery (NIH);
   Trauma 360 Smartapp (Medaware Inc); O-Arm Flow Disruptions (Medtronic); Human Factors Summative Studies (BioQuiddity Inc); Implementation and development (Gauss Surgical Inc)
- Key Skills: Healthcare quality improvement; patient safety; study design; systems analysis methodologies; teamwork training; technology implementation; healthcare simulation; human factors in healthcare; surgical process improvement.

#### **Senior Post-Doctoral Scientist**

10/05 - 7/11

Quality, Reliability, Safety and Teamwork Unit, Nuffield Department of Surgery, <u>University of Oxford</u>, and <u>The John Radcliffe Hospital</u>, Oxford, UK.

- Aim: Evaluating and reducing the opportunity for inadvertent patient injury in surgical care.
- *Main duties:* Co-leading the QRSTU; evaluation of safety interventions; development of models and measures of teamwork and error; grant applications; supervision; data collection and analysis; publication of results.
- Key Projects: Safer Surgical Services (NIHR); Creating a safe hospital at night handover model (BUPA Foundation);
   Improving the Quality of Surgical Care (Leverhulme Trust); Safer Theatre Teams (Health Foundation); The Productive Operating Theatre (NHS Institute for Innovation and Improvement); Hospital of the Future Project (EPSRC); Safety in

Surgery Review (NPSA); Can aviation-style team training improve performance in the operating theatre? (BUPA Foundation); Analysis of Anaesthetic Incident Reports (NPSA)

### **Principal Research Fellow**

4/03-9/05

Institute for Child Health, <u>University College London</u> and <u>Great Ormond Street Hospital for Children NHS Trust</u>, London, UK.

- Aim: An ethnographic and socio-technical systems approach to observing, understanding and reducing errors in surgery.
- Main duties: Delivering a multi-disciplinary project to study and model errors in surgical procedures across three treatment centres.
- Key Projects: Identifying and Reducing Errors in the Operating Theatre (Dept of Health PSRP); Improving Patient Handovers from Surgery to Intensive Care (Dept of Health)

## Senior Psychologist & Human Factors Consultant

9/99-3/03

DERA/QinetiQ Centre for Human Sciences, Farnborough, Hants, UK.

- Aim: Research and development in applied cognition for defence and civilian security and safety
- *Main duties:* Project management; technical management; customer liaison; commercial bid preparation; group/personnel management; data collection; analysis; reporting; technical and commercial strategy.
- Key Projects: Human Factors in Aviation Security (UK Dept. for Transport); VINTECH II (EU Framework V project); ESSAI (EU Framework V project); Adaptive Automation and Human Performance (Ministry of Defence).

SUCCESSFUL GRANTS (*denotes PI)  Competitive Funding  Systems Optimization for Advances in Sterile  Processing (SOAP)* (R01)  1R01HS027912-01A1	AHRQ, 2021-2026	\$1,995,995
Human Factors and Systems Integration in High Technology Surgery (HF-SIGHTS) (R01)* R01HS026491	AHRQ, 2018-2022	\$1,995,826
Identifying and Reducing Errors in Perioperative Anesthesia Medication Delivery (R18)* R18HS026625	AHRQ, 2018-2021	\$2,438,211
A Work Systems Analysis of Sterile Processing* 1R03HS025538-01	AHRQ 2017-2018	\$99,000
Improving the Delivery of Robotic Surgery (R03)* R03EB017447	National Institute of Biomedical Imaging and Bioengineering, 2014-2016	\$198,000
Military Operating Room of the Future Phase II W81XWH-11-1-0813	US Department of Defense Telemedicine and Advanced Technology Research Center (TATRC), 2012-2014	\$2,200,000
Military Operating Room of the Future Phase I W81XWH-10-1-1039	US Department of Defense Telemedicine and Advanced Technology Research Center (TATRC), 2011-2013	\$2,200,000
Creating a Safe Hospital at Night Handover Model*	BUPA Foundation, 2010-2012	£176,882
Safer Delivery of Surgical Services: a Reliable Teamwork Approach	NIHR Programme Grant, 2010-2013	£1,469,854
Improving the Safety and Quality of Surgical Care*	Leverhulme Early Career Research Fellowship, 2007-2008	£60,000
Can team communications training improve behaviour, attitudes, error rates or outcomes in the operating theatre?	BUPA Foundation, 2005-2008	£294,181

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Understanding the Spread of Teamwork Training	MUSC SCTR 2017-2018	\$15,000
IT-TACIT*	MUSC SCTR 2016-2017	\$15,000
Analysis of VITOM OR Imaging Device	Karl Storz Inc, 2013-2014	\$37,000
Flow Disruptions in O-Arm Use	Medtronic Inc, 2014-215	\$98,000
Usability Evaluation of Drug Delivery Device*	BioQuiddity Inc, 2014	\$62,000
Analysis of Safer Theatre Teams Project*	Royal College of Surgeons, 2008	£15,000
A review of incidents related to anaesthesia*	National Patient Safety Agency, 2006	£15,000
UK Threat Image Projection Programme	UK Department for Transport reviewed	£650,000
	and renewed annually, 2000-2003.	(approx.)

# **AWARDS & PROFESSIONAL RECOGNITION**

<u>AWARDS &amp; P</u>	ROFESSIONAL RECOGNITION
1997	Winner of the Prince of Wales Award for Innovation 1997
2006-	Reviewer for: Ergonomics; Applied Ergonomics; Cognitive Technology and Work; Human Factors; Annals
	of Surgery; Annals of Emergency Medicine; Journal of Patient Safety; The BUPA Foundation; Chief
	Scientist Office of the Scottish Government; The Health Foundation, UK; The PSI Foundation, Toronto;
	the National Science Foundation, USA; National Institute for Health Research, UK.
2007-	International keynote speaker at: Qatar Patient Safety Week 2017, Dohar; Current Approaches to
	Understanding Surgical Error, Leeds, UK, 2016; SimHealth 2015, Adelaide, Australia; Patient Safety
	Congress, Birmingham, UK 2015; Clinical Human Factors Group Meeting, London, 2014; Human Errors
	in Healthcare, Radiology Conference UK, 2014; Institute of Ergonomics and Human Factors Annual
	Conference, Cambridge, 2013; Healthcare Systems Ergonomics and Patient Safety, Oviedo, June, 2011;
	Human Factors in Healthcare Symposium, Sydney, March 2009; ECCU 2008, Las Vegas, June 2008;
2007	Improving Clinical Handover, Sydney, October 2007.
2007 2009-10	Runner up, Times Higher Research Project of the Year,UK Invited Member, Safe Anaesthesia Liasion Group, Royal College of Anaesthetists, UK
2009-10	Invited Member, Confidential Reporting System for Surgery, Royal College of Surgeons, UK
2010	Handover project exhibited at the Science Museum, London, UK
2011-15	Associate Editor for BMJ Quality and Safety.
2011-14	Visiting/Adjunct Professor, Department of Continuing Education, University of Oxford
2015	NSF Smart and Connected Health Study Section Grant Review Panel
2015-	AHRQ HSQR Study Section Grant Review Panel
2016	Sir Frederick Bartlett Award, for "significant contributions to original fundamental, applied or
	methodological research, development and application of knowledge and scholarship in
	ergonomics/human factors", Charted Institute for Ergonomics and Human Factors, UK.
2016-	Adjunct Professor, Department of Engineering, Clemson University.
2017-	Invited Member, Society of Cardiovascular Anesthesiologists' Quality & Safety Leadership Committee.
2018	Top Innovation, Clinical and Translational Science Awards (CTSA) Program.
2020-	Anesthesia Patient Safety Foundation Scientific Evaluation Committee Member

## PUBLICATIONS AND OTHER DISSEMINATION

### Peer-Reviewed Journal Articles

- 1. **Catchpole K**, Cohen T, Weigl M, Lusk C, Anger J. Addressing misconceptions of flow disruption studies in "Is non-stop always better? Examining assumptions behind the concept of flow disruptions in studies of robot-assisted surgery." *Journal of Robotic Surgery*. Accepted 3<sup>rd</sup> October 2021.
- 2. Ambrose JW, Layne DM, **Catchpole K**, Evans H, Nemeth LS. A Study to Examine Resilience and Team Decision Making in Interprofessional Healthcare Teams During Covid-19. Healthcare. Accepted 30<sup>th</sup> August 2021.
- 3. Cohen T, Wiegmann D, Kanji F, Alfred M, Anger J, **Catchpole K**. Using Flow Disruptions to Understand Healthcare System Safety: A Systematic Review of Observational Studies. *Applied Ergonomics*. Accepted August 2021.
- 4. Kanji, F, Cohen T, Alfred M, Caron A, Lawton S, Savage S, Shouhed D, Anger J, **Catchpole K** (2021). Room Size Influences Flow in Robotic Assisted Surgery. International Journal of Environmental Research and Public Health. 18, 7984. https://doi.org/10.3390/ijerph18157984
- 5. Herman A, Jaruzel C, Tobin C, Reves J, **Catchpole K**, Alfred M. (In Press). Understanding Morbidity, Mortality and Systems Safety in Non-Operating Room Anesthesia: A Systematic Review. *British Journal of Anaesthesia*. Accepted 9th July 2021.

- 6. **Catchpole K,** Privette A, Roberts L, Alfred M, Carter B, Woltz E, Wilson D, Crookes B (2021). A SmartPhone Application for Teamwork and Communication in Trauma: Pilot Evaluation 'In the Wild'. *Human Factors*. Published online 14 June 2021. Dol: 10.1177/00187208211021717
- 7. Bernstein S, Kelechi T, **Catchpole K**, Nemeth L, Prevention of Failure to Rescue in Obstetric Patients: A Realist Review. *Worldviews on Evidence-Based Nursing*. Accepted 14 March 2021.
- 8. Perry S, **Catchpole K**, Rivera J, Parker S, Gosbee J. (2021). Strangers in a Strange Land': Understanding Professional Challenges for Human Factors/Ergonomics and Healthcare. *Applied Ergonomics* 94, Dol: 10.1016/j.apergo.2019.103040.
- 9. Schreyer J, Koch A, Herlemann A, Becker A, Schlenker B, **Catchpole K**, Weigl M. RAS-NOTECHS: Validity and reliability of a tool for measuring non-technical skills in robotic-assisted surgery settings. Submitted to *Surgical Endoscopy*. Accepted 14 Feb 2021.
- 10. Delgaizo J, **Catchpole K**, Alexyenko A, Research and Exploratory Analysis Driven Time-data Visualization (read-tv) Software. JAMIA Open. Accepted 22 Jan 2021.
- Cofran L, Cohen T, Alfred M, Kanji F, Choi E, Savage S, Anger J, Catchpole K. Barriers to Safety and Efficiency in Robotic Surgery Docking. Surgical Endoscopy. Accepted 17 December 2020. <a href="https://doi.org/10.1007/s00464-020-08258-0">https://doi.org/10.1007/s00464-020-08258-0</a>
- 12. Alfred M, Cohen T, Cohen K, Kanji F, Choi E, Del Gaizo J, Nemeth L, Alekseyenko A, Shouhed D, Savage S, Anger J, **Catchpole K**. Using flow disruptions to examine system safety in robotic-assisted surgery: protocol for a stepped wedge crossover design. JMIR Research Protocols. Accepted 23 December 2020.
- 13. Kanji F, **Catchpole K,** Choi E, Alfred M, Cohen K, Shouhed D, Anger J, Cohen T. (2021). Work System Interventions in Robotic Assisted Surgery: A Systematic Review Exploring the Gap Between Challenges and Solutions. *Surgical Endoscopy*. Dol: 10.1007/s00464-020-08231-x
- 14. Alfred M, Catchpole K, Huffer E, Fredendall L, Taaffe K. Work Systems Analysis of Sterile Processing: Assembly (2020). *BMJ Quality & Safety*. DoI: 10.1136/bmjqs-2019-010740
- 15. Tobin C, Alfred M, Wilson D, MenkinSmith L, Lehman-Huskamp K, Schaefer J, **Catchpole K**, Reves J. Trainthe-Trainer: Pilot Trial for Ebola Virus Disease Simulation Training. Health Education. Accepted 26 August 2020.
- 16. **Catchpole K,** Bowie P, Fouquet S, Rivera J, Hignett S. Frontiers in Human Factors: Embedded Clinical Human Factors in Practice. International Journal for Quality in Health Care. Accepted 24 August 2020. Doi: 10.1093/intqhc/mzaa108
- 17. Jurewicz K, Neyens D, **Catchpole K,** Joseph A, Reeves S, Abernathy J. Using anaesthesia workflow to evaluate physical workspace design and layout. *British Journal of Anaesthesia*. Accepted 24 Aug 2020.
- Sessions L, Nemeth L, Catchpole K, Kelchi T (2020). Use of Simulation-Based Learning to Teach High-Alert Medication Safety: A Feasibility Study. Clinical Simulation in Nursing. 47:60-64. doi: 10.1016/i.ecns.2020.06.013.
- 19. MenkinSmith L, **Catchpole K**, Reves J. (2020). Adapting Ebola training to educate healthcare workers during the SARS-2-CoV pandemic. American Journal of Disaster Medicine. Accepted 13 May 2020.
- 20. **Catchpole K**, Neyens D, Abernathy J, Sutcliffe K (2020). Understanding the limitations of incident reports. *British Journal of Anaesthesia*. 2020 Jun 11;. doi: 10.1016/j.bja.2020.05.014. PMID: 32536441.
- 21. Koch E, Burns J, **Catchpole K**, Weigl M. Associations of flow disruptions in the operating room with surgical outcomes: A systematic review. *BMJ Quality & Safety* 23. doi: 10.1136/bmjqs-2019-010639
- 22. Herrick H, Lorch S, Hsu JY, Catchpole K, Foglia EE (2020). Impact of Flow Disruptions in the Delivery Room. *Resuscitation* 150, 29-35. doi.org/10.1016/j.resuscitation.2020.02.037
- 23. Weigl M, **Catchpole K**, Wehler M, Schneider A (2020). Workflow disruptions and provider situation awareness in acute care: An observational study with emergency department physicians and nurses. *Applied Ergonomics* 88. doi.org/10.1016/i.apergo.2020.103155
- 24. Borckardt JJ, Annan-Coultas D, **Catchpole K**, Wise H, Mauldin M, Ragucci K, Scheurer D, Kascak K, (2019). Preliminary evaluation of the impact of TeamSTEPPS® training on hospital quality indicators, Journal of Interprofessional Education & Practice. https://doi.org/10.1016/j.xjep.2019.100306
- 25. Cason M, Sessions L, Nemeth L, **Catchpole K**, Bundy D. (2020). Components of Team Science—What Contributes to Success? *Journal of Interprofessional Education & Practice*. Accepted 25 Nov 2019
- 26. Alfred M, **Catchpole K**, Huffer E, Fredendall L, Taafe K. (2019). Work Systems Analysis of Sterile Processing: Decontamination. *BMJ Quality & Safety*. Published Online 13 Nov 2019. doi:10.1136/bmjqs-2019-009422.
- 27. Sessions L, Nemeth L, Kelchi T, **Catchpole K** (2019). Perceptions of High-Alert Medication Safety: A Qualitative Descriptive Study. Journal of Advanced Nursing. Accepted 5 Aug 2019.
- 28. Alfred M, Catchpole K, Huffer E, Fredendall L, Taafe K. (2019). Work Systems Analysis of Sterile Processing: Sterilization, Storage and Case Cart Preparation. Advances in Healthcare Management. Accepted 1 May 2019.
- 29. Yamada N, **Catchpole K**, Salas E (2019). The role of human factors in neonatal patient safety. Seminars in Perinatology 43(8):151174. doi: 10.1053/j.semperi.2019.08.003. PMID: 31477264.

- 30. Souders C, **Catchpole K**, Eilber K, Bresee C, Hanneman A, Lyon R, Gross B, Jagannathan S, Weigl M, Anger J (2019). Disruptions in Robotic-Assisted Abdominal Sacrocolpopexy: Does Robotic Surgery Introduce Unforeseen Challenges for Gynecologic Surgeons? *International Urogynecology Journal*. Accepted 20<sup>th</sup> Feb 2019. doi: 10.1007/s00192-019-03929-6
- 31. Schubel L, Weldon D, Blumenthal J, Capan M, Arnold R, Kowalski R, Seagull FJ, **Catchpole K**, Schwartz J, Franklin E, Littlejohn R, Miller K (2019). Informatics and Interaction: Applying Human Factors Principles to Optimize the Design of Clinical Decision Support for Sepsis. *Health Informatics Journal*. Accepted 5<sup>th</sup> Feb 2019.
- 32. **Catchpole K**, Bisantz A, Hallbeck S, Weigl M, Randell R, Kossack M, Anger J (2019). Human Factors in Robotic Assisted Surgery: Lessons from Studies 'in the Wild'. *Applied Ergonomics* 78, 270–276. doi: 10.1016/j.apergo.2018.02.011.
- 33. MenkinSmith L, Lehman-Huskamp K, Schaefer J, Alfred M, **Catchpole K**, Pockrus B, Wilson D, Reves J. A Pilot Trial of Online Simulation Training for Ebola Response Education. *Health Security*. Published Online:29 Nov 2018. Doi: 10.1089/hs.2018.0055
- 34. Wahr J, **Catchpole K** (2018). Deceptive Defenses: rethinking safety interventions in complex adaptive systems. *British Journal of Anaesthesia* 121(6):1196-1198. doi: 10.1016/j.bja.2018.08.012
- 35. Joseph A, Khoshkenar A, Taaffe A, **Catchpole K**, Machry H, Bayramzadeh S, RIPCHD.OR Study Group (2018). Minor flow disruptions, traffic related factors, and their effect on major flow disruptions in the operating room. *BMJ Quality & Safety*. http://dx.doi.org/10.1136/bmjqs-2018-007957
- 36. Weber J, **Catchpole K**, Becker AJ, Schlenker B, Weigl M (2018). Effects of Flow Disruptions on Mental Workload and Surgical Performance in Robotic-Assisted Surgery. World Journal of Surgery (2018). https://doi.org/10.1007/s00268-018-4689-4.
- 37. Jurewicz K A, Neyens DM, **Catchpole K**, Reeves ST (2018). Developing a 3D Gestural Interface for Anesthesia-Related Human-Computer Interaction Tasks Using Both Experts and Novices. Human Factors. Accepted 5/18.
- 38. **Catchpole K**, Alfred M. (2018). Industrial Conceptualization of Healthcare vs the Naturalistic Decision Making Paradigm: Work as Imagined vs Work as Done. Accepted 5 April 2018.
- 39. Neyens D, Bayramzadeh S, **Catchpole K**, Joseph A, Taaffe K, Jurewicz K, Khoshkenar A, San D. (2018). Using a systems approach to evaluate a circulating nurse's work patterns and workflow disruptions. Submitted to *Applied Ergonomics Special Issue on Human Factors and Ergonomics in the Operating Room: Contributions that Advance Surgical Practice*. Accepted April 2018.
- 40. Weigl M, Weber J, Hallett E; Pfandler M; Schlenker,B.; Becker A, **Catchpole K**. (In Press). Associations of intraoperative flow disruptions and OR teamwork in robotic-assisted prostatectomies. *Urology*. Accepted 16<sup>th</sup> Nov 2017.
- 41. Drazin D, Grunert P, Hartl R, Polly D, Meyer B, **Catchpole K**, Laufer I, Sethi R, Perry T, Simon D, Wang M, Fisher C, Scribner M, White G, Tubbs RS, Oskouian RJ, Kim T, Johnson JP. (2018). Highlights from the First Annual Spinal Navigation, Emerging Technologies and Systems Integration Meeting. *Ann Transl Med* 6(6):110. doi: 10.21037/atm.2018.03.22
- 42. Hignett S, Albolino S, **Catchpole K** (2017). Health and social care ergonomics: patient safety in practice. *Ergonomics*. Oct 9:1-4. doi: 10.1080/00140139.2017.1386454.
- 43. **Catchpole K**, Neyens D, Abernathy J, Allison D, Joseph A, Reeves S (2017). A Framework for Direct Observation of Performance and Safety in Healthcare. *BMJ Quality & Safety* 26, 1015-1021.
- 44. Heinke T, **Catchpole K**, Abernathy J (2017). Designing for Safety: The Importance of the Physical Space. Current Anesthesiology Reports. DOI 10.1007/s40140-017-0223-8. Available Online 1st August 2017,
- 45. Mariyaselvam M, **Catchpole K**, Menon D, Gupta A, Young P (2017). Preventing Retained Central Venous Catheter Guidewires: A Randomised Controlled Simulation Trial using a Human Factors approach. *Anesthesiology* 127(4):658-665. doi: 10.1097/ALN.000000000001797.
- 46. Dru CJ, Anger JT, Souders C, Bresee C, Weigl M, Hallett E, **Catchpole KR** (2017). Surgical Flow Disruptions During Robotic-Assisted Radical Prostatectomy. *Canadian Journal of Urology*. 24(3):8814-8821.
- 47. Souders, CP, **Catchpole KR**, Wood LN, Solnik JM, Avenido RM, Strauss PL, Eilber KS, Anger JT. (2017). Reducing Operating Room Turnover Time for Robotic Surgery Using a Motor-Racing Pit-Stop Model. *World Journal of Surgery*. DOI 10.1007/s00268-017-3936-4.
- 48. **Catchpole, K**, Hallett, E, Curtis, S, Mirchi, T, Souders, C, Anger, J. (2017). Diagnosing Barriers to Safety and Efficiency in Robotic Surgery. *Ergonomics*. Dol:10.1080/00140139.2017.1298845.
- 49. Barmparas G, Ley EJ, Martin MJ, Ko A, Harada M, Weigmann D, **Catchpole KR**, Gewertz BL (2017). Failure to rescue the elderly: a superior quality metric for trauma centers. *European Journal of Trauma and Emergency Surgery*, 1-8.
- 50. Barmparas, G, Martin M, Wiegmann D, **Catchpole K**, Gewertz B, Ley E (2016). Increased Age Predicts Failure to Rescue. *The American Surgeon* 82 (11): 1073-1079.
- 51. Frykman P, Freedman A, Kane T, Cheng Z, Petrosyan M, **Catchpole K.** (2016). A study of the VITOM exoscope in pediatric surgery and urology: Evaluation of technology acceptance and usability by operating team and

- surgeon musculoskeletal discomfort. *Journal of Laparoendoscopic & Advanced Surgical Techniques* 23(7): 639-643.DOI: 10.1089/lap.2016.0225.
- 52. Jain M, Fry BT, Hess LW, Anger JT, Gewertz BL, **Catchpole K** (2016). Barriers to Efficiency in Robotic Surgery: The Resident Effect. *Journal of Surgical Research* 205 (2): 296–304. DOI: 10.1016/j.jss.2016.06.092
- 53. New S, Hadi M, Pickering S, Robertson E, Morgan L, Griffin D, Collins G, Rivero-Arias O, **Catchpole K**, McCulloch P (2016). Lean Participative Process Improvement: Outcomes and Obstacles in Trauma Orthopaedics. *PLoS ONE* 11(4): e0152360. DOI:10.1371/journal.pone.0152360
- 54. McCulloch P, Morgan L, New S, **Catchpole K**, Robertson E, Hadi M, Pickering S, Collins G, Griffin D (2016). Combining Systems and Teamwork Approaches to Enhance the Effectiveness of Safety Improvement Interventions in Surgery. *Annals of Surgery* 265(1):90-96. DOI: 10.1097/SLA.000000000001589
- 55. Waterson P, **Catchpole K** (2016). Human factors in healthcare: welcome progress, but still scratching the surface. *BMJ Quality and Safety* 25:480-484. doi:10.1136/bmjqs-2015-005074
- 56. **Catchpole K**, Perkins C, Bresee C, Solnik MJ,Sherman B, Fritch J, Gross B, Jagannathan S, Hakami-Majd N, Avenido R, Anger JT. (2016). Improving Safety, Efficiency and Learning Curves in Robotic Surgery: A Human Factors Analysis. *Surgical Endoscopy* 30 (9), 3749–3761. DOI 10.1007/s00464-015-4671-2
- 57. Weigl M, Stefan P, Abhari K, Wucherer P, Fallavollita P, Lazarovici M, **Catchpole K.** (2016). Intra-operative disruptions, surgeon's mental workload, and technical performance in a full-scale simulated procedure. *Surgical Endoscopy*. 30(2):559-66. DOI 10.1007/s00464-015-4239-1.
- 58. Blandford A, Berndt E, **Catchpole K**, Furniss D, Mayer A, Mentis H, O'Kane A, Owen T, Rajkomar A, Randell R (2015). Neither clinician nor patient: Challenges and strategies for studying technology use in hospitals. *Cognition Technology and Work* 17 (4), 489-502. DOI 10.1007/s10111-014-0318-7.
- 59. Catchpole K, Russ S. (2015). The Problem with.....Checklists. BMJ Quality and Safety. doi:10.1136/bmjqs-2015-004431
- Morgan L, Hadi M, Pickering S, Robertson E, Griffin D, Collins G, Rivero-Arias O, Catchpole K, McCulloch P, New S (2015). The effect of teamwork training on team performance and clinical outcome in elective Orthopaedic surgery: A controlled interrupted time series study. *BMJ Open.* 2015 Apr 20;5(4):e006216. doi: 10.1136/bmjopen-2014-006216.
- 61. Shojania, KG, **Catchpole, K** (2015). 'The problem with...': a new series on problematic improvements and problematic problems in healthcare quality and patient safety. *BMJ Quality and Safety* 24:246-249 doi:10.1136/bmjqs-2015-004033/
- 62. Hignett S, Jones E.L., Miller D, Wolf L, Modi C, Shahzad MW, Buckle P, Banerjee J, **Catchpole K**. (2015). Human factors and ergonomics and quality improvement science: integrating approaches for safety in healthcare. *BMJ Quality and Safety*; 24:250-254 doi:10.1136/bmjqs-2014-003623.
- 63. Morgan L, New S, Robertson E, Collins G, Rivero-Arias O, **Catchpole K**, Pickering S, Hadi M, Griffin D, McCulloch P (2015). Effectiveness of facilitated introduction of a Standard Operating Procedure into routine processes in the operating theatre: A controlled interrupted time series. *BMJ Quality and Safety* 24 (2), 120-127. doi:10.1136/bmjqs-2014-003158.
- 64. Morgan L, Pickering S, Hadi M, Robertson E, New S, Griffin D, Collins G, Rivero-Arias O, **Catchpole K**, McCulloch P (2015). A combined teamwork training and work standardisation intervention in operating theatres: controlled interrupted time series study. *BMJ Quality and Safety*.24 (2), 111-119.doi:10.1136/bmjqs-2014-003204.
- 65. Shao X, Zhong X, LiJ,Gewertz BL, **Catchpole K**, Ley E, Blaha J, Wiegmann DA (2015). Bottleneck Analysis to Reduce Surgical Flow Disruptions: Theory and Application. *IEEE Transactions on Automation Science and Engineering*, 12 (1): 127-139. 10.1109/TASE.2014.2329833.
- 66. Gordon M, Baker P, **Catchpole K**, Darbyshire D, Shocken D (2014). Devising a consensus definition and framework for non-technical skills in healthcare to support educational design: A modified Delphi study. *Medical Teacher* 22:1-6.
- 67. **Catchpole K**, Ley E, Wiegmann D, Blaha J, Shouhed D, Gangi A, Blocker R, Karl R, Karl C, Taggart B, Starnes B, Gewertz B. (2014). A human factors sub-systems approach to trauma care. *JAMA Surgery.* 149(9):962-8. Doi:10.1001/jamasurg.2014.1208
- 68. Robertson E, Hadi M, Morgan L, Pickering S, Collins G, New S, Griffin D, McCulloch P, **Catchpole K** (2014). Oxford NOTECHS II: A Modified Theatre Team Non-Technical Skills Scoring System. *PLoS One* 9(3):e90320. doi: 10.1371/journal.pone.0090320
- 69. Robertson E, Morgan L, Bird S, **Catchpole K**, McCulloch P (2014). Interventions employed to improve intrahospital handover: a systematic review. *BMJ Quality and Safety*.0:1–8. doi:10.1136/bmjqs-2013-002309.
- 70. Shouhed D, Blocker R, Gangi A, Ley E, Blaha J, Gewertz B, Wiegmann D, Starnes B, Karl C, Karl R, Margulies D, **Catchpole K** (2014). Flow Disruptions During Trauma Care. *World Journal of Surgery* 38(2):314-21. DOI 10.1007/s00268-013-2306-0.
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### **Book Chapters**

- 1. **Catchpole K**, Alfred M. (2020). Surgical Performance and the Working Environment. In Cohen, Gewertz, Ley (Eds). Human Factors in Surgery. Springer. ISBN 978-3-030-53127-0
- 2. **Catchpole K**, Castejón de la Encina ME, Muelas Moya B (2018). Transferencia de los pacientes críticos y seguridad clínical. In Castejón de la Encina ME (ed). Seguridad clinica en lo servicios de emergencias prehospitalarios. Barcelona: Elsevier Espana. ISBN: 978-84-9113-172-4;
- 3. **Catchpole K** (2017). Surgery through a Human Factors and Ergonomics Lens. In Sanchez, Barach, Johnson, Jacobs (Eds.). Surgical Patient Care: Improving Safety, Quality and Value. Springer, Inc.
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### Letters, Popular Articles and Published Proceedings

1. Jurewicz K, Alfred M, Neyens D, **Catchpole K**, Joseph A, Reeves S (2018). Investigating Intraoperative and Intraprofessional Handoffs in Anesthesia. HFES 2018 Annual Meeting.

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- 2. Weldon D, Kowalski R, Schuchardt B, Arnold R, Capan M, Blumenthal HJ, Franklin E, Catchpole K, Seagull FJ, Schwartz S, Miller K. Signaling Sepsis Scenario Development & Validation. HFES 2018 Annual Meeting.
- Mosby D, Scheurich T, Blumenthal J, Capan M, Arnold R, Seagull J, Catchpole K, Schwartz S, Franklin E, Miller K (2017). Informatics and Interaction: Applying Human Factors Principles to Optimize the Design of Clinical Decision Support for Sepsis. AMIA 2017 Workshop on Interactive Systems in Healthcare at the Annual Symposium of the American Medical Informatics Association, November 4th, 2017.
- 4. Nawathe P, Berndsen N, Sivarajan V, Olshove V, **Catchpole K**, Phillips A (2017). Making Perioperative Handoff Communication Count by Improving the Safety and Quality in a New Congenital Heart Program. Journal of the American College of Cardiology 11 (69), 614
- Miller, K; Capan, M; Mosby, D; Kowalski, R; Kraft, R; Schuchardt, B; Schwartz, S; Seagull, J; Catchpole, K; Arnold, R. (2017 May 15). Sepsis Survivor Network. Community Research Exchange Conference. Newark, Delaware.
- 6. Perkins C, **Catchpole K**, Wood L, Solnik J, Avenido R, Strauss P, Eilber K, Anger J (2015). Reducing Operating Room Turnover Time for Robotic Pelvic Surgery. Society of Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction 2015 Winter Meeting, February 24 28, Scottsdale, Arizona.
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- 12. Gangi A, **Catchpole K**, Blocker R, Blaha J, Shouhed D, Gewertz B (2013). Human factors methods improve efficiency in emergency trauma care. *Journal of the American College of Surgeons* 217(3): S100-S101
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- 28. Morgan L, Pickering S, **Catchpole K**, Robertson E, Hadi M, McCulloch P (2011). Observing and Categorizing Process Deviations in Orthopedic Surgery. HFES 2011.
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- 36. **Catchpole, K.**, Giddings, A., de Leval, M., Gallivan, S., Godden, P, Utley, M., Dale, T. & Hirst, G. (2005) Identifying and reducing systems failures through non-technicalskills. *The Surgeon,* Supplement FP1.4: Proceedings of the Royal College of Surgeons Edinburgh Quincentennial Conference, Edinburgh, July 1005.
- 37. Edworthy, J, Hellier, E J and **Catchpole, K** (2005) The alarming state of medical warnings: Problems and solutions, pp. 256-259 in R Tartaglia, S. Bagnara, T. Bellandi& S. Albolino, (eds.) *Healthcare Systems Ergonomics and Patient Safety*, London: Taylor & Francis. ISBN 041537782X.
- 38. **Catchpole**, **K** and De Leval, M (2004). Identifying and Reducing Errors in the Operating Theatre. In P. McCabe (ed.): *Contemporary Ergonomics* 2004 (pp. 346-350). London: CRC Press.
- 39. **Catchpole, K**, Fletcher, J, McClumpha, A, Miles, A and Zar, A (2001). Threat Image Projection: Applied Signal Detection for Aviation Security. In D. Harris (Ed.): *Engineering Psychology and Cognitive Ergonomics Volume Six.* (pp 231-237). Aldershot: Ashgate.ISBN 0-7546-1338-0
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- 42. **Catchpole, K**, McKeown, J, and Withington, D(1999). Alerting, Informing and Localisable Auditory Warnings. In D. Harris (Ed.), *Engineering Psychology and Cognitive Ergonomics Volume Four.* (pp. 447-454). Aldershot: Ashgate.ISBN 1-84014-545-5.
- 43. **Catchpole**, **K**, McKeown, J, and Withington, D (1999). Localisable auditory warnings: integral 'where' and 'what' components. In D. Harris (Ed.), *Engineering Psychology and Cognitive Ergonomics Volume Four.* (pp. 439-446). Aldershot: Ashgate.ISBN 1-84014-545-5.

## Other Selected Conference Presentations (\* denotes invited)

- Miller K, Blumenthal J, Schubel L, Littlejohn R, Capan M, Arnold A, McKenzie K, Franklin E, Seagull J, Catchpole K, Branaghan R. (2018). American Medical Informatics Association 2018 Visual Analytics in Healthcare Workshop. Signaling Sepsis: Novel Data Collection of Diagnostic Mental Models. San Francisco, CA. November 2018. Oral Presentation and Demonstration.
- 2. \*Catchpole K. (2018). Human Factors Practice and Science. Surgery Grand Rounds, University of Chicago, May 2018.
- 3. \*Catchpole K. (2018). Execution and Implementation of the ERACS Pathway Strategies to Develop, Implement, and Support an ERACS Pathway. Society for Cardiac Anesthesiology 40th Annual Meeting, Phoenix, 2018.

- 4. \*Catchpole K. (2018). Human Factors and Systems Design: What is an Error Anyway? South Carolina Medical Association Annual Meeting, Greenville, April 2018.
- 5. Miller K, Mosby D, Blumenthal J, McKenzie K, Capan M, Arnold R, Kowalski R, Seagull FJ, **Catchpole K**, Franklin E, Branaghan R. Oral Presentation. *Engineering the Future of Sepsis Care: An Application of Fuzzy Logic Cognitive Mapping for Sepsis Diagnosis*. 2018 International Symposium on Human Factors and Ergonomics in Health Care, Boston, March 2018.
- 6. Anderson-Montoya B, **Catchpole K.** (2018). A Human Factors Approach to Root Cause Analysis. Workshop at 2018 International Symposium on Human Factors and Ergonomics in Health Care, Boston, March 2018.
- 7. **Catchpole K**, Cohen T, Rivera J, Anderson-Montoya B, Miller K (2018). Survival and Success in Clinically-Embedded Human Factors Practice. Panel at 2018 International Symposium on Human Factors and Ergonomics in Health Care, Boston, March 2018.
- 8. \*Catchpole, K. Human Factors Related to Quality. ASA Practice Management 2018, New Orleans, January 2018.
- 9. \*Catchpole, K. Human Factors and Systems Integration in Spinal Surgery. 2<sup>nd</sup> Annual Spinal Navigation, Emerging Technologies & Systems Integration, Seattle Science Foundation, Seattle, WA Dec 2017.
- 10. \*Catchpole K. Human Factors. ASA Anaesthesia Quality Meeting, Chicago November 2017.
- 11. \*Catchpole K. Integrating People and Technologies in Acute Health Systems, Greenville October 2017
- 12. \*Catchpole K. Human Factors, Systems Engineering, and Technology in Improving Medication Safety, Qatar Patient Safety Week, September 2017.
- 13. \*Catchpole. Human Factors in Handoffs and Care Transitions, Surgery Grand Rounds, MUSC, Charleston, SC, 8th August 2017.
- 14. **Catchpole K**. Understanding and Improving the Delivery of Robotic Surgery. Applied Human Factors and Ergonomics 2017, Los Angeles, July 20<sup>th</sup> 2017.
- 15. Bailey J, Catchpole K & Wise H. Engaging leadership, students, and staff: Developing Best Practices in Interprofessional Teamwork Training. TeamSTEPPS Annual Conference, Columbus, OH, June 14-16, 2017
- 16. \*Catchpole. Task, Team and Technology Integration in Surgical Safety and Performance. Webinar, Beta Healthcare Group, 13 June 2017.
- 17. \*Catchpole. Resiliency in Teams & Organizations What it takes for High Reliability in Medicine. Society for Cardiac Anesthesiology, Orlando, FL, May 21st 2017.
- 18. **Catchpole**. Human Error: Human Factors, Teamwork, Safety and Efficiency. Nurse Anesthesiologists of Pennsylvania Annual Conference, Hershey, PA. May 5<sup>th</sup> 2017
- 19. \*Catchpole K (2017). Resiliency in Teams & Organizations- What it takes for High Reliability in Medicine.. Society for Cardiac Anaesthesiologists, Orlando, 24th April 2017.
- 20. **Catchpole** . Human Factors in Healthcare Simulation. Webinar, SSiH Hospital Based Simulation Program, 20<sup>th</sup> March 2017.
- 21. **Catchpole K**, Bisantz A, Hallbeck S, Randell R, Weigl M, Kossack M (2017). Socio-Technical Systems Issues in Robotic Surgery. Human Factors and Ergonomics in Healthcare, New Orleans, 6th March 2017
- 22. \*Catchpole, K (2016). Keynote: Human Factors in Surgical Error. Current Approaches to Understanding Surgical Error, Leeds, UK, 9th Dec 2016
- 23. \*Catchpole K, Drazin D, Kim T (2016). Human Factors and Systems Integration in Spinal Surgery. 1st Annual Spinal Navigation, Emerging Technologies & Systems Integration, Seattle Science Foundation, Seattle, WA 3rd Dec 2016
- 24. Joseph A, **Catchpole K** (2016). Realizing Improved Patient Care through Human-Centered Design in the Operating Room: Phase 1 findings. Health Care Design, Houston, 14th Nov 2016
- 25. Joseph A, **Catchpole K** (2016). Bench to bedside: Integrating Research, Education and Practice in Architecture. Health Care Design, Houston, 14th Nov 2016
- 26. \*Catchpole K (2016). Managing Teams to Improve Patient Safety. Update on Perfusion Conference, Charleston, SC, 21st October 2016
- 27. \*Catchpole K. (2016). Hero not Hazard: Putting Humans at the Center of the System. North and South Carolina Societies SC Societies of Anaesthesiologists Annual Meeting, Charleston, SC, 24th September 2016
- 28. **Catchpole K**, Drazin D, Kim T (2016). Flow Disruptions in Image Guided Spinal Surgery. Applied Human Factors and Ergonomics 2016, Orlando, 26th July 2016
- 29. \*Catchpole K (2016). Human Factors and Patient Safety. Grand Round, the Mayo Clinic, May 23rd 2016.
- 30. \*Catchpole K (2016). A Practical, Academic, Punk Ethnographic Journey Through Healthcare Human Factors. International Keynote at the 1st meeting of the Philosophical Breakfast Club, Exeter, UK, April 22nd 2016
- 31. \*Catchpole K (2016). Human Factors, Teamwork, Checklists, Technology and Simulation. Workshop at the Health Quality Symposium, Niagara, Canada, April 6th 2016
- 32. \*Catchpole K (2016). Improving Performance and Safety with Human Factors. Keynote at the Health Quality Symposium, Niagara, Canada, April 6th 2016

- 33. Catchpole K (2016). Human Factors and Transitions of Care. American College of Cardiology Annual Conference, Chicago, April 2-4 2016.
- 34. Catchpole K (2016). The Truth About Humans. MUSC National Patient Safety Awareness Week, March 15th 2016
- 35. **Catchpole K** (2016). Human Factors in Cardiac Surgery. MUSC department of Anesthesia Grand Round, March 8<sup>th</sup>.
- 36. \*Catchpole K (2015). The end of the beginning: How other industries helped us learn and how this will help them in the future. Keynote at SimHealth 2015, Adelaide, 17-21 August 2015.
- 37. \*Catchpole K (2015). Human Factors in Simulation: From Teamwork Training to Systems Transformation. Workshop at SimHealth 2015, Adelaide, 17-21 August 2015.
- 38. Catchpole K (2015). Ensuring your staff stay safe. Patient Safety Congress, Birmingham 2015.
- 39. Perkins C, **Catchpole K**, Wood L, Solnik J, Ávenido R, Strauss P, Eilber K, Anger J (2015). Reducing Operating Room Turnover Time for Robotic Pelvic Surgery. Society of Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction 2015 Winter Meeting, February 24 28, Scottsdale, Arizona
- 40. \*Catchpole, K (2014). Beyond Root Cause Analysis. Clinical Human Factors Group Meeting, London, December 2<sup>nd</sup> 2014.
- 41. \*Catchpole, K (2014).Task, Team and Technology in the OR. Society of Cardiovascular Anesthesiologists, New Orleans, 29th March 2nd April 2014.
- 42. \*Catchpole, K (2014). MRI and Patient Safety Case Studies. Radiology Conference UK, Birmingham, 9-11<sup>th</sup> June 2014.
- 43. \*Catchpole, K(2014). Human Errors in Healthcare, Keynote Address, Radiology Conference UK, Birmingham, 9-11th June 2014.
- 44. **K Catchpole**, E Ley, D Wiegmann, J Blaha, D Shouhed, A Gangi, R Blocker, B Gewertz (2014). A Human Factors Sub-Systems Approach to Trauma Care Reduces Disruptions, Treatment Time and Length of Stay. Pacific Coast Surgical Association Annual Meeting, Dana Point, CA February 14-17, 2014
- **45.** \*Catchpole, K (2013). Task, Team and Technology Integration in Surgery. Plenary presentation at the Institute of Ergonomics and Human Factors Annual Conference, Cambridge, 15-18 April 2013.
- **46.** \*Catchpole, K (2013). Task, Team and Techology Integration in Surgery. Human Factors in Healthcare Symposium, Baltimore, 11-13 March 2013
- 47. **Catchpole**, **K** (2013). Improving Hand-Offs Through Human Factors Research and Motor Racing Analogies. Annual International Meeting of the Association of Perioperative Nurses, Dan Diego, 4-8<sup>th</sup> March 2013.
- 48. Catchpole, K (2013). Flow Disruptions in Trauma Care Handoffs. Academic Surgical Congress, New Orleans, 2013
- 49. \*Catchpole, K (2012). How do we do it? Supporting humans in a complex world. Annual International Meeting of the Association of Perioperative Nurses, New Orleans, 24-30<sup>th</sup> March 2012.
- 50. **Catchpole**, **K** (2012). "So have you done anything useful?" Empirical research and ethnographic experience for improving performance in surgery. Human Factors in Healthcare Symposium, Baltimore, 12-14 March 2012.
- 51. \*Catchpole, K (2011). Patient handovers within the Hospital: Translating knowledge from motor racing to healthcare. European Respiratory Society Educational Research Seminar, Dublin 3<sup>rd</sup>-4<sup>th</sup> June 2012.
- 52. \*Catchpole, K (2011). Human Factors: Why training is right and why training is wrong. Patient Safety Congress, Birmingham. 16<sup>th</sup>-18<sup>th</sup> May 2011
- 53. \*Catchpole, K (2011). The Journey to Embed Human Factors: from Habitual to Invisible. Clinical Human Factors Group Meeting, London.
- 54. \*Catchpole, K (2010).Implementing human factors to improve patient safety. Risk and Patient Safety 2010, Church House, London, 25<sup>th</sup> November 2010.
- 55. \*Catchpole, K (2010). "So have you done anything useful recently?" Seven years of ethnographic and empirical study in surgical safety. Keynote address at the 3<sup>rd</sup> North Patient Safety Research Conference, Bradford Royal Infirmary, 19<sup>th</sup> November 2010.
- 56. Norris, B and **Catchpole**, **K** (2010). The Systems Approach to Human Factors. Clinical Human Factors Group Open Seminar, 2<sup>nd</sup> November 2010.
- 57. McCulloch, P, **Catchpole**, **K**, New, S, Dale, T (2010). Pilot evaluation of teamwork training for operating teams based on full-team medium fidelity crisis simulation.4th International Workshop on Behavioural Science Applied to Surgery, Amsterdam, Sep 13-14 2010.
- **58.** McCulloch, P, **Catchpole**, **K**, New, S, Dale, T (2010). Does teamwork training work? A systematic review. 4th International Workshop on Behavioural Science Applied to Surgery, Amsterdam, Sep 13-14 2010.
- 59. \*Catchpole, K (2010). How errors and disasters occur the evidence in surgery. The Productive Operating Theatre Conference, Royal College of Surgeons, 3<sup>rd</sup> Sept 2010.
- 60. **Catchpole, K**, Giddings, A, Dale, T, Hirst, G, Smith, P (2010). Improving the Effectiveness of Multi-Disciplinary Training in Surgical Teams: A study of Human Factors training in three specialties. International Forum on Quality and Safety in Healthcare 2010, Nice.

- 61. \*Catchpole, K (2010). Human factors, safety culture, technology and organisational change in healthcare. IPEM Medical Engineering Technologist Study Day, 20th July 2010.
- 62. \*Catchpole, K (2010). Causes and solutions to errors in surgical care: Seven years of patient safety ethnography. Seminar for the Dept of Social Sciences, University of Leicester, 8th Feb 2010.
- 63. \*Lyons, M and **Catchpole**, **K** (2010). Introduction to Human Factors. WebEx for Patient Safety First Human Factors Week, 1st February 2010.
- 64. \*Catchpole, K (2009). The Importance of teamwork and systems factors in ensuring reliability, quality and safety in IV Therapy. Keynote Address, 8<sup>th</sup> International Conference on IV Therapy, Oxford, October 2009.
- 65. \*Catchpole, K (2009). Human Factors in Learning Organisations. Welsh Risk Pool Annual Conference, July 2009.
- 66. \*Catchpole, K (2009). Human Factors Masterclass. Improving Care Pathways 2009 Conference, Portland Place, June 2009.
- 67. \*Catchpole, K (2009). Human Factors: Beyond Teamwork Training. Presentation to the NHS Institute for Innovation and Improvement, May 2009.
- 68. \*Catchpole, K (2009). Identifying and reducing error in surgical care: ethnographic and empirical evidence. International Keynote Address at Human Factors in Healthcare Symposium, Sydney, Australia, March 2009.
- 69. \*Catchpole, K (2009). Experience of working in patient safety research: 6 years of ethnography. The Patient Safety Research Programme Final Conference, Royal College of Physicians, London, February 2009.
- 70. \*Catchpole K (2009). Lean and Patient Safety. Lean and Six Sigma Conference, London, January 2009.
- 71. \*Catchpole K (2008). Chairman, Risk and Patient Safety 2008, Church House, London, November 2008.
- 72. \*Catchpole K (2008). Improving Safety in Surgical Care: Ethnographic and Empirical Evidence. Invited seminar at the University College London Interaction Centre, London, 19<sup>th</sup> November 2008.
- 73. \*Catchpole K (2008). Improving Safety in Surgical Care: Ethnographic and Empirical Evidence. Invited seminar at the King's Centre for Patient Safety and Service Quality, London, 19<sup>th</sup> November 2008.
- 74. \*Catchpole, K, (2008). Human Factors in Surgical Care: Ethnographic and Empirical Evidence. Presentation at the 7<sup>th</sup> Annual Quality Colloquium, Harvard, August 2008.
- 75. \*Catchpole K (2008). Assessing Performance in Paediatric Cardiac Surgery *and* Learning about Handovers from Ferrari F1. Invited seminars at University Medical Centre, Utrecht, Netherlands, June 2008.
- 76. \*Catchpole, K, (2008). The Ferrari Racing Team Approach to Resuscitation Team Training. Keynote Address at ECCU 2008. Las Vegas, June 2008.
- 77. \*Catchpole K (2008). Pathways for patient safety: emerging safety methodologies, Invited speaker at Care Pathways 2008. London. June 2008.
- 78. \*Catchpole K (2008). Psychology in the Real World:Surgery, Aviation and Formula 1. Invited open seminar at St Mary's University College, London, May 2008.
- 79. Kreckler S, **Catchpole K**, McCulloch P. (2008). Measuring quality of care on a surgical ward. Association of Surgeons of Great Britain and Ireland's Annual Scientific Meeting, Bournemouth, April 2008.
- 80. Mishra A, **Catchpole K**, McCulloch P. (2008). Teamwork training improves intra-operative performance in carotid endarterectomy. Association of Surgeons of Great Britain and Ireland Annual Scientific Meeting, Bournemouth, April 2008.
- 81. McCulloch, P, Mishra, A, **Catchpole, K** (2008). Aviation-Style Teamwork Training can Reduce Errors and Improve Outcomes in Surgery. Presentation at the International Forum on Quality and Safety in Healthcare 2008, Paris, April 2008.
- 82. \*Catchpole K (2008). Failure Mode Effects Analysis (FMEA) and human factors in healthcare; *and*Learning from other high risk industries. Invited talks at Failure Modes and Effects Analysis conference. London. April 2008.
- 83. \*Catchpole K (2008). Improving Safety in Surgical Care: Ethnographic and Empirical Evidence. Invited seminar in Department of Psychology, University of Aberdeen, February 2008.
- 84. \*Catchpole K (2008). Winning the Race for Life: Improving Quality in Surgery by Learning from Scuderia Ferrari. Invited seminar at the Said Business School, University of Oxford, January 2008.
- 85. \*Catchpole K. (2007). Raising the Bar: Learning about Surgery from Scuderia Ferrari. Invited speaker at University of Oxford Finance Department Continuing Professional Development Seminar, Oxford, December 2007.
- 86. \*Catchpole, K, (2007). Learning to be Reliable: Translation not Transplantation. Keynote Address at Improving Clinical Handover: Sharing the Lessons Learned. Sydney, October 2007.
- 87. \*Catchpole K. (2007). Improving safety in the surgical system. Invited seminar at the Royal Children's Hospital, Melbourne, Australia, October 2007.
- 88. \*Catchpole K. (2007). Understanding and Reducing Risks in Paediatric Surgical Care. Invited speaker at Paediatrics and Child Health conference, London, October 2007.
- 89. **Catchpole, K**, Mishra A, McCulloch P (2007). Multidisicplinary Team Training: Empirical Evidence of Why and How. Royal College of Surgeons of England Annual Education Conference, London, September 2007.

- 90. \*Catchpole K. (2007). Ensuring change occurs as a result of a Root Cause Analysis. Invited talk at the 4<sup>th</sup> Annual Conference on Root Cause Analysis, The Royal Society, London, May 2007.
- 91. \*Catchpole K. (2007). Improving Safety and Quality in Surgery: Learning from Scuderia Ferrari and Other Industries. Invited seminar at Scuola Superiore Sant' Anna, Pisa, Italy, April 2007.
- 92. Mishra A, **Catchpole K**, McCulloch P. (2007). Aviation-style training can improve teamwork in Laparoscopic Cholecystectomy, Association of Surgeons of Great Britain and Ireland's Annual Scientific Meeting, Manchester, 18th-20th April 2007.
- 93. Mishra A, **Catchpole K**, McCulloch P. (2007). Aviation style theatre teamwork training can reduce theatre time during Laparoscopic Cholecystectomy. Association of Surgeons of Great Britain and Ireland's Annual Scientific Meeting, Manchester, 18th-20th April 2007.
- 94. McCulloch P, **Catchpole K**, Mishra A, Handa A, Meakins J. (2007). Relationships between teamwork and technical error in operating theatres: what really matters? Annual meeting of European Surgical Association, Dublin, 13th-14th April 2007
- 95. **Catchpole, K**, and Goldman, A (2006). Improving Patient Handover from Surgery to Intensive Care: Learning from High Risk Industries. International Society for Quality in Health Care 23<sup>rd</sup> Annual Conference, London 22-25 October 2006.
- 96. **Catchpole, K**, Goldman, A, Mishra, A, and McCulloch, P (2006). Using Formula 1 and Aviation Models to Improve Safety in Surgery. Society of Clinical Perfusion Scientists of Great Britain & Ireland Annual Congress21st October 2006.
- 97. Catchpole, K (2006). Improving Safety through Serious Games. Apply Serious Games 2006, London, 25-26 May 2006.
- 98. Mishra A, **Catchpole K**, McCulloch P (2006). Situational Awareness skills may influence technical outcome in surgery. Society of Academic Research Surgery annual conference, Edinburgh, 11th 13th January 2006
- 99. **Catchpole, K**, Giddings, AEB, Hirst, G, Dale, T, de Leval, M (2006). Human errors, system failures, and non-technical skills in surgery. Patient Safety 2006, Birmingham, 1-2 February 2006.
- 100. Mishra, A, **Catchpole**, **K**, McCulloch, P (2006). Situational awareness skills may influence technical outcome in surgery. Society of Academic and Research Surgery Annual Meeting, Edinburgh, 11-13 January 2006.
- 101. **Catchpole**, **K**, Giddings, AEB, de Leval, MR, Dale, T, Hirst, G, (2005). Systems failures, human error and teamwork: the role of the perfusionist. Society of Clinical Perfusion Scientists of Great Britain and Ireland Annual General Meeting, Stratford-upon-Avon, 4-5 November 2005.
- 102. Edworthy, J, Hellier, L, **Catchpole, K** (2004). Should we be alarmed by the state of hospital warnings?. BA festival of Science, Exeter, 7<sup>th</sup> September 2004.
- 103. Milne, TJ, Farmer, E, **Catchpole K**, Melia, A and Nicholls, AP (2003). The Effect of Presentation Modality on Situation Awareness and Performance on the Flightdeck. Conference on Human Factors of Decision Making in Complex Systems, Dunblane Hilton Hydro Hotel, 8th-11th September 2003.
- 104. Milne, TJ, Farmer, E, **Catchpole, K** and Melia, A (2003). Improving Situational Awareness Through the use of Speech Technologies. Conference Proceedings: Human Factors of Decision Making in Complex Systems, University of Abertay, September 2003.
- 105. \*Catchpole, K (2002). Auditory Warnings: Design and Application. 3<sup>rd</sup> Annual Two Day Seminar and Workshop on Alarm Systems, London, 26-27<sup>th</sup> June 2002.
- 106. Fletcher, J, **Catchpole**, **K**, Zar, A, McClumpha, A, (2002). Using Threat Image Projection Technology to enhance performance. Proceedings of the British Psychological Society Division and Section of Occupational Psychology Annual Conference 2002, p75 78.
- 107. **Catchpole, K**, and McClumpha, A, (2001). Threat Image Projection: Past, Present and Future. Proceedings of the Third FAA International Aviation Security Technology Symposium, Atlantic City, November 27<sup>th</sup>-30<sup>th</sup>, 2001.
- 108. **Catchpole, K**, and McClumpha, A, (2001). UK Threat Image Projection: Data Management, Training, and Feedback. Proceedings of the Third FAA International Aviation Security Technology Symposium, Atlantic City, November 27<sup>th</sup>-30<sup>th</sup>, 2001.
- 109. **Catchpole, K** (2000). Hearing where we look: Implications of cross-modal integration for the design of interfaces. Proceedings of the Seminar on Eye Movements and their Applications, International Centre of Biocybernetics, Warsaw, 2-8 Oct 2000.
- 110. Russell, S, Moray, N, **Catchpole**, **K**, Craig, I, Eriksson, R, and Bateman, K (2000). Evaluation of Warnings and Control for Human Controlled or automated Systems: "Adaptive Automation". Proceedings of the 4<sup>th</sup> International Conference on Fatigue and Transportation, 19-22 March 2000.

### **Conference Posters**

- 1. Schubel L, Littlejohn R, Blumenthal J, Arnold R, Capan M, Franklin E, Seagull J, **Catchpole K**, Miller K. American Medical Informatics Association 2018 Visual Analytics in Healthcare Workshop. Signaling Sepsis: Conveying Severity through Novel Alert Design. San Francisco, CA. November 2018. Poster Presentation.
- 2. Alfred M, Schaefer J, **Catchpole K**, Reves J. (2018). A Novel Approach to Evaluating Simulation Scenarios. International Anesthesia Research Society Annual Meeting, Chicago, May 2018.
- 3. Alfred M, Huffer E, Taafe K, Fredendall L, **Catchpole K**. (2018) A Work Systems Analysis of Sterile Processing. 2018 International Symposium on Human Factors and Ergonomics in Health Care, March 2018.
- Perkins C, Catchpole K, Eilber K, Wood L, Lyon R, Gross B, Jagannathan S, Hakami N, Weigl M, Anger J (2014). Flow Disruptions in Abdominal Sacrocolpopexy: Does Robotic Surgery Introduce Unforseen Challenges to Surgeons? Society of Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction 2015 Winter Meeting, February 24 – 28, Scottsdale, Arizona
- Maghen N; Behringer E; Weber A; Arabia F; DeCastro M; Wiegmann D; Catchpole, K.. (2014). Improving the transfer of critical patient information from OR to Cardiac Surgical ICU (CSICU): Observational Analysis of present practice. Western Anesthesia Residents Conference. Critical Care Medicine 42 (12), A1557.
- 6. Duff S, Blocker R, Wiegmann D, **Catchpole K**, Shouhed D, Ley E, Blaha J, Gewertz B (2012). Transactive Memory Systems and Coordination in Trauma Care. Human Factors in Healthcare Symposium, Baltimore, 12-14 March 2012.
- 7. **Catchpole K**, Wiegmann D, Duff S, Blocker R, Shouhed D, Ley E, Blaha J, Gewertz B (2012). Observation of process, teamwork and error in surgery: A measurement framework. Human Factors in Healthcare Symposium, Baltimore, 12-14 March 2012.
- 8. **Catchpole K**, Dale T, Hirst G, Smith P, Giddings A. (2009).Improving the Effectiveness of Multi-disciplinary Training in Surgical Teams:A study of Human Factors safety training in three specialties. Association of Surgeons of Great Britain and Ireland's Annual Scientific Meeting, Glasgow, 13th-14<sup>th</sup> May 2009.
- Catchpole K, McCulloch P. (2007). Aviation style theatre teamwork training can reduce theatre time during Laparoscopic Cholecystectomy. Association of Surgeons of Great Britain and Ireland's Annual Scientific Meeting, Manchester, 18th-20th April 2007.
- 10. Mishra A, **Catchpole K**, McCulloch P (2007). The benefits of teamwork training in laparoscopic cholecystectomy. Annual scientific meeting of the Association of Upper Gastrointestinal Surgeons, Cardiff, 27th-28th September 2007.
- 11. McCulloch P, **Catchpole K**, Mishra A, Kaul A (2007). Towards an evidence base for systems safety in health care. Patient safety research: shaping the European agenda, Porto, 24th-26th September 2007
- 12. **Catchpole K**, Mishra A, Goldman A, McCulloch P (2007). Safety in surgery: five years of learning from high reliability organisations. Patient safety research: shaping the European agenda, Porto, 24th-26th September 2007
- 13. Mishra A, **Catchpole K**, McCulloch P (2007). Adapting methods for identifying non-technical skills from high-risk industries may improve patient safety. Patient safety research: shaping the European agenda, Porto, 24th-26th September 2007
- 14. Mishra A, **Catchpole K**, McCulloch P (2006). The NOTECHS observation tool is reliable in assessing teamwork skills in the operating theatre. 23rd international conference, the International Society for Quality in Health Care, London, 22nd 25th October 2006.
- 15. Mishra A, **Catchpole K**, McCulloch P, (2006).Situational Awareness skills may influence technical outcome in surgery. Society of Academic Research Surgery annual conference, Edinburgh, 11th 13th January 2006

### Public Domain Project Reports

- 1. **Catchpole, K**,Godden, PJ, Giddings, AEB, Hirst, G, Dale, T, Utley, M, Gallivan, S and de Leval, MR(2005). Identifying and Reducing Errors in the Operating Theatre. Patient Safety Research Programme Final Report PS012.Available at http://bit.ly/1PhDQCK Accessed 8 Feb 2016.
- 2. Ogden, J, Catchpole, K (2002). The Use of TIP Data. Transport Security Technical Information Notice 12/02. Department for Transport.
- 3. Catchpole, K, Dekker, S, Entwistle, T, Magnusson, S, Grunwald, A and Weatherhead, J. (2002). Data Analysis Methodology: User Needs, Knowledge Elicitation and Software Tools. VINTHEC II Consortium Report: VINTHEC II-WP3-TR3.1
- 4. **Catchpole, K**, Roessingh, J, Lamers, J, Cheung, YS, Entwistle, T, van der Geest, P, Blokzijl, C, Aymeric, B, Thompson, D, and Eriksson, R (2001). Hazardous States Related to Situation Awareness. In: Identification of Factors affecting Situation Awareness and Crisis Management on the Flight Deck, pp. 17-28. ESSAI Consortium Report ESSAI/QINETIQ/WPR/WP2/3.0.
- 5. **Catchpole**, **K** (2000). The use of complex auditory stimuli for localizable alarms. University of Leeds Doctoral Thesis.

### Technical/Customer Reports

- Catchpole, K, Panesar, S, Russell, J, Tang, V, Hibbert, P, Cleary, K. (2009). Surgical safety can be improved through better understanding of incidents reported to a national database. The National Patient Safety Agency.http://www.nrls.npsa.nhs.uk/resources/?Entryld45=63054
- 2. **Catchpole**, **K**, Dale, T, Hirst, G, Smith, P, Giddings, A. (2009). The Safer Theatre Teams Project. Final Project Report to the Health Foundation.
- 3. **Catchpole, K**, Bell, D, Johnson, S, Boult, M (2006).Reviewing the evidence of patient safety incidents in anaesthetics. Report to the National Patient Safety Agency.
- 4. Maguire, R, Mansfield, H, Bunting, A, **Catchpole, K** (2003). Optimising the management and use of TIP libraries. QinetiQ Report No. QINETIQ/KI/CHS/CR022584/1.0.
- 5. **Catchpole**, **K**, Zar, A, Miles, A, McClumpha, A, Bonner M (2002). Gudiance Document for Manufacturers of 2<sup>nd</sup> Generation Threat Image Projection Systems. QinetiQ Report No. QINETIQ/KI/CHS/SPEC022364/1.0.
- 6. **Catchpole, K**, Zar, A, Maguire, R, Miles, A (2002). UK Threat Image Projection: Performance Analysis, Functionality and Next Generation Systems. QinetiQ Report No. QINETIQ/CHS/CAP/TR020217/1.0.
- 7. Maguire, R, **Catchpole**, **K**, Clark, J (2002). Implications for automation within ISTAR Capabilities. QinetiQ Report No. QINETIQ/CHS/CAP/CR020231.
- 8. Bonner, M, Tatlock, K, **Catchpole**, **K**, McClumpha, A (2002). Roadmap for the Development of 2<sup>nd</sup> and 3<sup>rd</sup> Generation Threat Image Projection. QinetiQ Report No. QINETIQ/CHS/CAP/WP010459.
- 9. Thompson, D, **Catchpole**, **K**, Zar, A, (2002). Threat Image Projection for Hold Baggage Screening: A State of the Art Review. QinetiQ Technical Report No. QINETIQ/CHS/CAP/TR010583/1.0
- 10. Catchpole, K, Zar, A, Fletcher, J, (2001). UK Threat Image Projection: Training & Feedback. DERA Report No. DERA/CHS/MID/WP010270/1.0.
- 11. Emery, L, Macklin, C, Dudfield, H, **Catchpole, K**, Myers, E, (2001).Command Team Performance Using a Prototype Panoramic Display. DERA Report No. DERA/CHS/MID/CR010018/1.0.
- 12. **Catchpole**, **K**, Fletcher, J, Zar, A, (2001). UK Threat Image Projection: Support to Manufacturers 2000/2001. DERA Report No. DERA/CHS/MID/CR010137/1.0.
- 13. **Catchpole, K**, Zar, A, Fletcher, J, (2001). UK Threat Image Projection: Phase Two. DERA Report No. DERA/CHS/MID/CR000568/1.0
- 14. Zar, A, McClumpha, A, White, J, and **Catchpole, K** (2000). UK Threat Image Projection: Phase One. DERA Report DERA/CHS/MID/CR990443/3.0.
- 15. **Catchpole, K**, Moray, N, Russell, SG, Eriksson, RE, and Bateman, K (2000). Customer Report for Adaptive Automation and Human Performance. DERA Report No. DERA/CHS/MID/CR990418.
- 16. Moray, N, **Catchpole, K**, Eriksson, R, Russell, S, and Bateman, K (2000). Experimental Technical Report for Adaptive Automation and Human Performance. DERA Report No. DERA/CHS/MID/TR000012.
- 17. **Catchpole, K**, Russell, SG, Eriksson, R, Craig I, and Bateman, K (2000). Background Technical Report for Adaptive Automation and Human Performance. DERA Report No. DERA/CHS/MID/TR000013.
- 18. Catchpole, K (1999). Usability Guidance for SYCLOPS Interface Design. DERA Report No. DERA/CHS/MID/TR990387.
- 19. **Catchpole**, **K** and Nelson, C (1995). Software for Impulse Noise Analysis in Accordance with Defstan 00-27/1. INM Technical Report (Health & Hygiene) No. 95024.
- 20. Johnston, E and **Catchpole**, **K** (1995). A survey of Sonar Noise on HMS Southampton. INM Technical Report (Support) No. 95006
- 21. **Catchpole**, **K** (1994). Flight Deck Exposure to Helicopter Noise: Hearing Protection Specification. INM Technical Report (Support) No. 94033.
- 22. **Catchpole**, **K** (1994). A Second Survey of Whole Body Vibration and Noise on RFA Sir Tristram. INM Technical Report (Support) No. 94028.
- 23. **Catchpole**, **K** (1994). Assessment of 114 mm gun noise on HMS Cornwall. INM Technical Report (Support) No. 94014.
- 24. **Catchpole, K** (1994). Survey of Noise and Vibration in 5 Mess, HMS Herald. INM Technical Report (Support) No. 94012.
- 25. Catchpole, K (1994). Noise Exposure Assessment at RNAD Frater Small Arms Range. INM Technical Report (Support) No. 94008.
- 26. **Catchpole, K** (1993). Assessment of Noise Levels at RNAD Frater Paint Shop and Tinsmiths Shop. INM Technical Report (Support) No. 93038.

### Selected Popular Press and Internet Articles About My Work

- Daily Telegraph, UK, 29 August 2006: Ferrari pit stop saves Alexander's life.
- Corrieredella Sera, Italy, 30 August 2006: In salaoperatoria come al pit stop
- Formula for Success, Nursing management, Vol 13 No 7 November 2006
- Wall Street Journal, USA, 14 November 2006: A Hospital Races To Learn Lessons Of Ferrari Pit Stop.

- Reader's Digest, UK/International, February 2008: What a Hospital Learned from F1.
- The Sun, UK, 16 June 2008: F1 Pit-Stop Team Save Boy's Life
- American Society for Quality, August 2008. Ferrari's Formula One handovers and handovers from surgery to intensive care.
- http://www.formula1.com/news/features/2008/7/8015.html
- http://www.britsonpole.com/f1-how-pitstop-protocols-are-helping-sick-children-post746
- <a href="http://www.nodelaysachiever.nhs.uk/CaseStudies/CaseStudyItems/Improving+the+transfer+processes+at+the+end+of+heart+surgery.htm">http://www.nodelaysachiever.nhs.uk/CaseStudies/CaseStudyItems/Improving+the+transfer+processes+at+the+end+of+heart+surgery.htm</a>
- <a href="http://www.kentnews.co.uk/kent-news/Boy-owes-life-to-Lewis-Hamilton\_s-F1-pit-crews-newsinkent13940.aspx?news=local">http://www.kentnews.co.uk/kent-news/Boy-owes-life-to-Lewis-Hamilton\_s-F1-pit-crews-newsinkent13940.aspx?news=local</a>
- http://www.nesta.org.uk/how-can-formula-1-be-useful-for-healthcare/
- <a href="http://www.9autos.com/ferrari-pit-stops-help-doctors-in-the-or/">http://www.9autos.com/ferrari-pit-stops-help-doctors-in-the-or/</a>
- <a href="http://www.hfmmagazine.com/display/HFM-news-article.dhtml?dcrPath=/templatedata/HF">http://www.hfmmagazine.com/display/HFM-news-article.dhtml?dcrPath=/templatedata/HF</a> Common/NewsArticle/data/HFM/Magazine/2014/May/0514Upfront design\_OR360
- <a href="http://www.news-medical.net/news/20140326/Cedars-Sinai-partners-with-the-US-military-to-design-operating-room-of-the-future.aspx">http://www.news-medical.net/news/20140326/Cedars-Sinai-partners-with-the-US-military-to-design-operating-room-of-the-future.aspx</a>
- <a href="http://www.beckershospitalreview.com/capacity-management/cedars-sinai-partners-with-military-to-design-operating-room-of-the-future.html">http://www.beckershospitalreview.com/capacity-management/cedars-sinai-partners-with-military-to-design-operating-room-of-the-future.html</a>
- http://abc7.com/archive/9480036/
- http://www.wired.com/2014/07/how-the-military-is-helping-reinvent-trauma-care/