

Impact case study (REF3b)

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| Institution: University of Bristol |
| Unit of Assessment: 1 – Clinical Medicine |
| Title of case study: Delivering better birthdays: research-based training programme makes labour and birth safer for babies and mothers across the world. |
| <p>1. Summary of the impact (indicative maximum 100 words)</p> <p>As a consequence of a research-based training programme developed at the University of Bristol, the rates of perinatal hypoxia and intrapartum fetal injury in Bristol and two pilot units in Australia and the US are now among the lowest in the world. The improvements achieved in Bristol, the US and Australia have also been successfully achieved in a low resource setting in Zimbabwe.</p> <p>In response to demand from maternity units across the world, the Bristol team has developed PROMPT – a PRactical Obstetric Multi-Professional Training package, which has been successfully implemented in over 20 countries worldwide. PROMPT has had a major health and welfare impact on more than a million mothers and their babies, as well as bringing substantial economic benefits and supporting international development.</p> |
| <p>2. Underpinning research (indicative maximum 500 words)</p> <p>Safety in maternity services is a priority for women, their families and health services. Obstetric emergencies are low-occurrence, high-stakes events that demand a coordinated and immediate response from expert teams.[1] The SaFE (Simulation and Fire-drill Evaluation) Study, funded by the UK Department of Health (2003-2005), was a multi-centre randomised controlled trial of obstetric emergencies training. The research was carried out by Bristol researchers (listed at the end of this section) in collaboration with maternity staff across the South West. This 2x2 factorial design randomised trial compared high-technology, simulation-centre training with the same intervention delivered in a low-technology, in-house hospital setting, with or without teamwork training.</p> <p>The trial identified that the research-based training programme for obstetric emergencies developed by the Bristol team for the SaFE study improved knowledge, skills and attitudes for all staff and that these improvements lasted for at least 12 months.[2] Additional teamwork training and training in a simulation centre did not confer any additional benefit compared to training locally. These data were encouraging but the improvements were demonstrated only in simulations. At that time there was no robust research that demonstrated improvements in clinical outcomes for mothers and their babies associated with training. Indeed, there were two studies in the US and UK that demonstrated no change, or even deterioration in clinical outcomes post-training.</p> <p>The training programme for the SaFE study was iteratively developed using information and data from the study. It was then implemented at Southmead Hospital in Bristol and its effect evaluated using a longitudinal review of clinical outcomes comparing five years' post-training with five years' pre-training data. Following the introduction of training the Bristol research team identified significant clinical benefits (published in landmark papers – see section 3 for six papers that collectively have more than 400 citations):</p> <ol style="list-style-type: none"> 1. A 50% reduction in babies born in poor condition and a 50% reduction in birth-related neonatal brain injury.[3], [a, b] 2. A 70% reduction in brachial plexus injuries following a common complication of birth (shoulder dystocia).[4], [c, d] 3. A 50% reduction in the time taken to expedite birth in potentially life-threatening cases of umbilical cord prolapsed.[5] 4. Improved composite neonatal outcomes, including a reduction in the rates of intensive care admission from 38% to 22%.[5] |

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Further analysis of the simulated team performances recorded in the SaFE study has identified important lessons for team working.[6] Mixed qualitative and quantitative methods of analysis were employed by D. Siassakos from Bristol in collaboration with researchers from the Department of Linguistics and Social Studies at the University of the West of England (K. Bristowe and J. Angouri) and the Speech and Language Research Unit at Frenchay Hospital, Bristol (H. Hambly).

This research has provided an in-depth understanding of the characteristics of effective teams, translating them into simple, teachable behaviours and identifying suitable training methods.[6] These findings are relevant for all healthcare teams, not just those providing maternity services.

The training programme was further developed and made exportable to meet a rising demand. The programme is called PRactical Obstetric Multi-Professional Training (PROMPT) – www.promptmaternity.org.

Positions of key researchers at the University of Bristol

- T. Draycott: Honorary Senior Clinical Lecturer (2003-date)
- R. Fox: Honorary Senior Lecturer (2000-date)
- J. Crofts: Postgraduate Research Student (2003-2009); Honorary Clinical Lecturer (2009-2010); Clinical Lecturer in Obstetrics (2010-date)
- V. Akande: Honorary Senior Clinical Lecturer (2004-date)
- D. Siassakos: Honorary Clinical Lecturer (2008-2010); NIHR Academic Clinical Lecturer in Obstetrics (2011-date)

3. References to the research (indicative maximum of six references)

- [1] Siassakos, D., et al., *The active components of effective training in obstetric emergencies*. British Journal of Obstetrics & Gynaecology, 2009, **116**(8), 1028-1032. PMID: 19438497
- [2] Crofts, J.F., et al., *Training for shoulder dystocia: a trial of simulation using low-fidelity and high-fidelity mannequins*. Obstetrics & Gynecology, 2006. **108**(6), 1477-1485. PMID: 17138783
- [3] Draycott, T., et al., *Does training in obstetric emergencies improve neonatal outcome?* British Journal of Obstetrics & Gynaecology, 2006. **113**(2), 177-182. PMID: 16411995
- [4] Draycott, T.J., et al., *Improving neonatal outcome through practical shoulder dystocia training*. Obstetrics & Gynecology, 2008. **112**(1), 14-20. PMID: 18591302
- [5] Siassakos, D., et al., *Retrospective cohort study of diagnosis-delivery interval with umbilical cord prolapse: the effect of team training*. British Journal of Obstetrics & Gynaecology, 2009. **116**(8), 1089-1096. PMID: 19438496
- [6] Siassakos, D., et al., *Clinical efficiency in a simulated emergency and relationship to team behaviours: a multisite cross-sectional study* British Journal of Obstetrics & Gynaecology, 2011. **118**(5), 596-607. PMID: 21291509

4. Details of the impact (indicative maximum 750 words)**Impacts on health and welfare**

The PROMPT programme has improved outcomes in other units across the world as well as the UK. For example, a pilot of PROMPT in the state of Victoria in Australia demonstrated a reduction in low Apgar scores as well as fewer babies born with signs of hypoxia.[e] The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) is now rolling out the training programme to all obstetric units in those two countries.[f]. These improvements have been matched in the other pilot site, Kansas University Medical Center in the US.

Since the introduction of PROMPT in 2008, there has been a 50% reduction in infants born with hypoxia, a drop of over 90% in infants born with a permanent brachial plexus injury and a decrease in the caesarean section rate from 32% to 24%.

A stepped wedge design study has now been funded by the Scottish government to roll out the training across all the obstetric units in Scotland with a parallel process evaluation.[g]

Commercial impact

PROMPT is now being used in 85% of maternity units in the UK, and also in many other countries around the world including Australia, New Zealand, Hong Kong, China, the US, Egypt, Mongolia and Singapore. Once trained, individual units, institutions and countries purchase a licence to roll out PROMPT training, to ensure that quality and intellectual property rights are maintained.

The first edition of the PROMPT course manual was the biggest-selling text ever published by the Royal College of Obstetricians and Gynaecologists (RCOG) Press, with over 15,000 copies sold worldwide. The recently-published second edition is also listed as the fastest-selling book ever published by the RCOG Press. The manuals are now published by Cambridge University Press and there are region specific versions for the US, China, Australia and New Zealand. Versions for India and the Gulf states are being developed.

Furthermore, research at the University of Bristol has enabled collaboration with industry to design innovative training products – for example, the PROMPT Birthing Mannequin (Limbs & Things), the world's best-selling birth simulator, with more than 5,000 units sold at over £3,000 each. The University is also the main clinical developer of the SimMOM full-body Simulator with Laerdal Medical.

Impacts on practitioners and services

The University of Bristol team's research on defining the effective components of obstetric emergencies training has directly informed guidance on staff training nationally and internationally. The RCOG has commissioned members of the research team to write three national guidelines for the management of shoulder dystocia, cord prolapse and stillbirth.[d] Finally, both the RCOG and the NHS Litigation Authority have also used Bristol data to recommend annual, multi-professional skills training (PROMPT) for all maternity staff nationally.

PROMPT training has transformed the way that healthcare professionals are trained worldwide, improving the implementation of best practice and outcomes for mothers and babies.

The NHS Litigation Authority has specifically recommended PROMPT training in its most recent report ('Ten Years of Maternity Claims' – Oct 2012). The RCOG has also updated its training curriculum to include attendance at a local PROMPT course as an essential competency for obstetric trainees.

Impacts on the economy

The University of Bristol's multi-professional obstetric-emergencies training package has been associated with savings in litigation costs as a result of improved outcomes: comparing five years' pre- and ten years' post-training data, there has been a 91% reduction in mean annual payouts by the NHS Litigation Authority for Southmead Hospital (pre-training £2,998,587 per annum to £256,820 per annum post-training). The US and Australian pilots have demonstrated similar reductions in claims costs.

The team could therefore potentially save the NHS £42 million a year in preventable maternity damages in its network area and at least £280 million a year across England if all units achieved the same results as Southmead.

Impacts on international development

PROMPT is a low-resource training intervention ideal for supporting clinical improvements and staff development in resource-poor settings. In partnership with diaspora from Zimbabwe, and with the support of the Department for International Development and the Tropical Health Education Trust, a pilot project to roll out PROMPT training was set up in the second-largest maternity unit in Zimbabwe. Since the introduction of PROMPT in early 2011, local trainers have trained over 130

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staff members and improved communication between doctors and midwifery staff. Interim data have demonstrated a 19% reduction in maternal deaths following the implementation of PROMPT. The WHO has expressed interest in developing this work to make it available in other low-resource settings. As a result of the successful implementation of PROMPT in Bulawayo, the Deputy Prime Minister of Zimbabwe is working with the PROMPT team to develop a roll-out strategy for the whole country.

PROMPT training and research centres are also being developed in Bangalore, India and Chengdu, China following approaches to the Bristol research team from national obstetrics and gynaecology organisations wanting to implement PROMPT training.

5. Sources to corroborate the impact (indicative maximum of 10 references)

- [a] NHS Litigation Authority: Ten Years of Maternity Claims: <http://www.nhs.uk/Pages/Home.aspx>. Statement on page 100: "In recent years PROMPT3 (PRactical Obstetric Multi-Professional Training) training endorsed jointly by the RCOG and RCM has been utilised by a number of maternity services to ensure staff are trained in this topic [CTG interpretation]".
- [b] e-learning for Health: <http://www.e-lfh.org.uk/projects/electronic-fetal-monitoring/>. The evaluation chapter for this online fetal monitoring programme was commissioned from the PROMPT research group by the UK Department of Health because of the reduction in hypoxic infants observed after PROMPT training by units in the UK, Australia and United States.
- [c] Testimony available from Karen Hillyer – Chief Executive, Erb's Palsy Group Charity. This corroborates the reduction in brachial plexus injury (for example, Erb's palsy) across the UK and now the US.
- [d] Royal College of Obstetricians and Gynaecologists (RCOG) Green Top Guidelines, written by these UoB researchers and drawing on PROMPT experience in key risk situations:
- Shoulder dystocia: <http://www.rcog.org.uk/womens-health/clinical-guidance/shoulder-dystocia-green-top-42>;
 - Cord prolapse: <http://www.rcog.org.uk/womens-health/clinical-guidance/umbilical-cord-prolapse-green-top-50>;
 - The management of late intrauterine fetal death and stillbirth: <http://www.rcog.org.uk/womens-health/clinical-guidance/late-intrauterine-fetal-death-and-stillbirth-green-top-55>.
- [e] Victorian Managed Insurance Agency: <http://www.vmia.vic.gov.au/Risk-Management/Risk-partnership-programs/Projects/PROMPT.aspx>. Indicates the licencing of PROMPT by the State Government of Victoria via the Victorian Managed Insurance Authority (VMIA) to the Royal Australian and New Zealand College of Obstetrics and Gynaecology (RANZCOG).
- [f] RANZCOG website: <http://www.ranzcog.edu.au/programs-projects/prompt.html>. Contact can be provided. Indicates RANZCOG as the executor licensee and plans for implementation across Australia and New Zealand.
- [g] Catherine Calderwood. Consultant Obstetrician and Gynaecologist, Medical Adviser for medical and surgical specialties, maternity and women's health, screening programmes, Scottish Government. National Clinical Director for Women's Health NHS England. Dr Calderwood approached PROMPT to provide training for all the maternity units in Scotland and was integral to securing funding for the stepped wedge design study from the Chief Scientist Office (CSO) and National Education Scotland (NES).