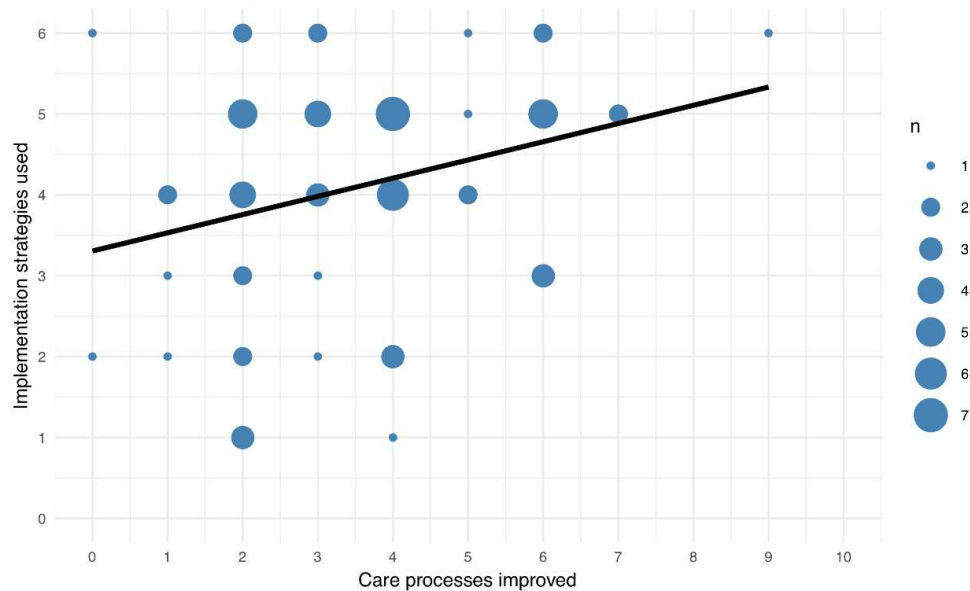


**Hospital level evaluation of the effect of a national quality
improvement programme: Time-series analysis of registry data**

Supplementary file

Scatterplot of implementation strategy use and care-process improvement data



Further post-hoc analysis of the relationship between care-process improvement and implementation strategy use.

We used Fishers Exact Test, with 2x2 contingency tables to compare groupings and a one-sided p-value, with significance set at $p < 0.05$. Only one of the six implementation strategies, segmentation of the care pathway, showed a significant difference between the two groups ($p = 0.013$) (Figure 5a). Given the lack of hierarchy amongst five of the six QI strategies we also compared the least and most improved hospitals by the number of QI strategies used (Figure 5b). When comparing the two groups and implementation strategy fidelity i.e. using five or all six intervention strategies vs. not, we found a significant relationship $p = 0.032$. Regarding other factors we used data from our process evaluation to compare the least and most improved hospitals by how NELA data was collected locally (Figure 5c), specifically if this was collected prospectively by all members of the care team or retrospectively, by a small number of clinicians who were, in general, also likely to be the QI leads. Prospective data collection i.e. presenting a lower time-burden for QI leads, was positively associated with greater care process improvement ($p = 0.039$).

Supplementary table 1. Results of sensitivity analysis, comparing 1) standard and strict run chart analysis rules and 2) a baseline median using the fixed and extend method (standard rules) and a median based on all chart data

Most improved hospital group	Number of processes improved (fixed baseline & standard rules)	Number of processes improved (strict rules)	Number of processes improved (median of all data points)
Hospital S.1	6	6	6
Hospital S.2	6	6	1
Hospital S.3	6	6	5
Hospital S.4	6	6	6
Hospital S.5	6	6	5
Hospital S.6	6	5	3
Hospital S.7	6	4	5
Hospital S.8	6	6	3
Hospital S.9	6	4	5
Hospital S.10	6	5	2
Hospital S.11	7	5	5
Hospital S.12	7	6	6
Hospital S.13	7	6	1
Hospital S.14	9	7	4
Total	90/140	78/140	57/140

Members of the EPOCH trial group

Given name	Family name
Rupert	Pearse
Carol	Peden
Tim	Stephens
Julian	Bion
Graham	Martin
Ann	Thomson
Brennan	Kahan
Sally	Kerry
Kate	Rivett
Duncan	Wells
Gerry	Richardson
Stephen	Brett
Gareth	Ackland
Mike	Grocott
Peter	Holt
Glenn	Robert
Obioha	Ukoumunne
Justin	Waring
Kirsty	Everingham
Mandeep	Phull
David	Cromwell
Rachel	Evley
Richard	Lilford
David	Kocman
Miqdad	Asaria
Justin	Waring
Carolyn	Tarrant
Fan	Yang
Ajit	Abraham
Pieter	Bothma

Daniel	Conway
Clare	Stapleton
Mark	Edwards
Gary	Minto
David	Saunders
Tom	Owen
Carl	Waldmann
Paul	Hayden
Michael	Gillies
Sean	Tighe
Neil	Smith
Monty	Mythen
David	Murray
Dileep	Lobo
Martin	Leuwer
Justin	Kirk-Bayley
Simon	Howell
Anthony	Gordon
Iain	Anderson
Jose	Lourtie
Simon	Walker
Sharon	Drake
Dave	Murray
Nick	Watson
Tamas	Szakmany
Robert	Sutcliffe
Graham	Martin
Ravi	Mahajan
Alan	Girling
Gordon	Forbes
Omar	Faiz
Mark	Blunt
Surjait	Singh
Alistair	Steel
Kate	Wong

Leilani	Cabrerros
Pieter	Bothma
Vivek	Chitre
Ayodele	Obideyi
Dhiraj	Ali
Karl	Blenk
Dan	Broad
Andreas	Brodbeck
Rajesh	Dumpala
Arnth	Engel
Ranjit	Ganepola
Sudha	Garg
Mike	Gay
Michael	Karlikowsk
Edward	Lams
Dean	Millican
Inga	Misane
Ajaya	Mull
Veena	Naik
Nathan	Pushpa
Chris	Nutt
Saravanna	Sagadai
Hazel	Stuart
Paul	Noble
Niko	Van De Velde
Liam	Hudson
Raoul	Benlloch
Satish	Singh
Karan	Verma
Damian	Laba
Jack	Carmichael
Peter	Richardson

Graham	Wilson
Ricky	Lewis
Karthik	Surendran
Essam	El-Damatty
Sarada	Gurung
Ilona	Raulusaite
Nabua	Gerstina
Chloe	Rochester
Rai	Kuldip
Andrew	Lindner
Therese	Murray
Chitre	Vivek
Roshan	Lal
Sarah	Downey
Vamsi	Velchuru
Kamal	Aryal
Raman	Guruswamy
Kirosh	Shankar
Helen	Porter
Matthew	Tutton
Helen	Agostini
Simon	Fletcher
Richard	Wharton
Steve	Hutchinson
Bala	Maiya
Richard	Howard-Griffin
Michael	Crabtree
Vlad	Kushakovsky
Abdel	Omer
Senthil	Nadarajavan
Stephanie	Bell
Vishal	Patil

Asif	Jah
Razeen	Mahroof
Nicholas	Watson
John	Tansley
Gareth	Moncaster
Neil	Flint
Andrew	Miller
Marcus	Wood
Andreou	Prematie
Sally	Roth
Sarah	Bowery
Dawn	Hales
Tanuja	Shah
Gill	Tierney
Craig	Morris
Syed	Iftikhar
Amit	Shukla
Grainne	O'Dwyer
Adam	Wolverson
Ferdinand	Adams
Laura	Perrin-Brown
Tim	White
Sarah	Beavis
Victoria	Banks
John	Abercrombie
Jonathon	Mole
Avninder	Chana
Ayan	Banerjea
David	Humes
Rajpal	Dhingsa
John	Wells
Stephanie	Brown
Kenneth	Adegoke

Barclay	Tofte
Ana	Alegria
Nat	Natarajan
Mansoor	Akhtar
Samer	Doughan
John	Mackinnon
Biju	Aravind
Esther	Cook
Mark	Snazelle
Matt	Gardner
Lee	Baldwin
Simon	Bailey
Greg	Lawton
Nandita	Divekar
Neil	Kukreja
Mansoor	Sange
Mark	Watson
Mallikarjunappa	Satisha
Michael	Protopapas
Zakaulla	Belagodu
Shameem	Sarfi
Pasupathy	Raju
Brenda	Stacey
Tim	Campbell-Smith
Simon	Parrington
Somi	Desikan
Andrew	Brennan
John	Griffith
Steve	Fletcher
Catherine	Farrow
Stewart	Prestwich
Laura	Graham

Martin	Northey
Jay	Gokhale
Frances	Mosley
Peter	Alexander
Abhiram	Sharma
Will	Brady
John	Hopper
Oliver	Hill
Sandeep	Varma
Christopher	Macklin
Alastair	Rose
Harjeet	Narula
Sarah	Buckley
Karen	Simeson
Kevin	Sim
Michael	Chadwick
Preeti	Kuduvalli
Susan	Dowling
Amanda	McCairn
Lawrence	Wilson
Dale	Vimalchandran
Anita	Jhamatt
Nicole	Robin
David	Monk
Martin	Leuwer
David	Bottomley
Oliver	Zuzan
Ingeborg	Welters
Davina	Ross-Anderson
Charles	Knowles
Nick	Bunker
Ying	Hu

Marta	Januszevska
Phoebe	Bodger
Edyta	Niebrzegowska
Carmen	Correia
Richard	Haslop
Tom	Abbott
Tabitha	Tanqueray
Sanjay	Wijeykoon
Susan	Jain
Jens	Full
Tamzin	Cuming
Flora	Bailey
Stelios	Chatzimichail
Pedro	Cunha
Almas	Rehman
Manab	Mohanty
Nicola	Radford
Otto	Mohr
Hitesh	Patel
Dolores	Mateo
Ashok	Raj
Michael	Machesney
Nazar	Abdul
Kim	Jemmet
Marta	Campbell
David	Inglis
Thomas	Parker
Thomas	Medici
Peter	Chan
Nathan	Borgeaud
Dipankar	Mukherjee
Oluremi	Odejinmi

Tomas	Jovaisa
Elizabeth	Harwood
Ramani	Moonesinghe
Jonathan	Mccullough
Jigna	Modha
Sanjiv	Patel
James	Limb
Sheshagiri	Bengeri
Amir	Rafi
Elizabeth	Hall
James	Brown
Bruce	Gibson
Una	McNelis
Mike	Bradburn
Maria	Lawson
Sara	Pick
Matthew	Gaughan
David	Browell
Vanessa	Linnett
Jenny	Ritzema
Paul	O'Loughlin
Sean	Cope
John	Corson
Alistair	Roy
Julie	Furneval
Anitha	Holtham
Sophie	Noblett
Chris	Dawson
Elizabeth	Hall
Mike	Bradburn
Fiona	McMenemie
David	Saunders

Stefan	Pulsa
Ian	Clement
Verity	Calder
Katherine	Allen
Catherine	Rimmer
Helen	Reed
Christine	Boyd
Diane	Monkhouse
Peter	Davies
Jost	Mullenheim
Emanuel	Cirstea
Martyn	Cain
Kirsty	Baillie
Tom	Owen
Arnab	Bhowmick
Keiarash	Jovestani
Sean	Mcmullan
Emma	Durant
Alexandra	Williams
Donna	Doyle
Jason	Cupitt
Jonathon	Barker
Nick	Harper
Emma	Brennan
Daren	Subar
Robert	Shawcross
Dominic	Sebastian
Panna	Patel
Gillian	O'Connell
Jyrki	Karvonen
Maitra	Ishaan
Alison	Hool

Karen	Burns
Carol	Mcarthur
Tezas	Stergios
Singh	Gursevak
Makvana	Sonia
Heather	Pratt
Kaighan	Lynne
Sean	McAfee
Chris	Lewis
Wael	Khalaf
Chris	Coldwell
Christine	Bronder
Mark	Wilkinson
Emma	Davis
Glenn	Arnold
Paul	Ziprin
Rachel	Bartlett
Martin	Stotz
Rovan	D'souza
Phillippa	Pemberton
Banwari	Agarwal
Anita	Sugavanam
Melanie	Tan
Massimo	Varcada
Craig	Lyness
Andrew	Thorniley
Ash	Prabhudesai
Ruth	Griffin
Shubha	Vashisht
James	Harris
Julie	Wakeford
Sergei	Vaganov

Yasser	Mohsen
Alister	Myers
Qamar	Iqbal
Simon	Harris
Sami	Ijaz
James	Burrow
Paul	Ziprin
Francesca	Rubulotta
James	Burrow
Nabil	El-Masry
Nicola	Stranix
Tamsin	Rope
Lampros	Liasis
Tariq	Husain
Josef	Watfah
Megan	Griffiths
Janindra	Warusavitarne
Charles	Cartwright
Linden	Baxter
Rakhee	Visavadia
Malcolm	Sim
Chris	Wilson
Paul	Harrison
Dewi	Williams
Maria	Bews-Hair
Wayne	Wrathall
Catherine	Jardine
Paul	Mclaren
Fanus	Dreyer
Paddy	Collins
Jennifer	Edwards
Susan	Moug

Kevin	Rooney
Erin	Mcilveen
Steven	Henderson
Linda	Graham
Gail	Stark
Lynn	Taylor
Mark	Munro
Lynn	Stewart
Natalie	Dickinson
Laura	Rooney
Lindsay	Bailey
Diane	Murray
Tim	Geary
Simon	Gibson
Colin	Pow
Kerwei	Tan
Richard	Stevenson
Ewen	Harrison
Peter	Lamb
Kate	Carey
Laura	Fitton
Fabian	Cook
Magen	Schwarz
Alan	Morrison
Gavin	Bryce
Khaled	Razouk
Kathryn	Cain
Gudrun	Kunst
Savvas	Papagrigoriadis
Phil	Hopkins
Adrian	Fawcet
Britta	O'Carroll-Kuehn

Amira	Girgis
Stas	Janokowski
Sami	Farhat
Stella	Vig
Nada	Hadi
Anthony	Parsons
Maurizio	Cecconi
David	Melville
Richard	Hartopp
Justin	Woods
Isabella	Karat
David	Gerrard
Edward	Curtis
Krishnamurthy	Somasekar
Tom	Morgan-Jones
Michael	Martin
Mark	Henwood
Gordon	Milne
Ajit	Sivasankaranand
Alexandra	Scott
Xavier	Escofet
Piroska	Toth-Tarsoly
Majed	Al Shama
Valerie	Hilton
Huw	Davis
Gail	Williams
Tim	Harvard
Peter	Fitzgerald
Dom	Hurford
Tamas	Szakmany
Babu	Muthuswamy
Gethin	Williams

Jack	Parry Jones
Nick	Mason
Ramesh	Rajagopal
Shrisha	Shenoy
Magdy	Khater
Richard	Morgan
Nikolaos	Makris
Anil	Hermades
Andrew	White
Guy	Finch
Matt	Outram
Jonny	Wilkinson
Jennifer	Spimpolo
Debbie	Shaw
Marion	Obichere
Giovanni	Brescia
Flavia	Menezes
Helena	Stafford
Malcolm	Watters
Chris	Thorn
Julian	Stone
Sam	Andrews
Nicola	Lythell
Helen	Langton
Clare	Stapleton
Stephen	Baxter
Roy	Fernandes
Rame	Sunthareswaran
Alastair	Ankers
Kumar	Panikkar
Simon	Sleight
Belinda	Cornforth

Louise	Bell
Phil	Dodd
Fenella	Welsh
Geoff	Watson
Frankie	Dorman
Guy	Nash
James	Bromilow
Fran	Haigh
David	Pogson
Stuart	Mercer
Vanessa	Tucker
Carolyn	Way
James	Kirby-Bott
Jenny	McLachan
Rob	Chambers
Rachael	Craven
Jane	Blazeby
Dan	Freshwater-Turner
Lorna	Burrows
Helen	Howes
Iain	Christie
Mark	Coleman
Gary	Minto
Sam	Waddy
Grant	Sanders
Abigail	Patrick
Catherine	Pitman
Susan	Tyson
Hannah	Smith
Guy	Rousseau
Mark	Cartmell
Jan	Hanousek

Nigel	Hollister
Lynsey	Kightly
Mark	Pulletz
Anjay	Talwar
Susie	Baker
Ruth	Thomas
Richard	Gibbs
Hamish	Noble
Joseph	Silsby
Helen	Black
Thomas	Evans
Robert	DeBrunner
Nicola	Cook
Stacy	Hodges
Amanda	Stevens
Rowena	Felipe
Jonathan	Paddle
Denzil	May
Alison	Pickford
Sid	Riddington
Olga	Tucker
Simon	Smart
Jeremy	Marwick
Nigel	Suggett
Ewen	Griffiths
David	Riddington
Kathryn	Gill
Neil	Cruikshank
Jay	Susarla
Emma	Leno
Julie	Colley
Andrew	Burtenshaw

Stephen	Lake
Jamie	Greenwood
Sian	Bhardwaj
Jessica	Thrush
Julie	Wollaston
Julian	Sonksen
Rajan	Patel
Adrian	Jennings
David	Stanley
Jenny	Wright
Chris	Horner
Faisal	Baig
Katie	Cooke
Jagdeep	Singh
Andrew	Claxton
Nazzia	Mirza
Simon	Hester
Georgia	Knight
Peeyush	Kumar
Taj	Saran
Gabriele	Marangoni
Roger	Townsend
Andy	Thacker
Anne	Scase
Meghna	Sharma
Beth	Hale