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Core Outcome Sets in Women's and Newborn Health: A Systematic Review.

James M. N. Duffy [1], Rachel Rolph [2], Chris Gale [3], Martin Hirsch [4], Khalid S. Khan [4], Sue Ziebland [1], Richard J. McManus.[1]

On behalf of the International Collaboration to Harmonise Outcomes in Pre-eclampsia (iHOPE) *steering committee listed at the end of the manuscript.

[1] Nuffield Department of Primary Care Health Sciences, University of Oxford, OX2 6GG, United Kingdom.

[2] Department of Plastic and Reconstructive Surgery, Kings College London, EC2R 2LS, United Kingdom.

[3] Neonatal Medicine, Faculty of Medicine, Imperial College London, London, SW10 9NH, United Kingdom.

[4] Women's Health Research Unit, Queen Mary, University of London, London, E1 4NS.

Correspondence to:

Dr James M. N. Duffy
Balliol College, University of Oxford
Oxford OX1 3BJ
United Kingdom
+44 (0)1865 289298
james.duffy@balliol.ox.ac.uk

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@jamesmnduffy
www.phc.ox.ac.uk/jamesduffy

Running title: Core Outcomes in Women's and Newborn Health

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Abstract

Background: Variation in outcome collection and reporting is a serious hindrance to progress in our specialty, over eighty journals have come together to support the development, dissemination, and implementation of core outcome sets.

Objective: This study systematically reviewed and characterised registered, progressing, or completed core outcome sets relevant to women's and newborn health.

Search strategy: Systematic search using the Core Outcome Measures in Effectiveness Trial initiative and the Core Outcomes in Women's and Newborn Health initiative databases.

Selection criteria: Registry entries, protocols, systematic reviews, and core outcome sets.

Data collection and analysis: Descriptive statistics to describe characteristics and results.

Results: There were 46 core outcome sets in maternal and newborn health, with the majority registered in 2015 (22; 48%) or 2016 (16; 35%). Benign gynaecology (5; 11%) and newborn health (3; 9%) is currently under-represented. Twenty-four (52%) core outcome sets were funded by international (1; 2%), national (18; 39%), and regional (4; 9%) bodies. Seven protocols were published. Twenty systematic reviews characterised the inconsistency in outcome reporting across a broad range of relevant healthcare conditions. Four core outcome sets were completed:

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reconstructive breast surgery (11 outcomes), preterm birth (13 outcomes), epilepsy in pregnancy (29 outcomes), and maternity care (48 outcomes). The quantitative, qualitative, and consensus methods used to develop core outcome sets have varied considerably.

Conclusions: Core outcome sets are currently being developed across women's and newborn health, although coverage of topics is variable. Development of further infrastructure to develop, disseminate, and implement core outcome sets is urgently required.

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Keywords: (1) Core outcome sets; (2) Neonatology; (3) Obstetrics and Gynaecology; (4) Systematic review; and (5) Women's Health.

Tweetable abstract: 46 women's & newborn core outcome sets registered. 50% funded. 7 protocols, 20 systematic reviews, & 4 core outcome sets published. @coreoutcomes

Introduction

Randomised controlled trials are high quality studies from which decisions regarding treatments are made.[1] While much attention has been paid to standardising randomised trial methods, the collection and reporting of outcomes has been widely neglected.[2] Several systematic reviews have characterised the inconsistency in outcome reporting across, for example, 164 different outcomes and 113 different outcome measures have been reported by endometriosis trials.[3] Such heterogeneity

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results in substantial outcome reporting bias and an inability to synthesise results across studies in systematic reviews.[2] The development and rigorous implementation of core outcome sets would help to address these issues.

Core outcome sets are minimum collections of outcomes with standardised measurement and reporting.[2] They represent a minimum data set of outcomes prioritised by stakeholders, including healthcare professionals, researchers, and patients.[2, 4] Recognising variation in outcome collection and reporting is a serious hindrance to progress in our specialty, over eighty journals have come together to support the Core Outcomes in Women's and Newborn Health (CROWN) initiative.[4, 5] The consortium strongly encourages researchers to develop core outcome sets using appropriate methods, facilitates dissemination, and ensures consistent reporting using such outcome sets across participating journals.[4]

This study systematically reviewed and characterised registered, progressing, or completed core outcome sets relevant to women's and newborn health.

Methods

A protocol with explicitly defined objectives, criteria for selection, and approaches to data extraction was developed. The objectives of this systematic review falls outside of the scope of the International Prospective Register of Systematic Reviews (PROSPERO) and therefore did not require registration.[6, 7]

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A systematic literature review was undertaken searching the Core Outcome Measures in Effectiveness Trial (COMET) initiative register and Core Outcomes in Women's and Newborn Health (CROWN) register from inception to January 2017 (Appendix S1). The Core Outcome Measures in Effectiveness Trial (COMET) initiative register is a database of citations relevant to core outcome set development, including protocols, systematic reviews, and completed core outcome sets. The register is maintained by searches of the Cochrane Methodology Register, MEDLINE, and Scopus.[8, 9] In addition, core outcome developers are encouraged to prospectively register.[8, 9] Two authors independently screened each potentially relevant record based on title and abstract then reviewed the full text of selected publications, for example, published protocols, systematic reviews, or core outcome sets. Discrepancies between the authors were resolved through discussion.

Registry entries, protocols, systematic reviews, and core outcome sets, relevant to women's or newborn health were included. No language or publication date restrictions were applied. Using a pilot-tested and standardised data extraction form, two authors independently extracted characteristics and data.

For registry entries, characteristics including scope, funder, and registration details were extracted. For published protocols, characteristics, planned quantitative and qualitative methods to identify potential core outcomes, and planned consensus methods to identify core outcomes were extracted. For published systematic reviews, characteristics, methods (search strategy, inclusion criteria, and methodological assessment of included studies), and results (included studies, participants, outcome domains, outcomes, and outcome measures) were extracted.

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For published core outcome sets, characteristics, quantitative and qualitative methods identifying potential core outcomes, and consensus methods identifying core outcomes were extracted. A reporting guideline for core outcome sets, Core Outcome Set-STAndards for Reporting: the COS-STAR statement, has recently been published.[10] Two authors independently assessed reporting quality of each each core outcome set using the statement's 18 item checklist.[10]

This study was reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.[1] Descriptive statistics were reported to characterise registry entries, protocols, systematic reviews, and core outcome sets, mapping their characteristics, methods, results, and reporting quality. Where identified, unpublished protocols were sought from the authors.[11]

This is independent research arising from a doctoral fellowship (DRF-2014-07-051) supported by the National Institute for Health Research, awarded following external peer review.[12] The funder had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Results

The search identified 121 registry records, 35 duplicate records were excluded, and 86 records were screened by two authors independently. Seventy-seven records were included: 46 core outcome set registry records, seven protocols, 20 systematic reviews, and four core outcome sets (Figure S1).

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Registry records

Forty-six core outcome sets registered with the Core Outcome Measures in Effectiveness Trial (COMET) initiative (41; 89%) and / or Core Outcomes in Women's Health (CROWN) initiative (38; 83%) were identified (Table 1). The majority of registry records were registered in 2015 (22; 48%) or 2016 (16; 35%) (Figure 1). Five core outcome sets (11%) relevant to benign gynaecology and subfertility, 33 (72%) relevant to pregnancy and childbirth, three (7%) relevant to newborn health, and five (11%) relevant to oncology have been registered (Figure 2). Twenty-four of the core outcome sets (52%) received funding for their development, from international (1; 2%), national (18; 39%), and regional (4; 9%) bodies (Table 1).

Published core outcome set protocols

Seven published protocols were identified: endometriosis, termination of pregnancy, pre-eclampsia, diabetes in pregnancy, neonatal abstinence syndrome, gastroschisis, and autologous fat grafting (Table S1).[12-18] The protocols were published in 2015 (1), 2016 (5), or January 2017 (1). Five protocols described core outcome sets funded by international funders, World Health Organization, national funders, including Health Research Board (Ireland), National Institute of Health Research (United Kingdom), and Royal College of Obstetricians and Gynaecologists (United Kingdom), or regional funders such as Barts Health Charity (London, United Kingdom).[12-15, 17] The scope of the core outcome set was clearly stated in five protocols.[12-17] All protocols described systematic reviews to identify potential core outcomes. Additionally, three protocols described linked qualitative research methods, including a systematic review of qualitative research and qualitative patient

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interviews.[12, 14, 16] All protocols intended to identify core outcomes by using a modified Delphi method and in addition six protocols intended to organise a consensus development meeting.

Systematic reviews characterising the inconsistency in outcome reporting

Twenty systematic reviews characterising the inconsistency in outcome reporting across a broad range of relevant healthcare conditions were identified (Table S2). [3, 11, 19-35] Seventeen systematic reviews (85%) extracted and mapped outcome reporting across included studies, three (15%) mapped predefined outcomes across included studies, and two (10%) investigated outcome reporting bias.[36] The scope was clearly stated in a majority of systematic reviews (12; 60%). The search strategy varied across the included reviews: many (11; 55%) searched multiple bibliographical databases (range: 2 - 7 databases) and applied no date limitations (10; 50%) but a significant minority did not. The search strategy was unclear in two reviews (10%).

In terms of content, single (5%) review included 25 study protocols, seven reviews (35%) included non-randomised studies (range 28 - 232), 14 reviews (70%) included randomised trials (range 28 - 1041), and 10 reviews (50%) included systematic reviews (range 1 - 174). A minority of reviews (4; 20%) undertook a methodological assessment of included studies. Eleven reviews (55%) mapped both primary and secondary outcomes. The reported variation in outcome reporting was considerable, for example, a review of endometriosis trials identified 164 outcomes and 113 outcome measures and a review of bladder pain syndrome trials identified five

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outcomes and 19 outcome measures.[3] A minority of reviews (6; 30%) did not explicitly state the number of unique outcomes identified.

Published core outcome sets

Four published core outcome sets were identified: reconstructive breast surgery (11 core outcomes), primary prevention of preterm birth (13 core outcomes), epilepsy in pregnancy (29 core outcomes), and maternity care (48 core outcomes) (Table 2 and S3).[11, 37-39]

No published core outcome sets clearly defined their scope. All four had made a systematic review of the literature to identify potential core outcomes (Table S3). Three core outcome sets published their systematic reviews separately.[26, 28, 34, 35, 40] Three reviews clearly described their search strategy, two searched multiple bibliographical databases (range: 3-4) and a single review limited their search to the Cochrane Pregnancy and Childbirth Group's Specialised Register. All reviews applied a date restriction and two described the rationale for this: Van 't Hooft and colleagues included randomised trials published after the first Consolidated Standards of Reporting Trials (CONSORT) statement[37] and Potter and colleagues included studies from 1980 onwards following the development of modern reconstructive surgical techniques.[11] Two reviews included non-randomised studies (range 28 – 232 studies), three reviews included randomised trials (range 11 – 170 trials), and the last was a review of 33 systematic reviews.

Qualitative methods, including patient and healthcare professional interviews, were used by two core outcome sets to identify potential core outcomes to be entered into

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a formal consensus method (Table S3). These methods, including data collection and analysis, were not described clearly within study reports.

All included core outcome sets used the modified Delphi method to identify core outcomes (Table S3).[41] Participants included health care professionals (range 103-242 participants) and patients (range 24-154 participants). Individual stakeholder groups were clearly stated by a single core outcome set.[37] Two core outcome sets recruited participants from a single country, United Kingdom, and the remaining two core outcome sets recruited participants from multiple countries (range: 25-27 countries). The attrition rate varied between 21%-48%. In addition, three core outcome sets arranged specific meetings to inform their development. Participants included healthcare professionals (range 13-25 participants), researchers (range 1-10 participants), and patients (range 2-15 participants). No core outcome set described a formal consensus method, but rather came to consensus through semi-structured discussion and voting.

No core outcome set fulfilled the Core Outcome Set-STAndards for Reporting: the COS-STAR statement's reporting criteria (Table S4). Eight of the eighteen criteria required significant improvement including: specific objectives (2b); scope (3a-c); information sources (6b); protocol deviations (11); outcomes (13b); funding (17); and conflicts of interest (18).

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Discussion

Main Findings

Forty-six core outcome sets relevant to women's and newborn health have been registered, the majority in the last two years. Although a wide range of outcome sets are in development, several areas are currently under-represented, including benign gynaecology and newborn health. The quantitative, qualitative, and consensus methods used by core outcome set developers have varied considerably, and only a minority have published a protocol. Four core outcome sets have been completed to date, including reconstructive breast surgery, preterm birth, epilepsy in pregnancy, and maternity care. All have used the modified Delphi method to identify core outcomes engaging with stakeholders, including patients. The number of core outcomes included in the final core outcome set varies considerably from 11 to 48. No core outcome sets have determined how or when core outcomes should be measured.

Strengths and Limitations

To our knowledge, this is the first systematic review to characterise and evaluate registered, ongoing, and published core outcome sets relevant to women's and newborn health. The strengths of this systematic review include its comprehensive search strategy and design ensuring the review process and data extraction were conducted independently by two authors.

This empirical evaluation is not without limitations. The search strategy was limited to the Core Outcome Measures in Effectiveness Trial (COMET) initiative and Core Outcomes in Women's and Newborn Health (CROWN) initiative databases.

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Additional core outcome sets could have been identified by expanding the search to other bibliographical databases, for example, the Cochrane Methodology Register (CMR). However, identifying core outcome sets is challenging as no appropriate medical subject heading exists and prospective registration is not compulsory.[42] A limited number of registered core outcome sets have published a protocol, thus accurately assessing their methods and progress is challenging. There are no established criteria to assess the quality of completed outcome sets. Therefore, no decisions about quality of developed core outcome sets and subsequent recommendations for their adoption can be confidently made.

Interpretation

Although prospective registration is not currently mandated for core outcome sets, its implementation could help prevent unnecessary duplication of research effort, assist key stakeholders to identify planned or ongoing core outcome sets, and ensure approval and design of new research studies is informed by relevant core outcome sets.[43] Publishing core outcome set protocols could provide an additional strategy to improve core outcome set research in a similar fashion as prospective registration. Researchers would be able to obtain feedback on draft core outcome set protocols through peer review and enable consumers to compare what was originally intended with what was actually done.[44]

There is currently limited guidance for the most appropriate methods to develop core outcome sets. This systematic review has identified significant variation in the quantitative, qualitative, and consensus methods used.[2, 45] For example, researchers have designed their modified Delphi technique using different strategies, perhaps

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recruiting participants from a single country or combining different stakeholders into a single group, decisions that are rarely justified. [11, 37-39] The number of core outcomes included in the final core outcome set varies considerably from 11 to 48. The high number of core outcomes recommended in several sets, may limit their implementation and encourage researchers to continue to "cherry pick" the outcomes collected and reported. Given the uncertainty in core outcome set development methods, further methodological research is urgently required to standardise the approach.[2]

There is significant core outcome set development in women's and newborn health and embedding methodological research within the development of individual sets should be encouraged. An instrument for assessing the methodological quality of core outcome sets is currently in development, which should facilitate objective assessment to support recommendations regarding dissemination and implementation.[8]

No core outcome set included in this systematic review have associated core outcomes with specific measures. Determining how core outcomes should be measured is necessary to limit unwarranted variation. Associating core outcomes with outcome measures is challenging and requires significant methodological expertise.[46] There are several frameworks to identify and assess potential outcome measurement instruments.[46, 47] For example, the Outcome Measures in Rheumatology (OMERACT) initiative has designed an explicit framework comprising truth, discrimination, and feasibility to assess the quality of potential outcome measures.[44] Without standardised outcome measures it is difficult to envisage a

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situation where core outcome sets will be robustly implemented within clinical studies.

Effective dissemination and implementation of core outcome sets will be required to eliminate the unwarranted and confusing variation in outcomes and outcome measures. Reporting research is as important a part of a core outcome set study as its design or analysis. A reporting guideline for core outcome sets, Core Outcome Set-STAndards for Reporting: the COS-STAR Statement, has recently been published.[10] Speciality journals participating within Core Outcomes in Women's and Newborn Health (CROWN) initiative have committed to implementing the COS-STAR statement to ensure the methods are described unambiguously and the results clear.[5]

In the last two years, the number of core outcome sets in development has risen exponentially. The development of infrastructure to evaluate, disseminate, and implement core outcome sets within women's and newborn health is urgently required to ensure effective and timely dissemination and implementation.

Conclusions

Core outcome sets are currently being developed across women's and newborn health, although several areas are currently under-represented, including benign gynaecology and newborn health. Key stakeholders, for example, healthcare professionals, researchers, and patients could be encouraged to participate in their development. We recommend core outcome researchers should: prospectively register, develop and publish a robust protocol, engage in methodological research,

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and follow reporting guidelines. The development of infrastructure to develop, disseminate, and implement core outcome sets is urgently required.

International Collaboration to Harmonise Outcomes in Pre-eclampsia (iHOPE) Steering Group

James M. N. Duffy (University of Oxford, Oxford, United Kingdom); Janneke van 't Hooft (Academical Medical Centre, Amsterdam, Netherlands); Chris Gale (Imperial College London, London, United Kingdom); Mark Brown (St George and Sutherland Hospitals, Kogarah, Australia); William Grobman (Northwestern University, Chicago, United States); Ray Fitzpatrick (University of Oxford, Oxford, United Kingdom); S. Ananth Karumanchi (Harvard Medical School, Boston, Untied States); Nuala Lucas (Obstetric Anaesthetists' Association, London, United Kingdom); Laura Magee (St George's, University of London, London, United Kingdom); Ben Mol (University of Adelaide, Adelaide, Australia); Michael Stark (University of Adelaide, Adelaide, Australia); Shakila Thangaratinam (Queen Mary, University of London, London, United Kingdom); Mathew Wilson (University of Sheffield, Sheffield, United Kingdom); Peter von Dadelszen (St George's, University of London, London, United Kingdom); Paula Williamson (University of Liverpool, Liverpool, United Kingdom); Khalid S. Khan (Queen Mary, University of London, London, United Kingdom); Sue Ziebland (University of Oxford, Oxford, United Kingdom); and Richard J. McManus (University of Oxford, Oxford, United Kingdom).

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Conflict of interest

RJM has received blood pressure monitors for research from Omron and Lloyds Pharmacies and expenses and honoraria for speaking from the Japanese Society of Hypertension and the American Society of Nephrology. The remaining authors declare no competing interests. The ICMJE disclosure forms are available as online supporting information.

Author contributions

Study concept and design: JMD, RR, MH, SZ, and RMcM. Acquisition of data: JMD, RR, and MH. Analysis and interpretation of data: JMD, RR, CG, MH, KK, SZ, and RMcM. Drafting of the manuscript: JMD, RR, KK, SZ, and RMcM. Critical revision of the manuscript for important intellectual content: CG and MH. Obtained funding: JMD, KK, SZ, and RMcM. Educational supervision: KK, SZ, and RMcM.

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Table 1: Core outcome sets registered with the Core Outcome Measures in Effectiveness Trials (COMET) initiative and / or Core Outcomes in Women's and Newborn Health (CROWN) initiative

	Funder; Country	COMET registration number; URL
Benign gynaecology and subfertility		
Endometriosis (2015)	Endometriosis Millennium Fund, United Kingdom	691; comet-initiative.org/studies/details/691
Heavy menstrual bleeding (2015)	Academy of Medical Sciences, United Kingdom	789; comet-initiative.org/studies/details/789
Menopause (2016)		917; comet-initiative.org/studies/details/917
Subfertility (2016)	Royal Society of New Zealand, New Zealand	
Reproductive disorders (2015) [a]	Dutch Heart Foundation, the Netherlands	701; comet-initiative.org/studies/details/701
Early pregnancy		
Preconception and early pregnancy (2015) [b]	University of Western Australia, Australia	784; comet-initiative.org/studies/details/784
Preconception: diabetes in pregnancy (2015)	Health Research Board, Ireland	692; comet-initiative.org/studies/details/692
Hyperemesis gravidarum (2015)		805; comet-initiative.org/studies/details/805
Miscarriage (2015) [c]	National Institute for Health Research, United Kingdom	679; comet-initiative.org/studies/details/679 815; comet-initiative.org/studies/details/815 816; comet-initiative.org/studies/details/816
Recurrent miscarriage (2016)		
Termination of pregnancy (2015)	World Health Organization, Switzerland	779; comet-initiative.org/studies/details/779
Pregnancy		
Pre-eclampsia (2014)	National Institute for Health Research, United Kingdom Barts Health Charity, United Kingdom EGA Hospital Charity, United Kingdom	588; comet-initiative.org/studies/details/588
Gestational diabetes (2016)		686; comet-initiative.org/studies/details/686
Reduced fetal movements (2017)		928; comet-initiative.org/studies/details/928
Stillbirth (2016)	Australian and New Zealand Stillbirth Alliance, Australia	
Bereavement care following stillbirth (2016)	North Bristol NHS Trust Research Fund, United Kingdom [d]	775; comet-initiative.org/studies/details/775

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Preterm birth (2015) [e]		603; comet-initiative.org/studies/details/603
Very preterm birth (2011) [f]	National Institute for Health Research, United Kingdom	256; comet-initiative.org/studies/details/256
Intrauterine growth restriction (2015)	Health Research Board, Ireland	689; comet-initiative.org/studies/details/689
Multiple pregnancy (2016)		844; comet-initiative.org/studies/details/844
Twin-twin transfusion syndrome (2016)		921; comet-initiative.org/studies/details/921
Iron deficiency anaemia (2016)		836; comet-initiative.org/studies/details/836
Venous thromboembolism (2016)		839; comet-initiative.org/studies/details/839
Immune thrombocytopenia purpura (2017)		840; comet-initiative.org/studies/details/840
Epilepsy in pregnancy (2015)	National Institute for Health Research, United Kingdom	393; comet-initiative.org/studies/details/393
Cardiac diseases in pregnancy (2016)		834; comet-initiative.org/studies/details/834
Obesity in pregnancy (2017)		939; comet-initiative.org/studies/details/939
Mechanical ventilation in pregnancy (2016)		916; comet-initiative.org/studies/details/939
Maternal morbidity definitions (2016)		835; comet-initiative.org/studies/details/835
Childbirth		
Induction of labour (2015)		695; comet-initiative.org/studies/details/695
Intrapartum care (2015)		673; comet-initiative.org/studies/details/673
Intrapartum fetal assessment (2015)	Health Research Board, Ireland	741; comet-initiative.org/studies/details/741
Caesarean delivery (2015) [g]	Indiana University School of Medicine, United States	763; comet-initiative.org/studies/details/763
Postpartum haemorrhage (2014)	British Medical Association, United Kingdom	706; comet-initiative.org/studies/details/706
Maternity care (2007)		108; comet-initiative.org/studies/details/108
Newborn health		
Neonatal medicine (2016)	Medical Research Council, United Kingdom	842; comet-initiative.org/studies/details/842
Neonatal abstinence syndrome (2016)		808; comet-initiative.org/studies/details/808
Gastroschisis (2014)	National Institute for Health Research, United Kingdom	746; comet-initiative.org/studies/details/746
Oncology		
Cervical cancer (2015) [h]	British Medical Association, United Kingdom	791; comet-initiative.org/studies/details/791

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Endometrial hyperplasia (2015)	Cancer Research UK, United Kingdom	
Endometrial cancer (2015)	Cancer Research UK, United Kingdom	
Reconstructive breast surgery (2015) [l]	Medical Research Council, United Kingdom	152; comet-initiative.org/studies/details/152 860; comet-initiative.org/studies/details/860
Other		
Intimate partner violence (2016)	Barts Health Charity, United Kingdom	823; comet-initiative.org/studies/details/823

[a] Determining cardiovascular disease endpoints for prognostic research. [b] Determining neonatal outcomes for observational studies. [c] Prevention, medical interventions, and surgical interventions for miscarriage. [d] Feasibility funding. [e] Interventions for primary prevention of preterm birth. [f] Exploratory work. [g] Determining maternal infectious outcomes. [h] Fertility sparing surgical interventions. [i] Reconstructive surgery and autologous fat grafting for breast cancer.

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Table 2: Core outcome sets in women's and newborn health.

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Reconstructive breast surgery [41]

- Implant-related complications
- Flap-related complications
- Major complications
- Unplanned surgery for any reason
- Donor-site problems/morbidity
- Self-esteem
- Emotional well-being
- Normality
- Quality of life
- Physical well-being
- Women's cosmetic satisfaction

Preterm birth [38]

Maternal

- Maternal mortality
- Maternal infection or inflammation
- Preterm rupture of membranes
- Harm to mother from intervention

Offspring

- Gestational age at delivery
- Offspring mortality
- Birthweight
- Early neurodevelopmental morbidity
- Late neurodevelopmental morbidity
- Gastrointestinal morbidity
- Infectious morbidity
- Respiratory morbidity; and
- Harm to offspring from intervention

Epilepsy in pregnancy [39]

Neurological

- Seizure control in pregnancy and postpartum
- Status epilepticus
- Maternal mortality
- Drowning
- Sudden unexpected death in epilepsy
- Postnatal depression
- Quality of life

Obstetric

- Live birth
- Stillbirth
- Miscarriage
- Ectopic pregnancy
- Termination of pregnancy
- Admission to a high dependency or intensive care unit

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- Breastfeeding
- Mode of delivery
- Preterm birth
- Pre-eclampsia
- Eclampsia

Offspring

- Congenital abnormalities
- Fetal anticonvulsant syndrome
- Neurodevelopment
- Autism disorder
- Neonatal clinical complications
- Admission to a neonatal intensive care unit
- Anthropometric measurements

Studies on anti-epileptic drugs

- Maternal anti-epileptic drugs toxicity
- Anti-epileptic drugs compliance
- Neonatal withdrawal symptoms
- Neonatal haemorrhagic disease.

Maternity care [16]

- Maternal death
- Mode of birth
- Neonatal death
- Stillbirth
- Type of labour onset
- Neonatal admission to special care and/or intensive care unit
- Birth injury to infant
- Ruptured uterus
- Postpartum hemorrhage
- Mother requires admission to intensive care
- Maternal postnatal readmission to hospital
- Method of infant feeding
- Vaginal birth after previous cesarean section
- Gestational age at birth
- Postnatal depression
- Place of birth
- Neonatal resuscitation required
- Normal birth without intervention
- Oxytocin augmentation of labor
- Anal sphincter damage
- Hypoxic ischemic encephalopathy
- Intrapartum hypertensive disorders of pregnancy
- Hypertensive disorders of pregnancy
- Puerperal psychosis
- Maternal fecal incontinence
- Birth asphyxia
- Breastfeeding at discharge
- Neonatal readmission to hospital
- Apgar score at five minutes
- Trial of labor after previous cesarean delivery

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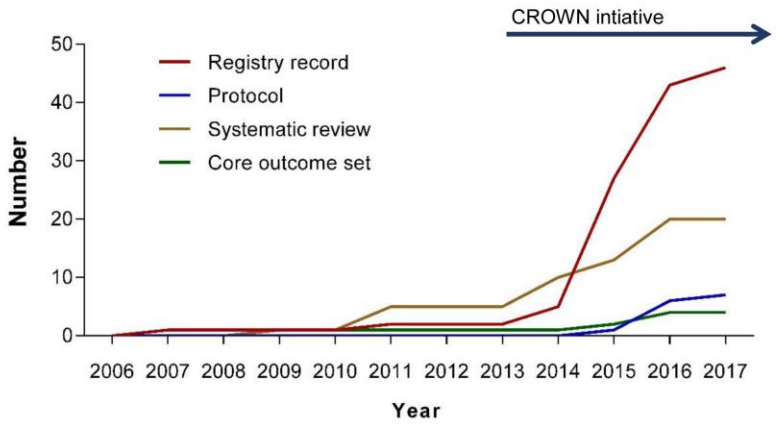
- Breastfeeding at three months
- Maternal satisfaction (postnatal)
- Infant birthweight
- Neonatal fitting/seizures
- Infant requiring intubation
- Congenital anomaly
- Use of pharmacological analgesia / anesthesia
- Maternal satisfaction (antenatal)
- Postnatal hypertensive disorders of pregnancy
- Maternal satisfaction (postnatal)
- Cesarean section wound infection
- Pulmonary embolism
- Intrauterine growth restriction
- Preterm labor
- Meconium aspiration
- Intrapartum hemorrhage
- Neonatal infection
- Shoulder dystocia

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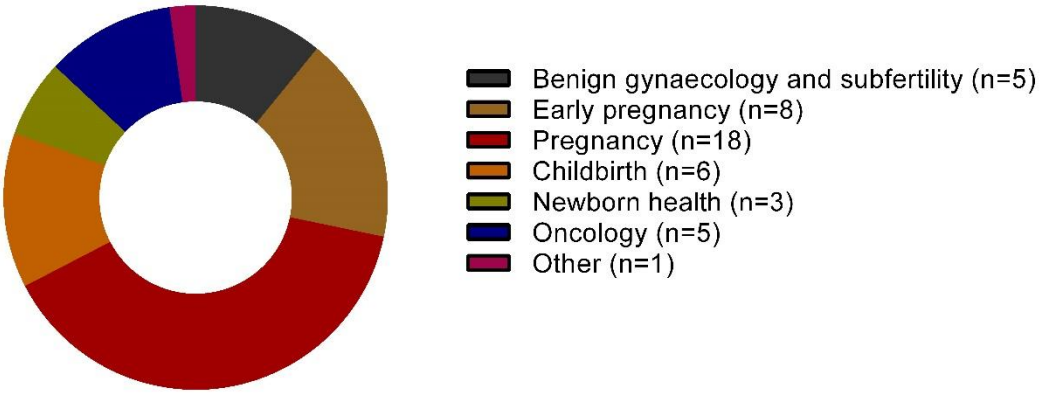
Figure 1. Historical trends: registry records, protocols, systematic reviews, and core outcome sets.



Abbreviations: CROWN: Core Outcomes in Women's and Newborn Health.

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Figure 2: Registered core outcome sets.



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