Safer Baby Collaborative - Evaluation

OFFICIAL

Background

Reducing the rate of stillbirth is an Australian Government priority. We know that many cases of stillbirth are preventable, and research shows that 20-30% of late gestation stillbirths could be avoided with better care (1).

In 2019, the state of Victoria committed to reducing the rate of stillbirth by 20 per cent by 2022. In 2016, Victoria's stillbirth rate was ~6.2 per 1000 births after 20 weeks, and ~2.2 per 1000 births at 28 weeks or more (2). At the time, awareness of risk factors for stillbirth was believed to be low and research indicated many stillbirths may have been preventable through education and identification of women at higher risk.

From 2019 until 2021, Safer Care Victoria (SCV) and the Institute for Healthcare Improvement (IHI) partnered with 19 health services to deliver the Victorian Safer Baby collaborative which aimed at reducing preventable stillbirths in participating services through the introduction of an evidence-based bundle of care. This initiative used an adapted breakthrough series (BTS) collaborative approach to test, implement, and scale evidenced-based changes across the participating maternity services (see Appendix 1 for list of participating health services).

This bundle of care aligns with work undertaken in the United Kingdom as part of the Saving Babies Lives Care Bundle and with the Safer Baby Bundle as developed by the Stillbirth Centre of Research Excellence (Stillbirth CRE).

This post-hoc evaluation was completed in 2023 whilst the collaborative concluded in 2021. Members of the evaluation team were not previously involved in the collaborative.

What did we want to accomplish?

Safer Baby collaborative aim

By July 2021 we intend to reduce the rate of avoidable stillbirths in the third trimester* by 30% in participating health services.

**This initiative targets stillbirth at 28 weeks or more, a period of gestation in which more cases are considered avoidable and excludes terminations and babies with lethal congenital or chromosomal anomalies.*

Our goals were:

- 30% or more reduction in the number of stillbirths across Victoria, based on a 2017-2019 baseline
- 95% or higher compliance with the agreed clinical bundle of care components.

The five key aspects of clinical care bundle were:

- Promoting smoking cessation at every episode of care

- Detection and management of fetal growth restriction (FGR) at every episode of care
- Management of decreased fetal movements (DFM)
- Promoting optimal maternal sleep position (MSP)
- Shared decision making around timing of birth at the point of risk identification.

Did it work?

Key achievements for this program included:

- Within the reporting period of the collaborative, there were 20 less stillbirths (a reduction in the aggregate stillbirth rate towards the target aim of 30% reduction) than expected
- increased smoking cessation rates of women during pregnancy to 33%
- decreased the stillbirth rate by 21% from an average rate of 0.24% to 0.19%
- participating teams reported a positive experience, and particularly enjoyed the leadership opportunities, learning improvement science and being able to connect and share with other teams
- teams' ability to understand and use improvement methodology increased, particularly in response to 1:1 and group virtual coaching and on-site coaching visits.

See Appendix 2 for further detail about results and aggregated data charts.

How did we measure improvement?

Measurement is a critical part of testing and implementing changes; measures tell a team whether the changes they are making lead to improvement. Determining if improvement has really happened and if it is lasting requires observing patterns over time.

The main tools used for measuring improvement are run charts and Shewhart (or control) charts. These charts utilise the rules of probability to detect when a change in a system has potentially occurred based on the variation of data from what would be expected in a stable system. Different types of data require the use of different control charts. In this collaborative P-Charts and C-Charts are utilised. P-Charts are the most appropriate control chart for analysing changes in categorical data and C-Charts are used for 'count' data in systems where the area of opportunity is large and relatively stable.

In this report, three control chart rules have been used to detect signals of system change. These are:

- points outside the control limits of the chart
- eight consecutive points above or below the mean
- six consecutive increasing or decreasing points

When these patterns in the data are observed, it means that the change in the system is unlikely to have occurred by chance or random variation).

On a control chart, the centre line describes the mean of the observed values and the upper (UCL) and lower (LCL) lines indicate the control limits. Control limits are calculated from observed values in the data of the system you are studying and indicate the expected level of variation in the system. The control chart rules have been devised to maximise the sensitivity and specificity to special cause variation (that would not be expected as part of the normal performance of the system), to reduce the likelihood of false signals of random (chance) variation.

How did we know that a change was an improvement?

Participating services used an established measurement strategy (see Figure 1) during the collaborative to know whether the changes they were making were leading to improvement. The health service teams collected and

reported data in real time using this 'family of measures'. The measurement strategy was developed in consultation with the clinical lead, expert working group and faculty group and was used as the basis for this summative evaluation.

What changes did we make that resulted in improvement?

SCV and IHI adapted and contextualised the change components for Victorian health services. The changes draw on:

- the Saving Babies' Lives Care Bundle, a piece of work developed in the UK National Health Service (NHS) by midwives, obstetricians, and representatives from stillbirth charities, and
- the Safer Baby Bundle, a package developed by the Australian Stillbirth Centre of Research Excellence (CRE).

See Appendix 3 for the Driver Diagram and further detail about changes made that resulted in improvement.

Figure 1: Family of measures, Safer Baby Collaborative

Outcome Measure	The number of stillbirths >28 weeks gestation (excluding terminations of pregnancy)[1]
Process Measures	Percentage of women who ceased smoking between conception and birth Percentage of women who received 'Ask, Advise, Help' Percentage of women who had a symphyseal fundal height (SFH) measurement taken and plotted on growth chart Percentage of women screened for fetal growth restriction at each antenatal visit Percentage of women provided with DFM information and education from 24 to 28 weeks gestation Percentage of women provided with maternal sleep position education & brochure from 28 to 34 weeks gestation Percentage of women who reported being involved as much as they wanted to with decision-making around timing of birth
Balance Measures	Percentage of women who birthed via induction or elective caesarean section before 39.0 weeks gestation Percentage of babies admitted to special care nursery from 37 weeks

How did the pandemic impact our implementation strategy?

The original timeline for the collaborative was June 2019 to July 2020. The collaborative was paused at the beginning of April 2020, due to the coronavirus (COVID-19) pandemic and the associated pressure on the Victorian health system.

When state-wide pandemic conditions allowed, the collaborative was restarted with Phase 2 of the Safer baby collaborative commencing in November 2020 and finishing in May 2021. Minor refinements were made to the driver diagram (Appendix 3) and measurement strategy (Appendix 2) for the collaborative, a new data platform was implemented (Team Assurance) and most teams returned (Appendix 1).

[1] During project delivery still birth data was studied in 'number days between still births', 'percent of still births per total births per month' and 'number of still births per month' control charts. For this report, which presents aggregate data, the number of still births per month has been selected due to ease of interpretation. However, when data is studied for one health service only, due to the relative rarity of still births, count or percent charts are unlikely to be useful for the purpose of detecting improvement, preferred alternative options are time (days) or number of births between still births charts.

Limitations of the Safer Baby Collaborative

- This program was tested as a bundle of elements together and therefore we are unable to determine which individual bundle elements had the greatest impact on the results of the collaborative.
- In general, the incidence of stillbirth is very low. It is difficult to demonstrate statistical significance in results for an outcome that is very rare, especially when measured over the span of only one year.
- This is a retrospective evaluation completed in August 2023. The original project team were not able to be involved in the evaluation.
- All data in this report is self-reported by the services.

References:

1. Consultative Council on Obstetric and Paediatric Mortality and Morbidity. (2020). Victoria's Mothers, Babies and Children. https://www.safercare.vic.gov.au/sites/default/files/2022-05/FINAL%20CCOPMM%20REPORT_SCV-2020.pdf

2. Consultative Council on Obstetric and Paediatric Mortality and Morbidity. (2016). Victoria's Mothers, Babies and Children. https://www.safercare.vic.gov.au/sites/default/files/2018-03/mothers-babies-children-2016.pdf

3. Provost, Lloyd P., and Sandra K. Murray. *The health care data guide: learning from data for improvement*. John Wiley & Sons, 2022.

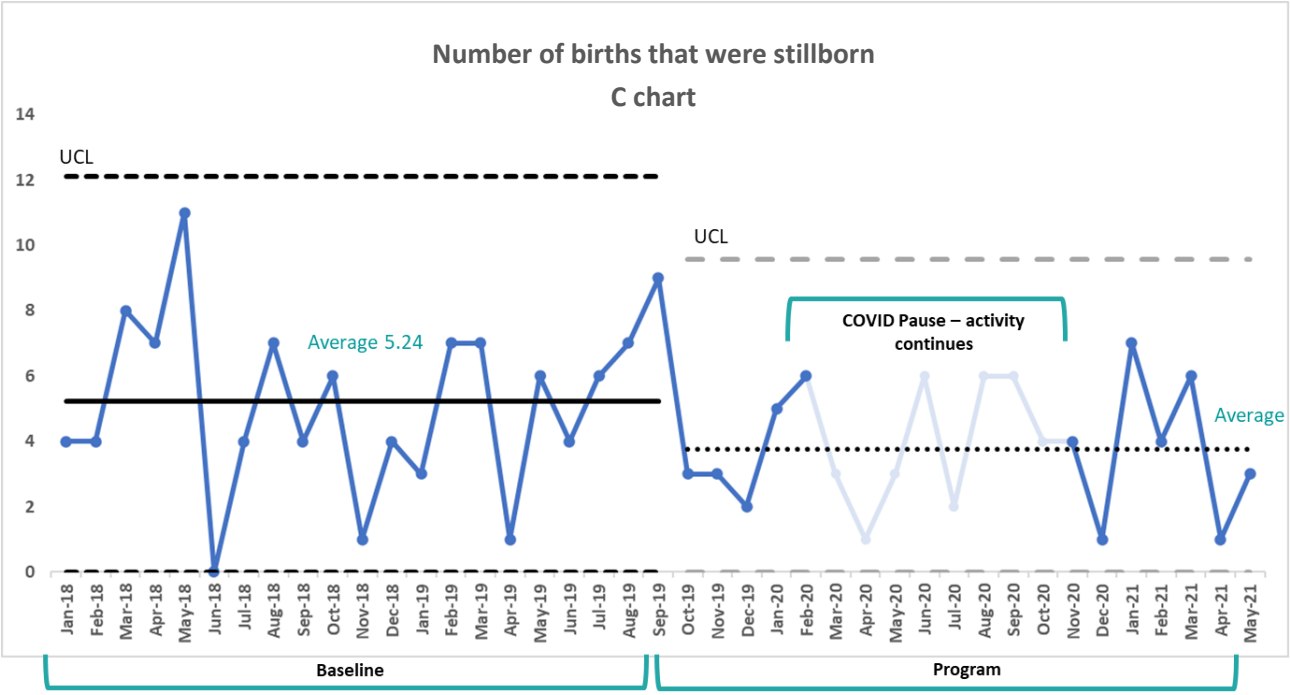
Appendices

Appendix 1 - Participating Health Services

Phase 1	Phase 2
Albury Wodonga Health	Albury Wodonga Health
Ballarat Health Services	Ballarat Health Services
Benalla and District Memorial Hospital	Benalla and District Memorial Hospital
Bendigo Health	Bendigo Health
Cabrini Health	
Djerriwarrh Health Services	Djerriwarrh Health Services
East Grampians Health Service – Ararat	East Grampians Health Service – Ararat
Eastern Health – Angliss and Box Hill hospitals	Eastern Health – Angliss and Box Hill hospitals
Echuca Regional Health	Echuca Regional Health
Latrobe Regional Hospital	Latrobe Regional Hospital
Maryborough District Health Service	Maryborough District Health Service
Mercy Health – Werribee Hospital	
Monash Health – Casey, Clayton, Dandenong	Monash Health – Casey, Clayton, Dandenong
Northern Health	Northern Health
Peninsula Health – Frankston Hospital	Peninsula Health – Frankston Hospital
Royal Women's Hospital – WADS	
South West Healthcare – Warrnambool	
St Vincent's Private Hospital	St Vincent's Private Hospital
West Gippsland Healthcare Group	West Gippsland Healthcare Group

Appendix 2. Aggregate data

Measure 01: Number of births that were stillborn



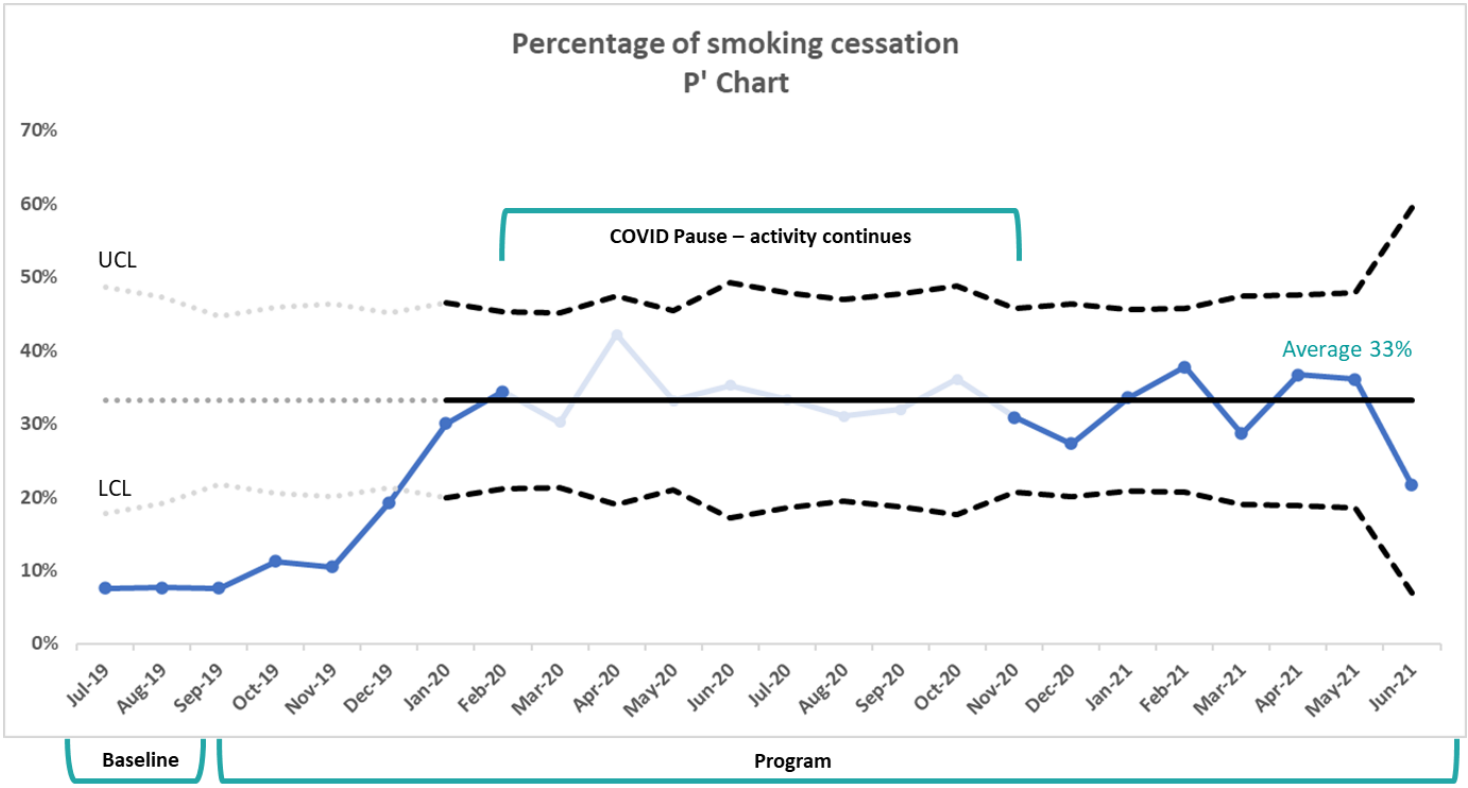
Numerator – The number of stillbirths at 28 weeks or more gestation
Note – this is a C chart therefore no denominator.

This graph demonstrates that:

- Period from October 2019, there were 20 stillbirths less than what would have been expected based on data from January 2018 to September 2019.
- Insufficient data to draw on significance of this result
- Second period based on a small number of observations.

Measure 02: Percentage of smoking cessation

Supporting women to stop smoking during pregnancy



Numerator: Number of women who meet the denominator criteria who ceased smoking during pregnancy

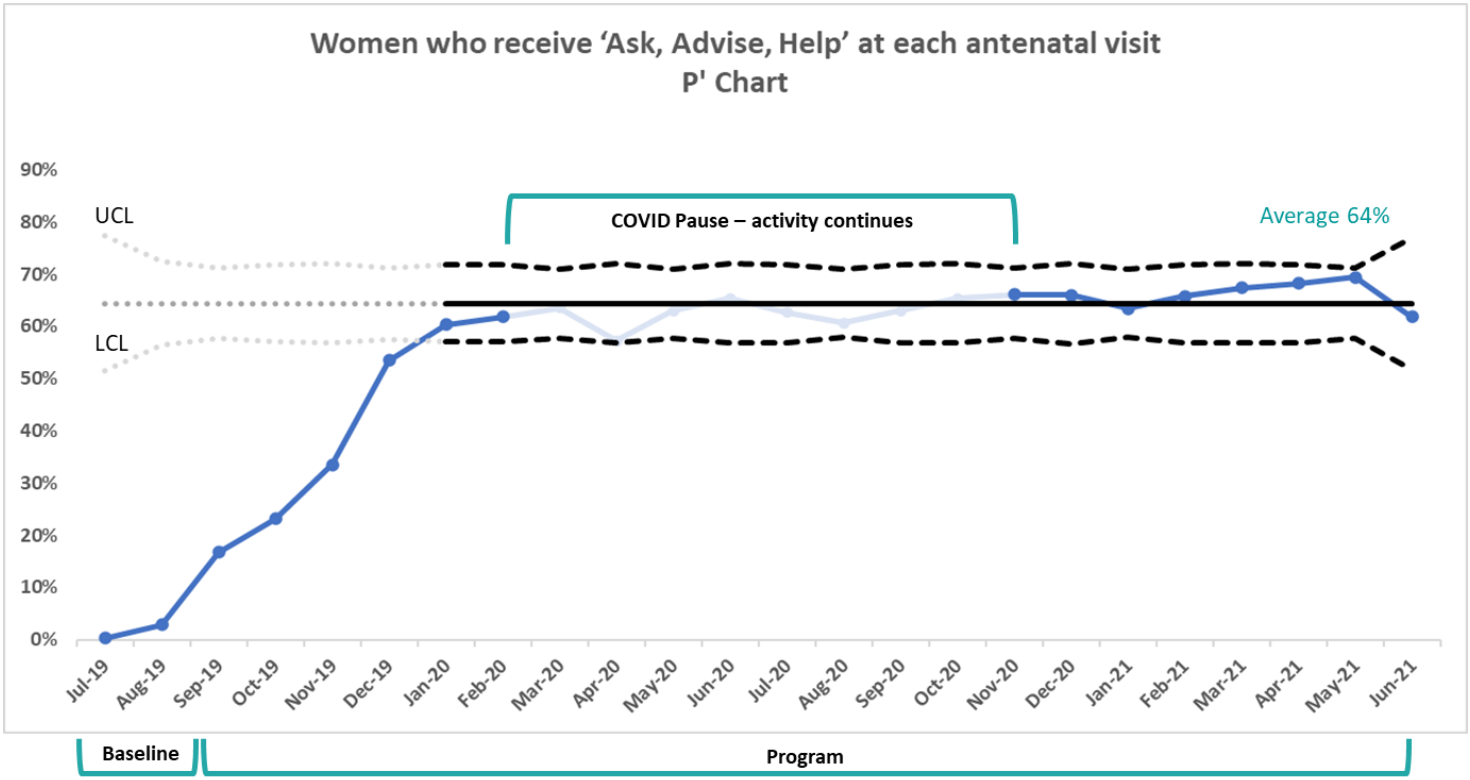
Denominator: Number of women identified as smoking

This graph demonstrates that:

- Pre-program (baseline) smoking cessation during pregnancy appears low, however there were not enough data points to establish a mean
- Following implementation of the program, smoking cessation significantly increased to a new mean of 33%.

Measure 03: Women who receive 'Ask, Advise, Help' at each antenatal visit

Supporting women to stop smoking during pregnancy



Numerator: Number of antenatal appointments who meet the denominator criteria where 'Ask, Advise, Help' intervention was performed

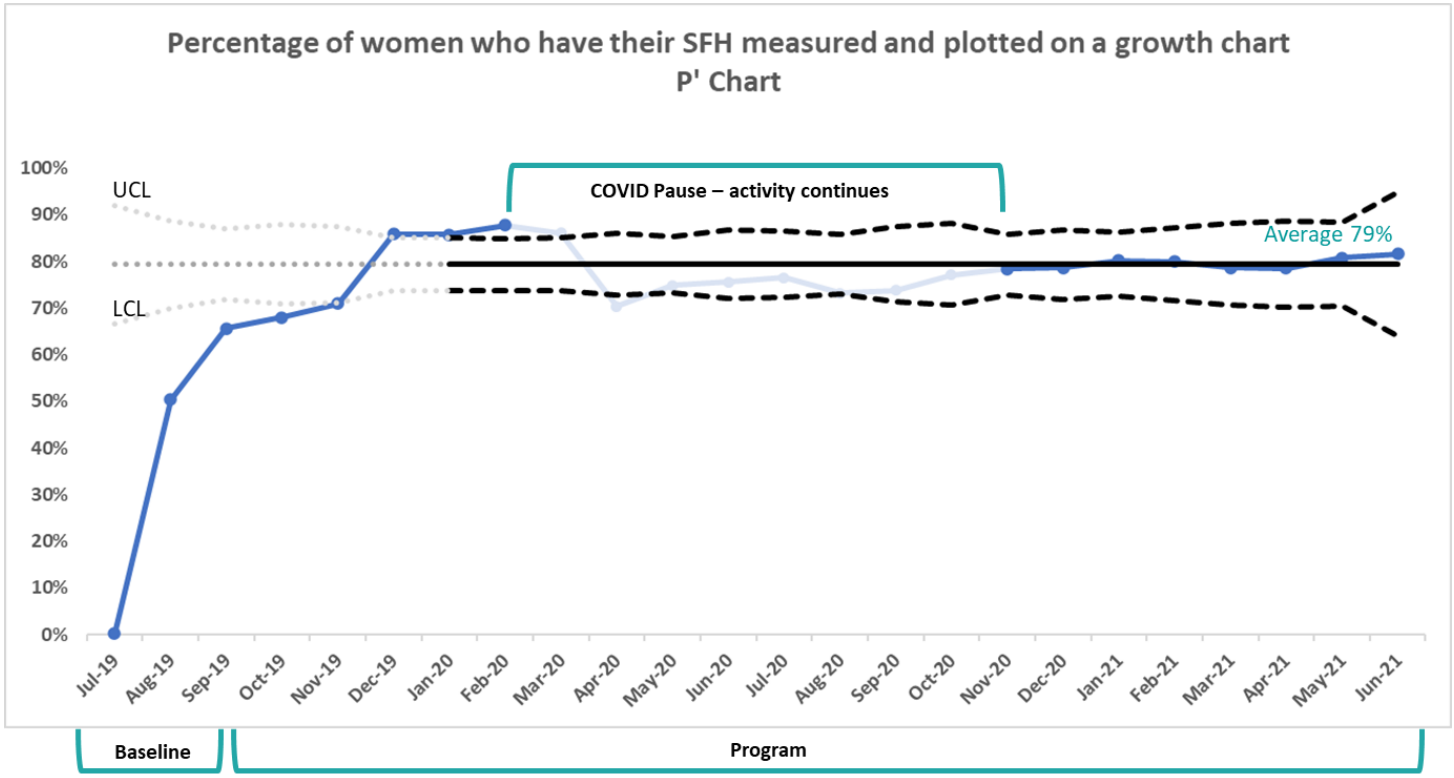
Denominator: Number of antenatal appointments for women identified as smoking during pregnancy.

This graph demonstrates that:

- Pre-program (baseline), the percentage of women who received 'Ask, Advise, Help' at each antenatal visit was zero, as this was a new strategy that was implemented
- Following implementation of this strategy, the percentage of women who received 'Ask, Advise, Help' at each antenatal visit gradually increased
- From January 2020, a new mean was established at 64% and this was sustained throughout the collaborative.

Measure 04: Percentage of women who have their SFH measured and plotted on a growth chart

Improving detection and management of fetal growth restriction



Numerator: Number of antenatal appointments who meet the denominator criteria where an SFH is measured and documented

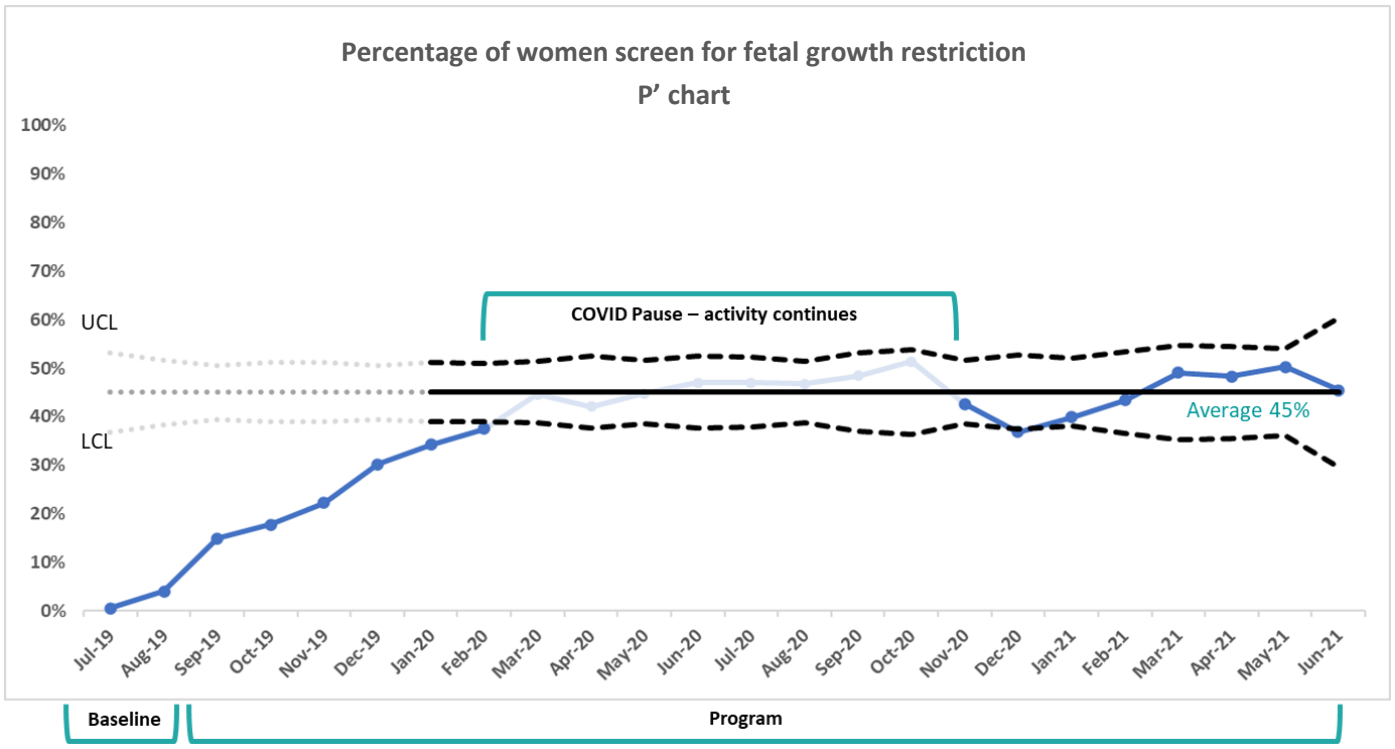
Denominator: Number of antenatal appointments for women >/= 24 weeks gestation

This graph demonstrates that:

- Pre-program (baseline), the percentage of women who had their Symphyseal Fundal Height (SFH) measured and plotted on a growth chart was zero, as this was a new strategy that was implemented
- Following implementation of this strategy, the percentage of women who had their SFH measured and plotted on a growth chart gradually increased
- From January 2020, a new mean was established at 79% and this was sustained throughout the collaborative.

Measure 05: Percentage of women screened for fetal growth restriction at each antenatal visit

Improving detection and management of fetal growth restriction



Numerator: Number of antenatal appointments at which women were screened for FGR

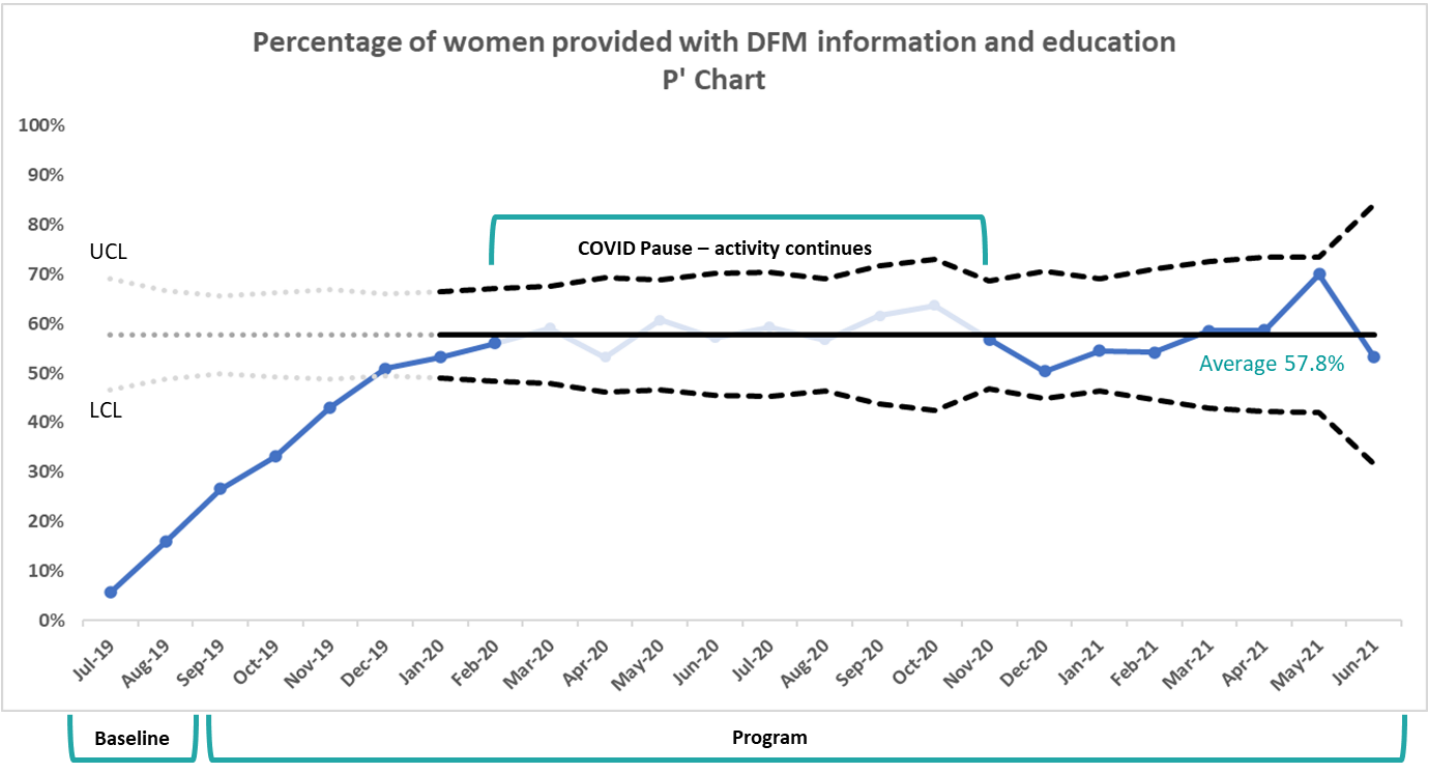
Denominator: Number of antenatal appointments

This graph demonstrates that:

- Pre-program (baseline), the percentage of women who were screened for fetal growth restriction at each antenatal visit was zero, as this was a new strategy that was implemented and a tool for screening was not being completed prior to the collaborative.
- Following implementation of this screening tool, the percentage of women screened for fetal growth restriction gradually increased.
- From January 2020, a new mean was established at 45% and this was sustained throughout the collaborative.

Measure 06: Percentage of women provided with DFM information and education from 24 to 28 weeks gestation

Improving care for women with decreased fetal movements



Numerator: Number of women who meet the denominator criteria who receive DFM information and education

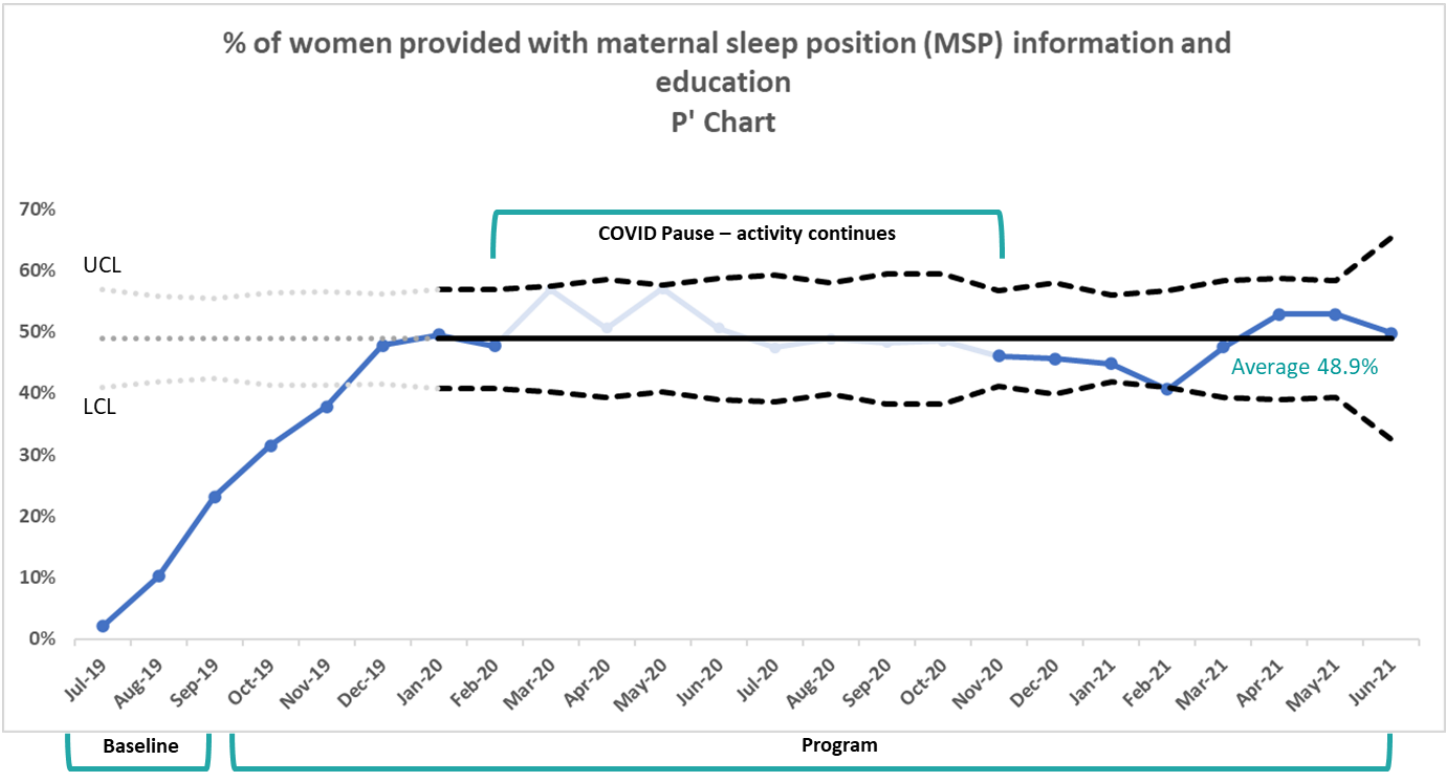
Denominator: Number of women between 24- and 28-weeks' gestation who attended at least one antenatal appointment

This graph demonstrates that:

- Pre-program (baseline), the percentage of women who were provided with DFM information and education from 24 to 28 weeks gestation was low. It is suspected that this was not well documented prior to the collaborative.
- Following implementation of the program, the percentage of women provided with DFM information and education gradually increased.
- From January 2020, a new mean was established at 57.8% and this was sustained throughout the collaborative.

Measure 07: Percentage of women provided with maternal sleep position information and education from 28 to 34 weeks gestation

Improving awareness of maternal safe sleep position in late pregnancy



Numerator: Number of women who meet the denominator criteria who receive maternal safe sleeping position information and education

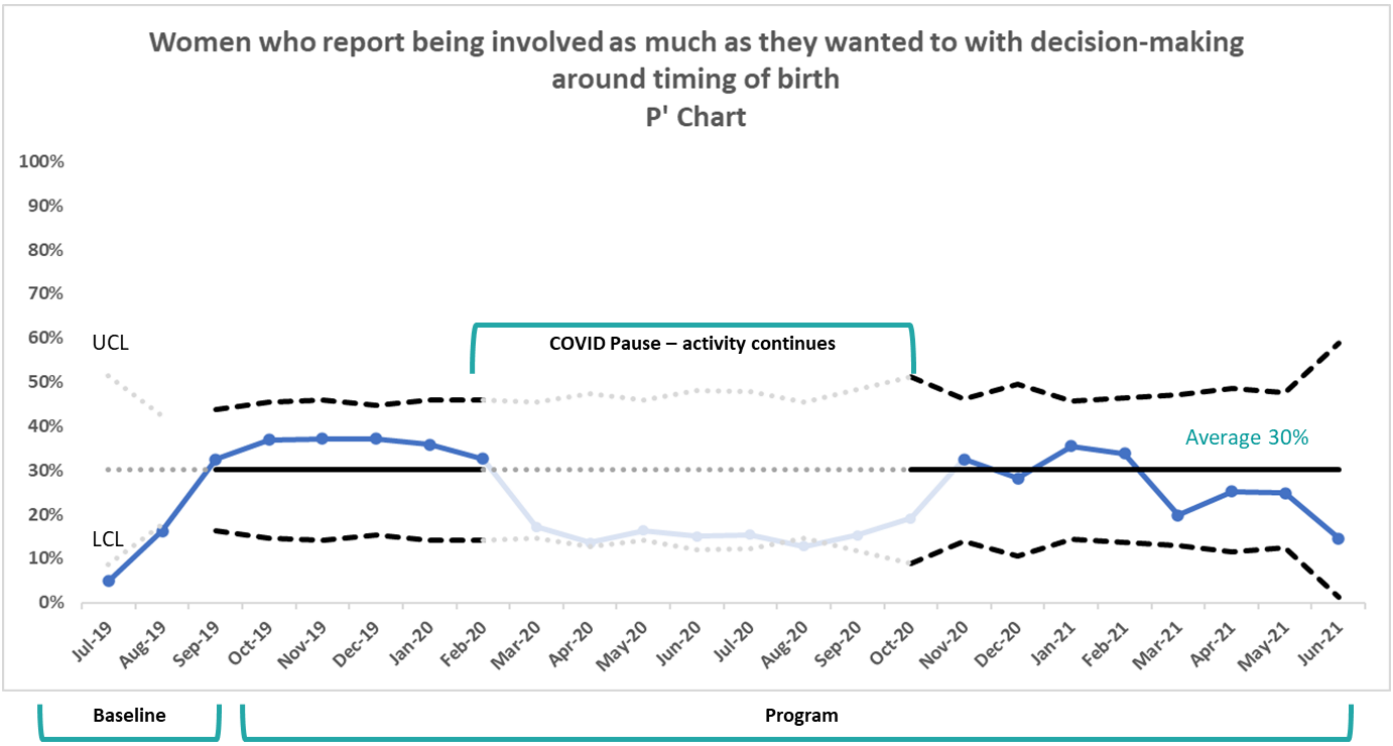
Denominator: Number of women between 28- and 34- weeks gestation who attended at least one antenatal appointment

This graph demonstrates that:

- Pre-program (baseline), the percentage of women who were provided with maternal sleep position (MSP) information and education from 28 to 34 weeks gestation was low. It is suspected that this was not well documented prior to the collaborative.
- Following implementation of the program, the percentage of women provided with MSP information and education gradually increased.
- From January 2020, a new mean was established at 48.9% and this was sustained throughout the collaborative.

Measure 08: Percentage of women who report being involved as much as they wanted to with decision-making around timing of birth

Improving shared decision-making about time of birth



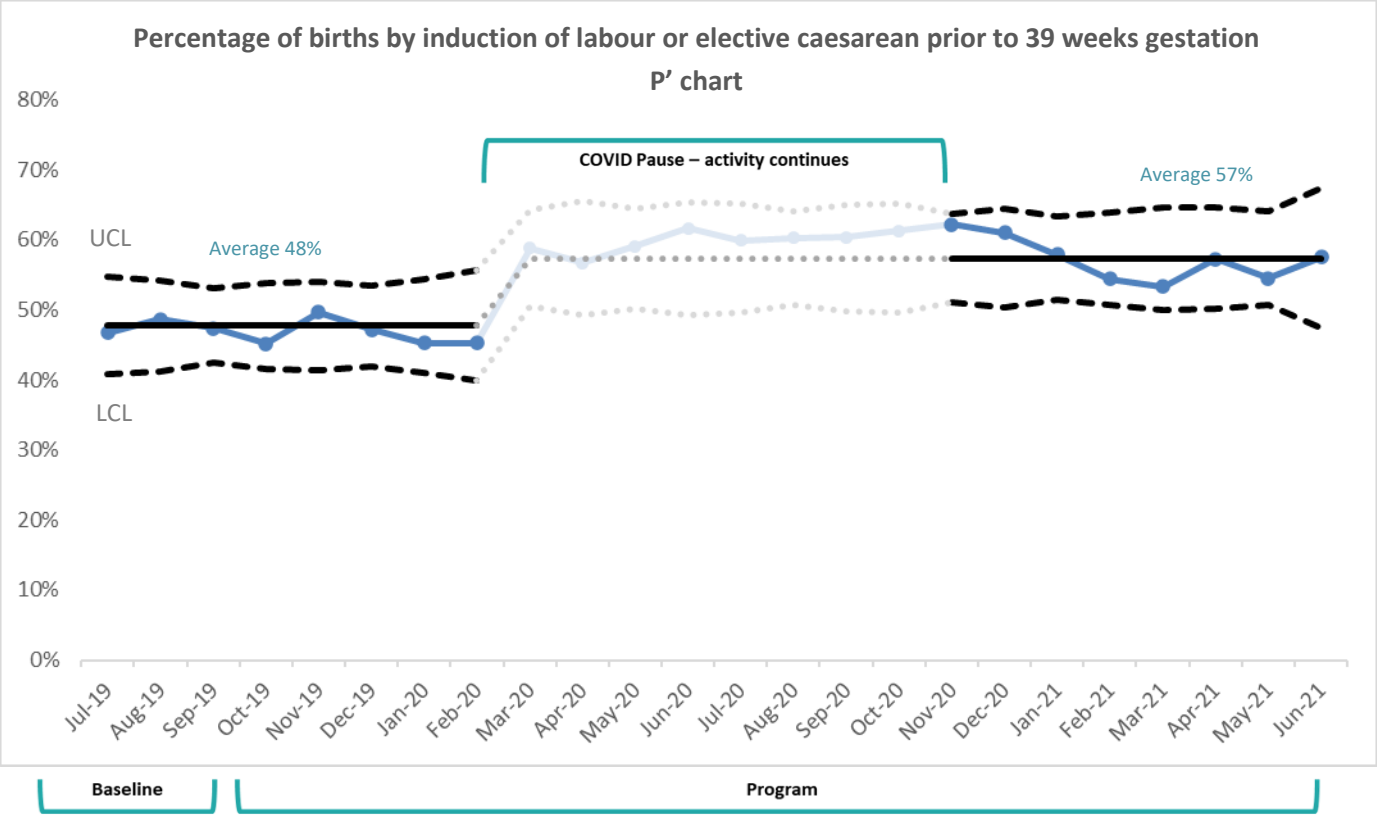
Numerator: Number of women who meet the denominator criteria and report being involved as much as they wanted to be in decision-making around the timing of birth

Denominator: Number of women who gave birth

This graph demonstrates that:

- Pre-program (baseline), the percentage of women who reported being involved as much as they wanted to with decision-making around the timing of birth was low.
- There was a rapid improvement in women who reported being involved after program implementation, followed by subsequent changes over the course of the collaborative, including a dip during COVID.
- Between September 2019 and June 2021, the established mean of was approximately 30% of women who reported being involved as much as they wanted to with decision-making around timing of birth.

Measure 9: Percentage of women who gave birth, via induction or elective caesarean section before 39.0 weeks gestation



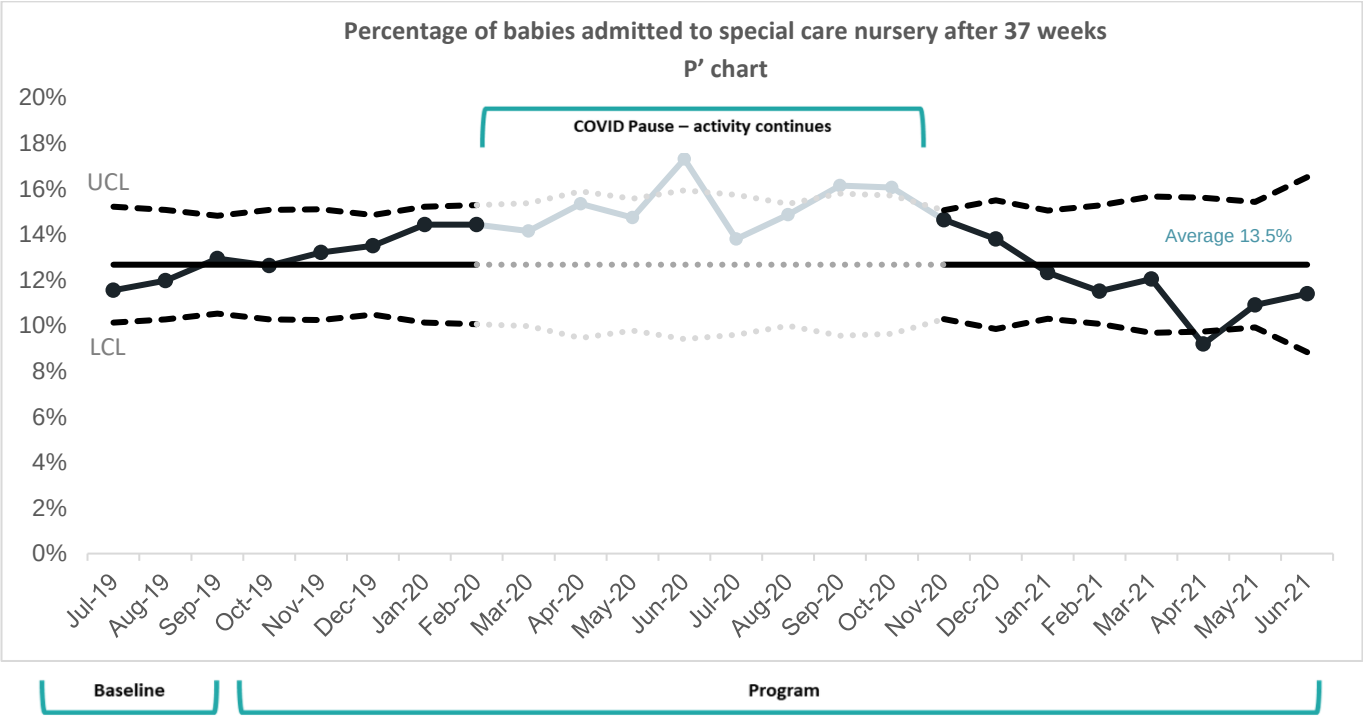
Numerator: Total number of women who have labour induced or elective caesarean before 39.0 weeks gestation

Denominator: The total number of women who gave birth before 39 weeks

This graph demonstrates that:

- Pre-program (baseline) demonstrates a steady rate of percentage of women who gave birth, via induction or caesarean section, prior to 39.0 weeks.
- There was a notable increase in the percentage of women who gave birth, via induction or caesarean section prior to 39.0 weeks during the COVID-pause between February 2020 and November 2020. This increase did not return to baseline after activity resumed.

Measure 10: Percentage of babies admitted to special care nursery after 37 weeks



Numerator: The total number of babies admitted to special care nursery from 37 weeks

Denominator: The total number of babies admitted to special care nursery

This graph demonstrates that:

- Pre-program (baseline) and Phase 1 of the Collaborative, there was a slight upward trend in the percentage of babies admitted to special care nursery (SCN) after 37 weeks
- There was some fluctuation during COVID peaking in June 2020 at 17.3%
- Between November 2020 and June 2021, there was a slight downward trend with an overall mean of 12.7%
- Overall, no significant change in SCN admissions.

Appendix 3. Driver Diagram

A driver diagram is a visual display of a team's theory of what "drives", or contributes to, the achievement of a project aim. A driver diagram shows the relationship between the overall aim of the project, the primary drivers (sometimes called "key drivers") that contribute directly to achieving the aim, the secondary drivers that are components of the primary drivers, and specific change ideas to test for each secondary driver. For further information about driver diagrams, see IHI website.

AIM What we want to achieve	PRIMARY DRIVERS Parts of the system we will influence	SECONDARY DRIVERS Where and when we will influence the system	CHANGE IDEAS How we will influence the system
By July 2021 we intend to reduce the rate of avoidable stillbirths in the third trimester by 30% in participating health services.	Partnering with women	At booking	› Discuss expected length of pregnancy with all women › Include the consumer-designed poster and sticker, outlining 5 bundle elements, in all booking packs › Include information about stillbirth risk factors (smoking, fetal growth restriction (FGR), decreased fetal movements (DFM), maternal sleep position)
		At pregnancy care appointments	› Discuss stillbirth risk factors (smoking, FGR, DFM, maternal sleep position) at every visit › Share links to the Stillbirth CRE Safer Baby Bundle consumer site ***Bundle element 3: Management of decreased fetal movements*** › Share the 'Movements matter' resources with every woman ***Bundle element 4: Promoting optimal maternal sleep position*** › Share the 'Sleep on side' video and resources with every woman › Ask every woman about sleep position, during pregnancy care appointments in the third trimester
		When planning for timing of birth	***Bundle element 5: Shared decision-making around timing of birth*** › Use shared decision-making tools to guide and document discussions › Share the 'Every week counts' resource with all women › Screen for stillbirth risk at term
	Application of the bundle elements	Routine professional development	› Incorporate education and training on the five clinical interventions, shared decision making and providing informed consent › Create training videos for the five clinical interventions › Introduce daily SBC huddles in antenatal clinic, to gather feedback and share information › Incorporate teach-back skills › Identify opportunities for in-the-moment teaching, reflection and clinical reasoning development
		Every episode of care	***Bundle element 1: Promoting smoking cessation*** › Screen for smoking behaviours using the Ask, Advise, Help brief advice intervention › Refer to Quit services › Include partners and other family members in screening and referral › Share information with GPs ***Bundle element 2: Detection and management of fetal growth restriction (FGR)*** › Screen all women for their risk of FGR › Use a consistent technique for measuring symphyseal fundal height (SFH) › Plot symphyseal fundal height (SFH) and estimated fetal weight (EFW) on growth charts
		When reported	***Bundle element 3: Management of decreased fetal movements*** › Assess all women who report DFM as soon as possible