



University of
South Australia

Sleep position and stillbirth risk

Associate Professor Jane Warland

Common Risk factors for stillbirth

At Booking

- Age (young and older)
- Ethnicity (Indigenous, south Asian)
- Nulliparity and parity >4
- Lifestyle factors (smoking , recreational drug, substance)
- Increasing BMI
- Previous stillbirth
- Assisted reproduction
- Pre-existing Medical conditions
- Low SES

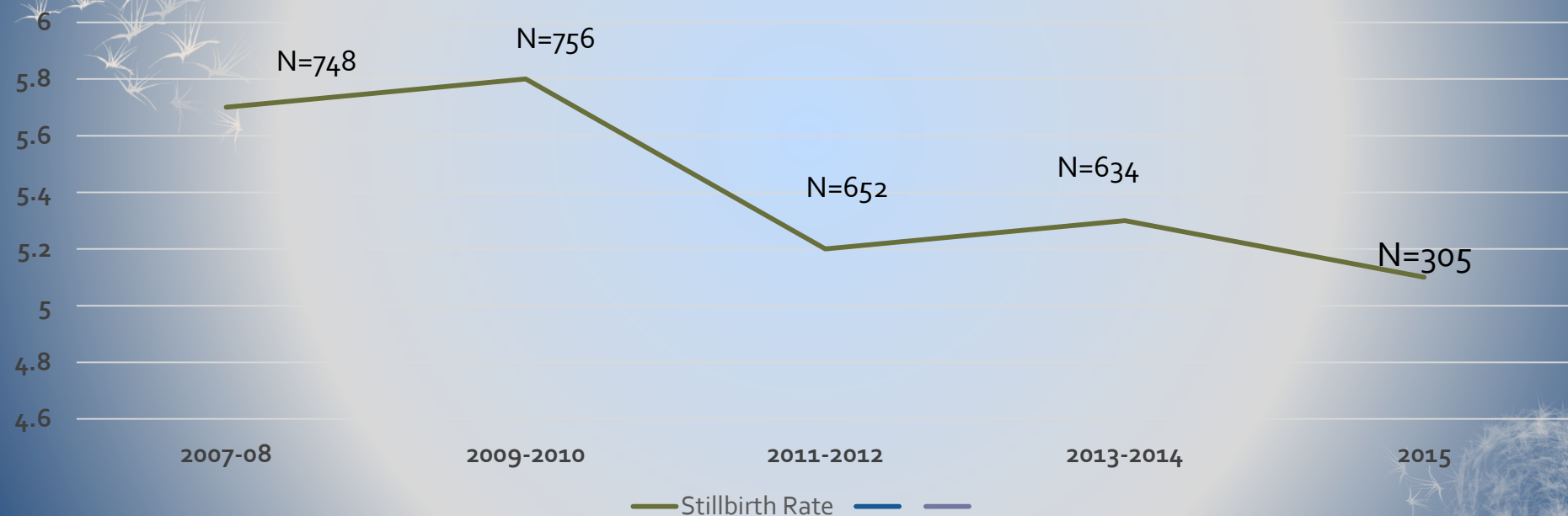
During pregnancy

- Hypertension and Diabetes
- Fetal Growth Restriction
- Altered Fetal Movement
- No antenatal care
- Post term pregnancy
- Few of these are amenable to modification especially once pregnant

Sleep and Pregnancy: Why might it matter?

- Humans spend approximately one third of their life asleep
- Some events occurring during sleep are known to be associated with adverse health outcomes esp. sleep disturbance, sleep quality and sleep disordered breathing

What happened in New Zealand in 2011?



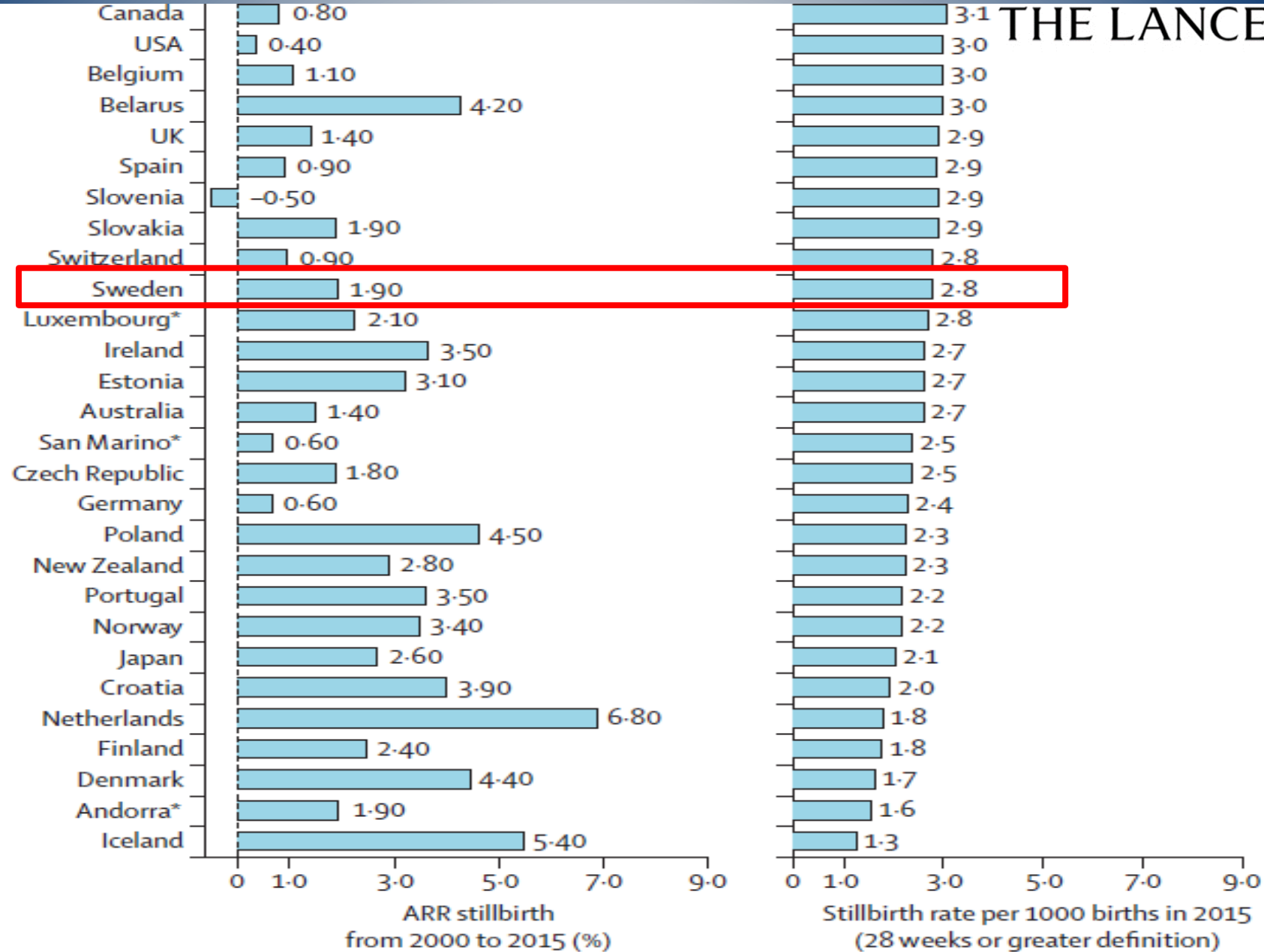


Figure 1: Present stillbirth rates and reductions since 2000 in high-income countries

ARR=annual rate reduction. *Countries with less than 5000 annual births.

Association between maternal sleep practices and risk of late stillbirth: a case-control study

Tomasina Stacey, midwifery lecturer, PhD student,¹ John M D Thompson, midwifery lecturer,² Ed A Mitchell, professor of child health research,² Alec I Fekoma, senior lecturer, obstetrics and gynaecology,¹ M Zuccollo, senior lecturer, perinatal medicine,¹ and the Auckland Stillbirth Study Group, ¹University of Auckland, Auckland, New Zealand

Stillbirth study suggests sleep position important

7:01 pm on 15 June 2011

Share this      

Could Sleeping on Left Side Help Prevent Stillbirth?
Study finds higher rates of this tragic outcome when women slept on back or right side
June 15, 2011, at 6:00 a.m.

NEWS

Expecting? Sleep on your left -- just in case

Alok Jha 15 Jul 2011 17:15

COMMENTS

Left-Sided Sleep May Cut Risk of Stillbirth
— Pregnant women who sleep on their left side may be decreasing their risk of delivering a stillborn child, a retrospective case-control study suggested.
by Nancy Walsh, Staff Writer, MeUpPage Today
June 14, 2011

PREGNANCY
Sleeping Position in Pregnancy Linked With Stillbirth Risk
By Tara Trehan - June 17, 2011
As case expectant mothers didn't have enough to worry about, researchers at the University of Auckland have found a link between sleep positions in the final hours of pregnancy and the risk of late stillbirths.

THE UNIVERSITY OF AUCKLAND
MEDICAL AND HEALTH SCIENCES
Sleep position in late pregnancy could decrease risk of late stillbirth
15 June 2011
Women who go to sleep on their left side on the last night of their pregnancy have a halved risk of late stillbirth compared with women who do not according to findings from The University of Auckland published on bmj.com today.

THE CONVERSATION
Academic rigor, journalistic flair
Arts - Culture - Economy - Business - Education - Environment - Energy - Ethics - Religion - Health - Medicine - Politics - Society - Science - Technology
Sleeping on left side may halve risk of stillbirth
June 14, 2011 7:20pm EDT

Proceedings of the Stillbirth Summit 2014

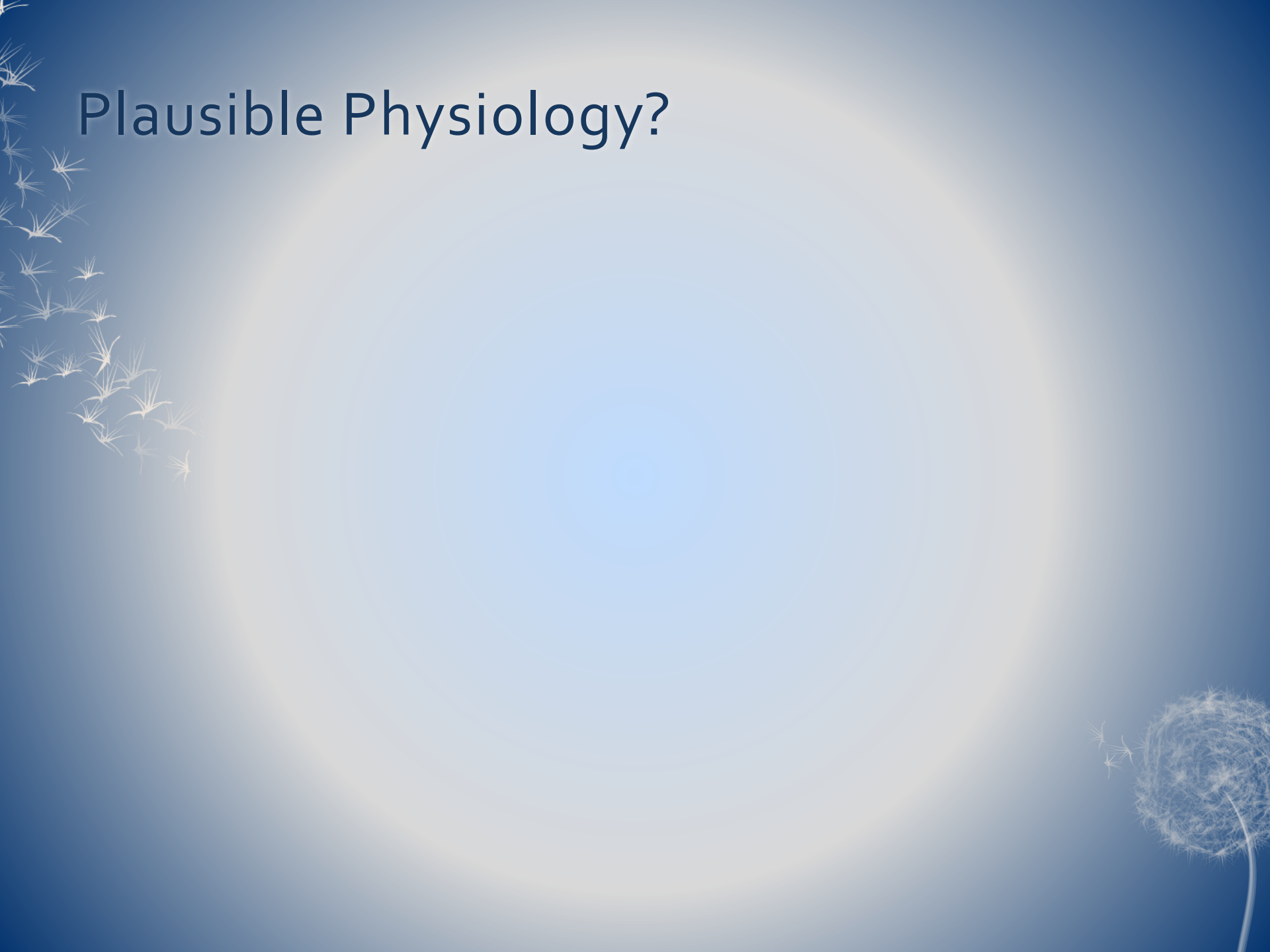
Medina, MN, USA. 19-21 June 2014

Published: 15 April 2015

These abstracts are available online at <http://www.biomedcentral.com/bmcpregnancychildbirth/supplements/15/S1>

- ✿ *Despite urging caution, midwives appear to have accepted the findings and are advising their patients to sleep on the left side.*
- ✿ This has resulted in a significant increase in left sided sleep position, from 35.9% in the Auckland stillbirth study (2006-9) to 62.5% in late 2011 (unpublished Findings).
- ✿ This has been associated with a reduction in late stillbirth for New Zealand
- ✿ Although we cannot exclude other reasons for the decline, it is tempting to believe that the decline is a consequence of more pregnant women sleeping on their left. (Mitchell 2014)

Plausible Physiology?



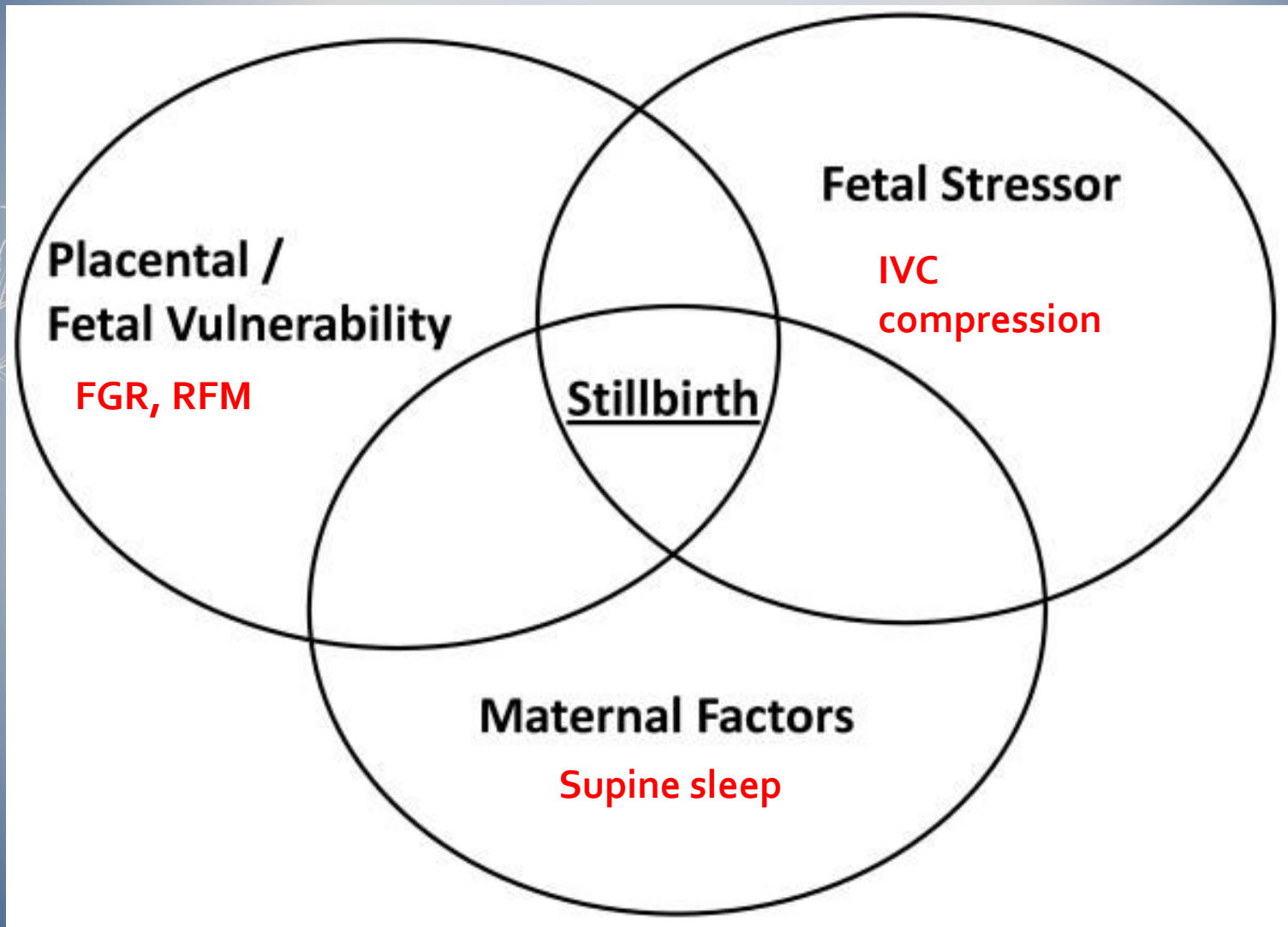
IVC
compression

Physiology

Clinical
experience

Routine
practice

Triple risk in pregnancy



Research to date

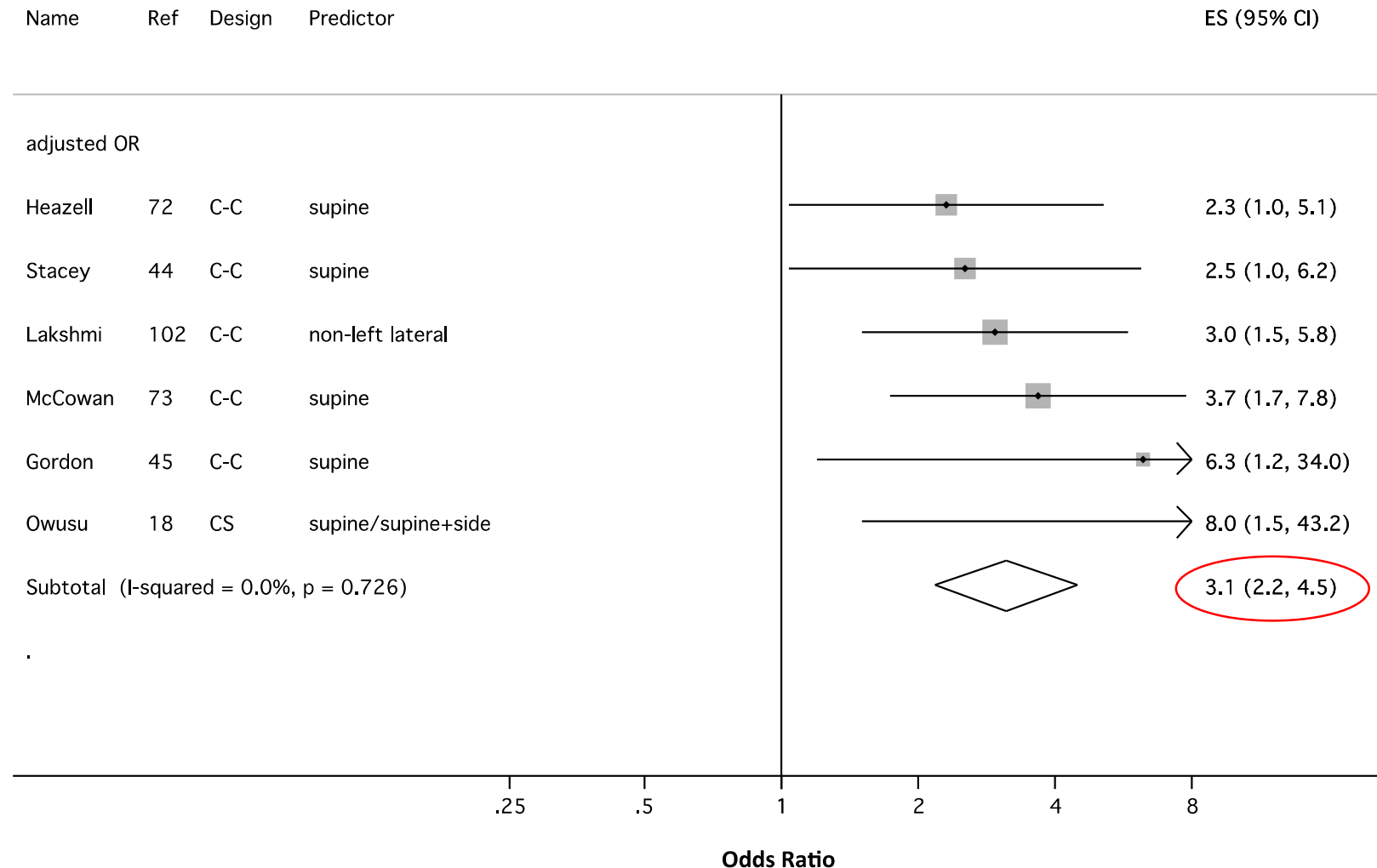


Current Primary Research: position

Authors	Country	Method	OR	PAR
Stacey et al 2011	NZ	Case Control 155/310	aOR = 2.54, 95% CI: 1.04–6.18, and p = 0.005.	PAR for non-left-sided sleep position night before for stillbirth to be 37%.
Owusu et al 2013	Ghana	Cross sectional 220	aOR = 8.0, 95% CI: 1.5-43.2, and p = 0.016).	PAR of 'typical' supine sleep position for stillbirth was 25%.
Gordon et al 2015	Australia	Case-Control 103/192	aOR = 6.26, 95% CI: 1.2-34	The PAR for self-reported supine sleep position in last month of pregnancy was 9.88%.
Lakshmi et al 2017	India	Case-control 100/200	OR 2.27 (1.37-3.75)	Not reported
McCowan et al 2017	NZ	Case-Control 164/569	aOR 3.67, 95% CI 1.74-7.78.	The PAR of supine sleep position for late stillbirth was 9.4%.
Heazell et al 2017	UK	Case-Control 297/ 742	aOR 2.31, 95% CI 1.04-5.11	The PAR of supine going to sleep position 3.7%
O'Brien et al Under review	Internet	Case-Control 153 /480	n.s.	N/A

Lit review with meta-analysis

Sleep Position and Stillbirth



PROSPERO International prospective register of systematic reviews

Collaborative IPD analysis of maternal sleep position and late stillbirth (greater than or equal to 28 weeks of gestation)

Minglan Li, Lesley McCowan, Robin Cronin, John Thompson, Edwin Mitchell, Vicki Culling, Lisa Askie, Adrienne Gordon, Camille Raynes-Greenow, Victoria Bowring, Alexander Heazell, Tomasina Stacey

✿ Individual participant Data (IPD) meta-analysis of:

- ✿ NZ (TASS) 155 cases, 310 control
- ✿ Australia (SSS) 103, 192 controls
- ✿ NZ (MCSS) 164 cases, 569 controls
- ✿ UK (MINESS) 297 cases, 742 controls
- ✿ International (STARS) 153 cases and 480 controls

CRIBBS

- ✱ Going to sleep in the supine position compared with all other positions is associated with a pooled odds ratio OR of 2.59 (95% CI 1.76- 3.80) I^2 of 0

Current Research: understanding the physiological mechanism



Research Paper

Effect of maternal position on fetal behavioural state and heart rate variability in healthy late gestation pregnancy

Peter R. Stone , Wendy Burgess, Jordan P. R. McIntyre, Alistair J. Gunn, Christopher A. Lear, Laura Bennet, Edwin A. Mitchell, John M. D. Thompson, the Maternal Sleep In Pregnancy Research Group, The University of Auckland

First published: 11 December 2016 [Full publication history](#)

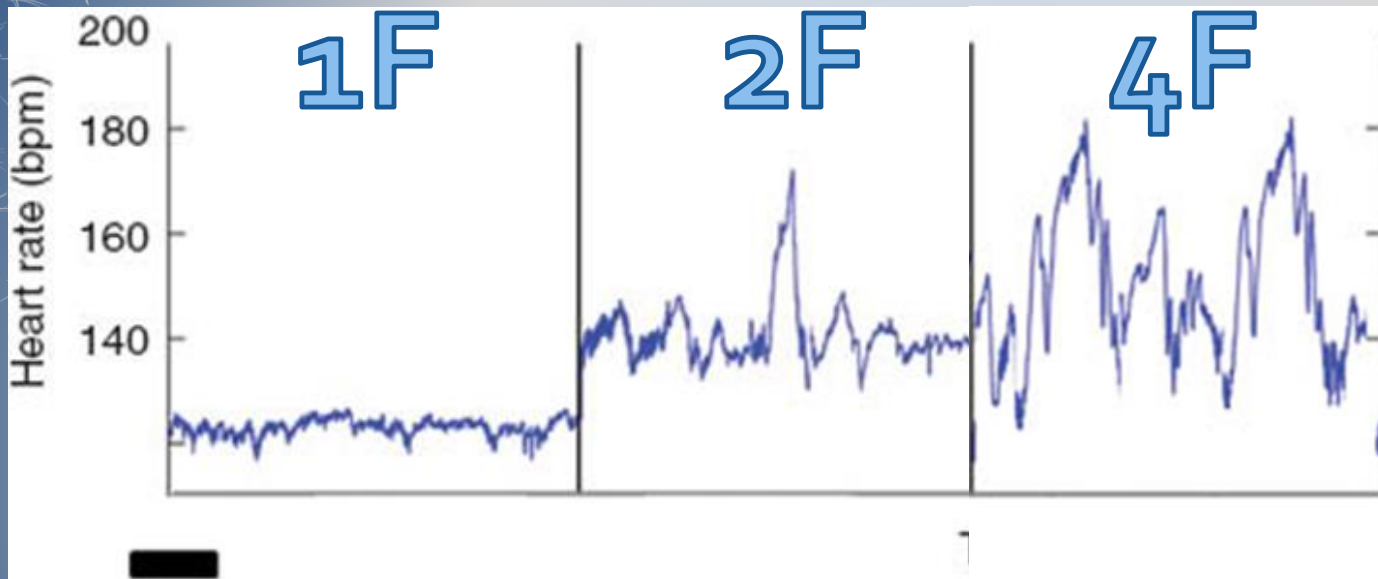
DOI: [10.1113/JP273201](https://doi.org/10.1113/JP273201) [View/save citation](#)



[View issue TOC](#)
Volume 595, Issue 4
15 February 2017
Pages 1213-1221
or
[Browse Virtual Issue](#)

- 29 healthy singleton pregnancies
- 35-38 weeks
- 4 positions: supine, right, left lateral (30° tilt), & semi-recumbent
- FHR via AN24

Fetal Behavioural State: FBS



State/fHRP	1F/fHRP1 quiet sleep	2F/fHRP2 active sleep	4F/fHRP4 active awake
Original criteria	<ul style="list-style-type: none"> • Quiescence which can be regularly interrupted by brief body movements (startles) • Stable heart rate, small oscillation • Isolated accelerations occur strictly related to movement 	<ul style="list-style-type: none"> • Frequent gross body movement Heart rate with wider bandwidth than 1F • Frequent accelerations during movement 	<ul style="list-style-type: none"> • Vigorous activity with many trunk rotations • Unstable heart rate • Large and long lasting accelerations fused into sustained tachycardia
Criteria for automatic state detection			
Baseline	<160 bpm	<160 bpm	>160 bpm possible
Oscillation bandwidth	<±7.5 bpm	±7.5–±15 bpm	>±15 bpm
Accelerations	No	>15 bpm/>15 s	>30 bpm/>30 s
Movement	No	Yes	Yes

FBS in according to maternal position when awake

	1F	2F	4F
Left	11.3	79.1	9.6
Right	22.0	71.7	6.3
Semi-recumbent	16.7	81.9	1.5
Supine	34.4	63.4	2.3
Chi-Sq: 32.2 (p<0.0001)			

- 46% of all 4F in left-lateral,
- 41% of all 1F in supine
- Intra-observer Kappa 0.8

FBS in according to maternal position when asleep

Variable	1F	2F	4F
Left	13.4	82.2	4.4
Right	11.3	83.5	5.2
Supine	14.0	85.2	0.8
Chi-Sq: 81.53 (p<0.0001)			

- 4F occurred almost exclusively when mother was on her side,
- 1F was more common when mother was supine (OR 1.30, 95% CI, 1.11-1.52)

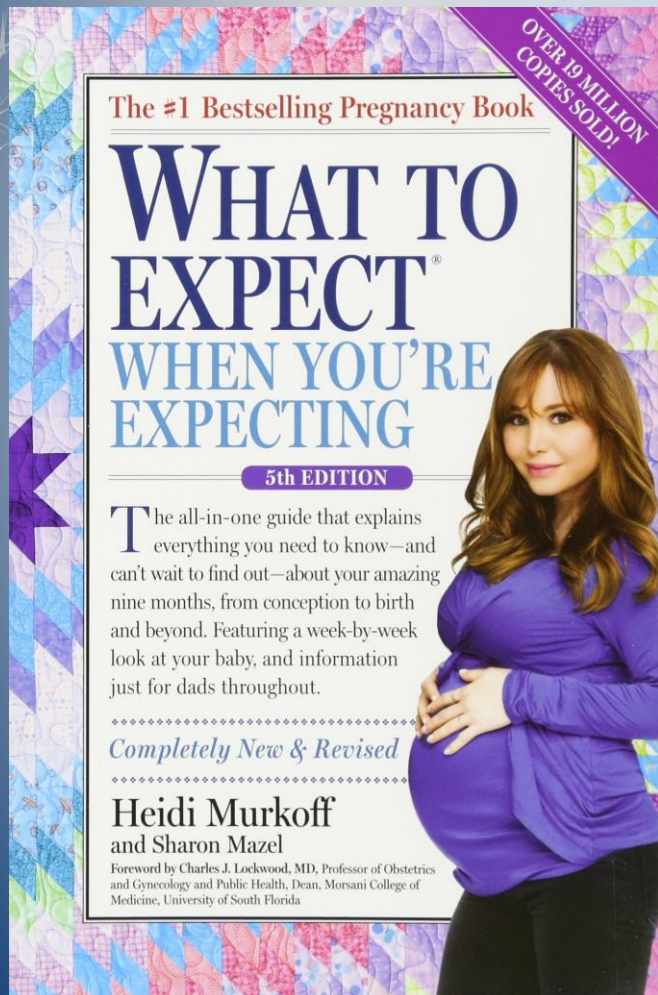
How do we bring this into practice?

Practice



Research

Should we tell women not to settle to sleep on their back?.



“Curling up or stretching out on your side – preferably the left side, though either side is fine—...is ideal for both you and your fetus. It not only allows maximum flow of blood and nutrients to the placenta but also enhances efficient kidney function, ...” [15 p.247].

Public awareness campaigns

Tommy's

 **I need urgent advice**

Our organisation
saving babies' lives

Pregnancy information
from our midwives

Search



Basket

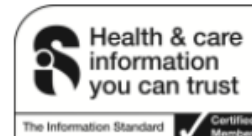


Log in

[About us](#) [Getting pregnant](#) [I'm pregnant](#) [Symptom checker](#) [Labour & birth](#) [Pregnancy complications](#) [For health professionals](#)



Call our free PregnancyLine 0800 0147 800 Open 9-5, Monday to Friday



[Pregnancy information](#) » [I'm pregnant](#) » [Pregnancy calendar](#) » [Third trimester - weeks 29 to 40](#) » [Safest sleep position in pregnancy](#)

Safest sleep position in pregnancy

In the third trimester of pregnancy going to sleep on your side has been shown to help prevent late stillbirth

Share      [Print this page](#) 

In the third trimester our advice is to go sleep on your side because research has shown that this is safer for baby. This includes night sleep and day time naps.

<https://www.tommys.org/pregnancy-information/sleep-side-pregnancy-campaign>

Tips for helping a woman sleep on her side in late pregnancy

- ✿ Put pillows behind her back to reduce falling on her back and between knees for comfort. It won't prevent being on your back for certain but is likely to make it more uncomfortable.
- ✿ If she has long hair, try tying it in a low bun, which may make it uncomfortable to sleep on her back for any length of time.
- ✿ If she wakes up for any reason during the night, don't worry about being on back but go back to sleep on her side.
- ✿ If she naps during the day pay the same attention to sleep position during the day as she would during the night.
- ✿ For women with pain on side sleeping the important thing is that she is not lying flat on her back as this is what the research is related to.

Keep your baby safe in pregnancy - poster

A3 poster about two of the most important things for women to remember in the third trimester, monitoring fetal movements and going to sleep on your side.

Share      Print this page 



Free

Quantity

1


Add to basket

[view your basket](#)

A3 poster for GP surgeries, antenatal clinics and so on. Covers two of the most important things to remember in the third trimester - monitoring fetal movements and going to sleep on your side.

Global Alliance-Awareness for stillbirth prevention (GAASP)

FOR FAMILIES FOR HEALTH PROFESSIONALS ABOUT US



STAR LEGACY FOUNDATION

GET INVOLVED WHAT WE DO EVENTS OUR STARS BLOG

FISCALLY SPONSORED PROJECTS


- [- Learn More: Safe Sleep Research](#)
- [- FAQ](#)
- [- Blog: Side Sleep – What Does It Mean?](#)

SAFE SLEEP IN PREGNANCY

Star Legacy Foundation is honored to be partnering with [Tommy's](#) in the UK and [Still Aware](#) in Australia for the #SleepOnSide campaign to educate expectant mothers and health professionals across the globe about safe sleep during pregnancy. There are now [4 studies](#) from around the world that have had the same finding: **women who sleep on their backs during the 3rd trimester have a higher rate of stillbirth than women who sleep on their sides.**


Research will never provide a perfect answer for all situations, and #SleepOnSide is not a 'magic bullet' that will end all stillbirths. But, there is much we can learn from the data in these studies. For more information, please visit our [Sleep Research Studies](#) page and [Sleep FAQs](#), and read our Executive Director Lindsey Wimmer's [blog post](#) about safe sleep practices. Still have questions? Please feel free to [contact us](#).

Help us share the new PSA video, research overview video, and infographic published about this topic:




Safe Sleep in Pregnancy-USA

0:51



The research behind #SleepOnSide

4:58



SAFE PREGNANCY

Information to help
keep baby safe in pregnancy.



**STILL
AWARE**
stillaware.org

STICK ME ON YOUR FRIDGE, AS YOUR DAILY SAFE PREGNANCY REMINDER

SIDE TO SLEEP

WHY?

When you are pregnant sleeping on your side helps oxygen reach you and your growing baby. **Sleeping on your back can put pressure on blood flow and oxygen to you and your baby's placenta.**



WHEN?

From about 28 weeks pregnant, you should start to go to sleep on your side. **You may like to use a sleeping aid or pregnancy pillow to help you stay on your side while asleep.**



WHAT IF?

If you wake up on your back in the night, just rollover onto your side. If you get up in the night settle to sleep on your side again. **Falling asleep on your side, helps you stay on your side for the deepest and often longest part of your sleep.**



CALL?

At anytime in your pregnancy, if you feel strange or uneasy in anyway or worried about you and your baby, call your care provider for a check-up. Your baby's link to the outside world is you. **DON'T WAIT**



If you get hip pain or can't sleep on your side, it is still suggested that you avoid sleeping FLAT on your back. You may like to try a wedge under your mattress or right side to achieve a pelvic tilt while you sleep.

MOVEMENTS MATTER

WHAT'S NORMAL?

There is no set number of normal movements. Your baby will have their own pattern of movements that you can get to know. **From 16-24 weeks on you'll feel the baby move more and more up until 32 weeks then stay about the same until you give birth.**



MYTHS?

- It is **NOT TRUE** that babies move less towards the end of pregnancy.
- You should feel baby move right up to the moment you go into labour & during labour too.



WHY?

A reduction or a sudden increase in a baby's movements can sometimes be an important warning sign that a baby is unwell. **Around half of women who had a stillbirth noticed their baby's movements had slowed down or stopped.**



CALL?

If you think your baby's movements have slowed down, stopped or changed in a way that worries you, contact your midwife or maternity unit immediately they need to know! **DON'T WAIT**



Most women usually begin to feel their baby move between 15 and 24 weeks of pregnancy. A baby's movements can be described as anything from a kick, flutter, swish or roll. The type of movement may change as your pregnancy progresses.

What are maternity care providers (MCPs) doing?

Practice



Research

The study

- ★ Australian Maternity care providers (MCPs)
- ★ 110 Responses
- ★ 93 Midwives 13 Obs and 3 GPs

Q: Do you currently give pregnant women advice regarding sleep position and pregnancy?



What advice do you give?

Blood and Oxygen

Sleep on Left Side

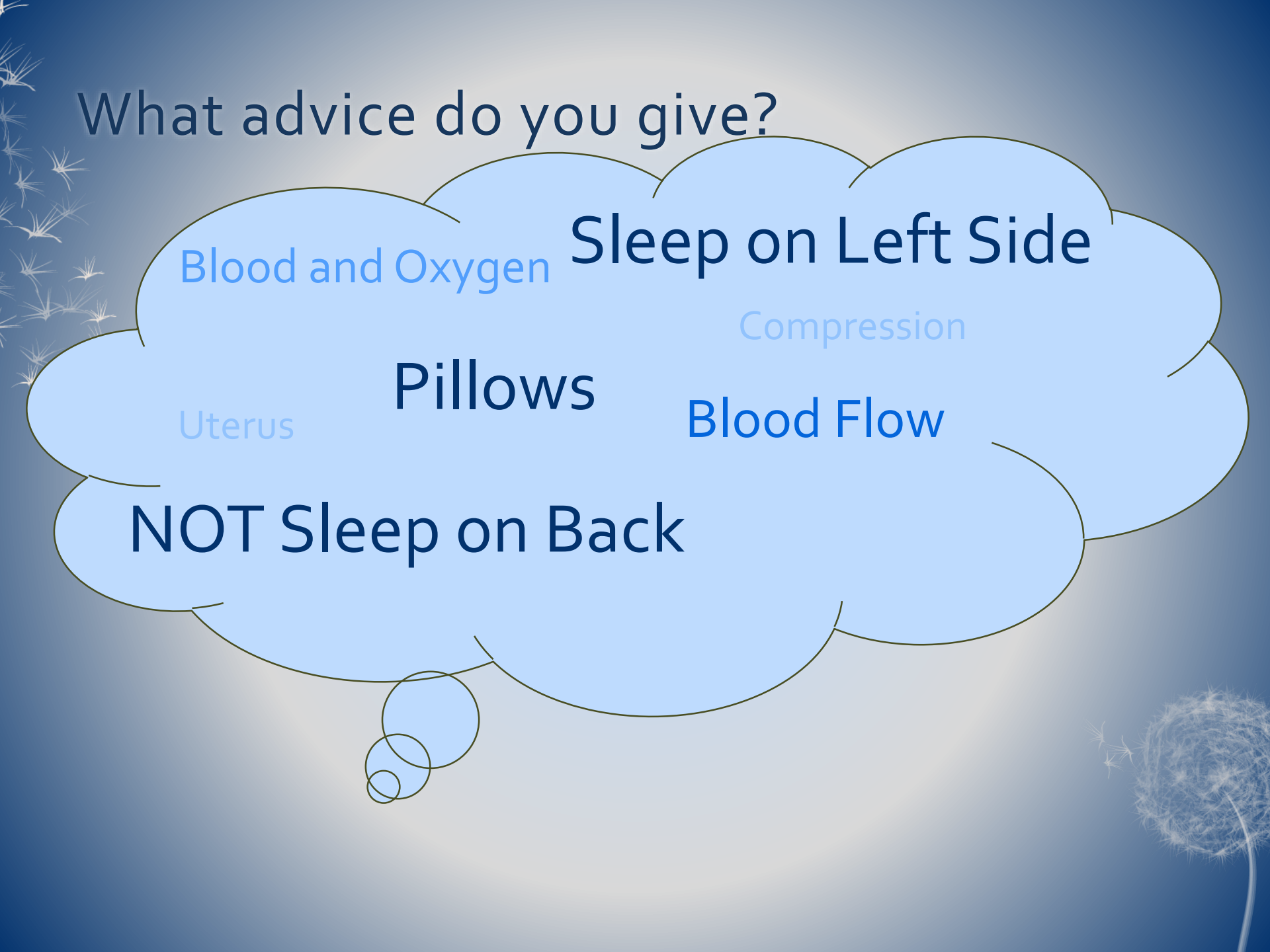
Compression

Pillows

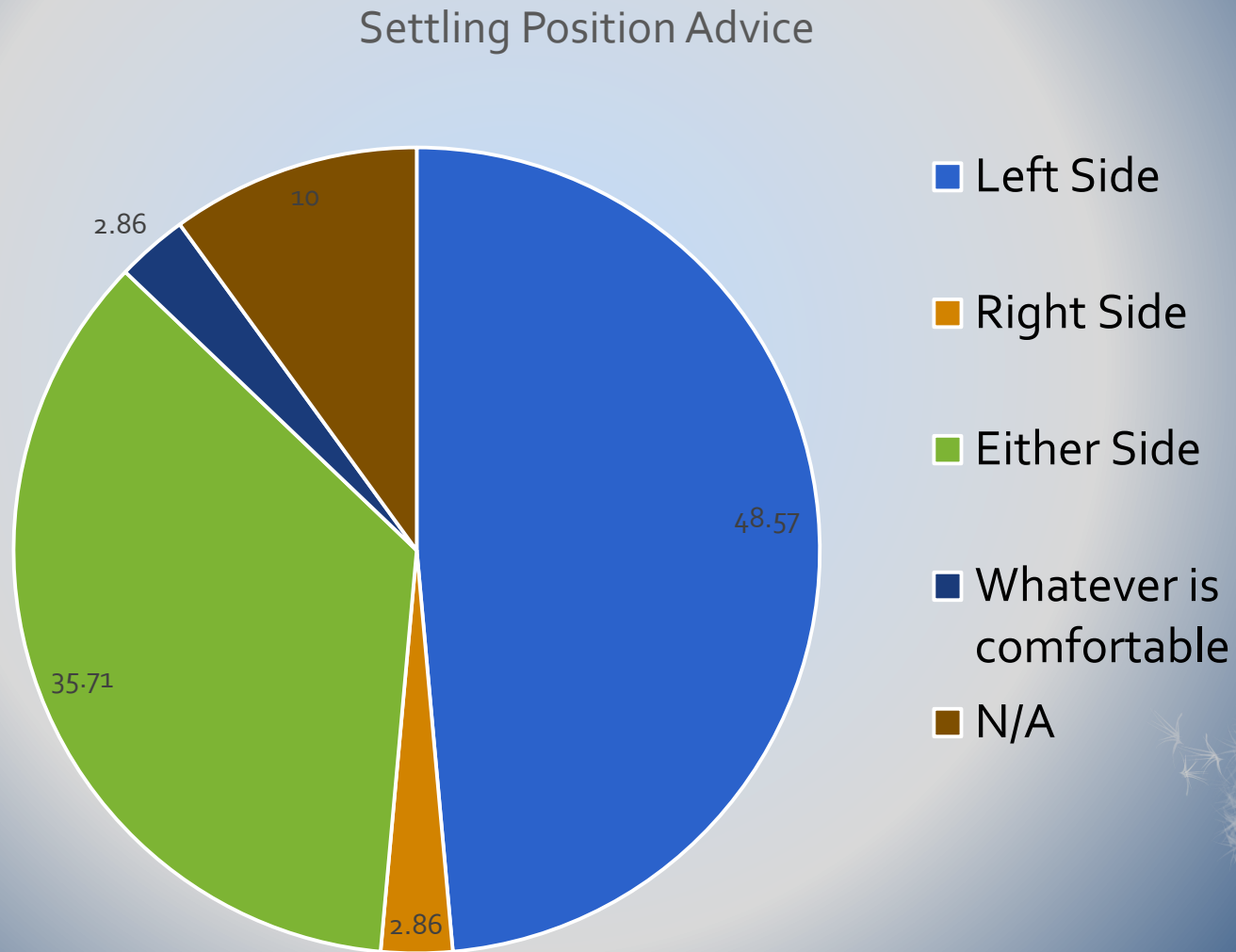
Uterus

Blood Flow

NOT Sleep on Back



Q: What position do you advise women to settle to sleep in?



When do you suggest she start changing her sleep position?

SUGGESTED CHANGE TIME

FROM BEGINNING

30 %

FROM 20 WKS

5.72 %

FROM 28 WKS

42.86 %

LAST FEW WEEKS

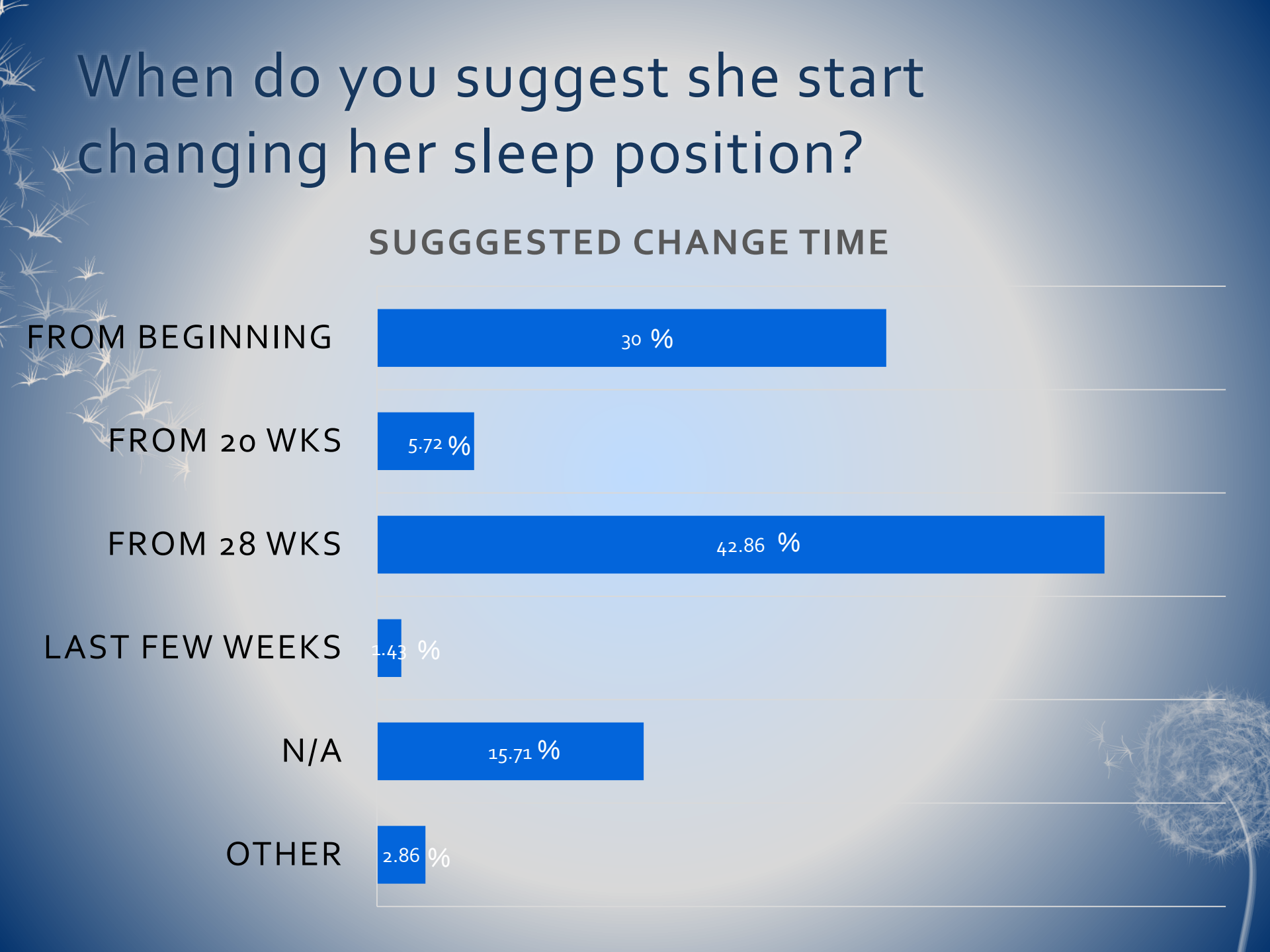
1.43 %

N/A

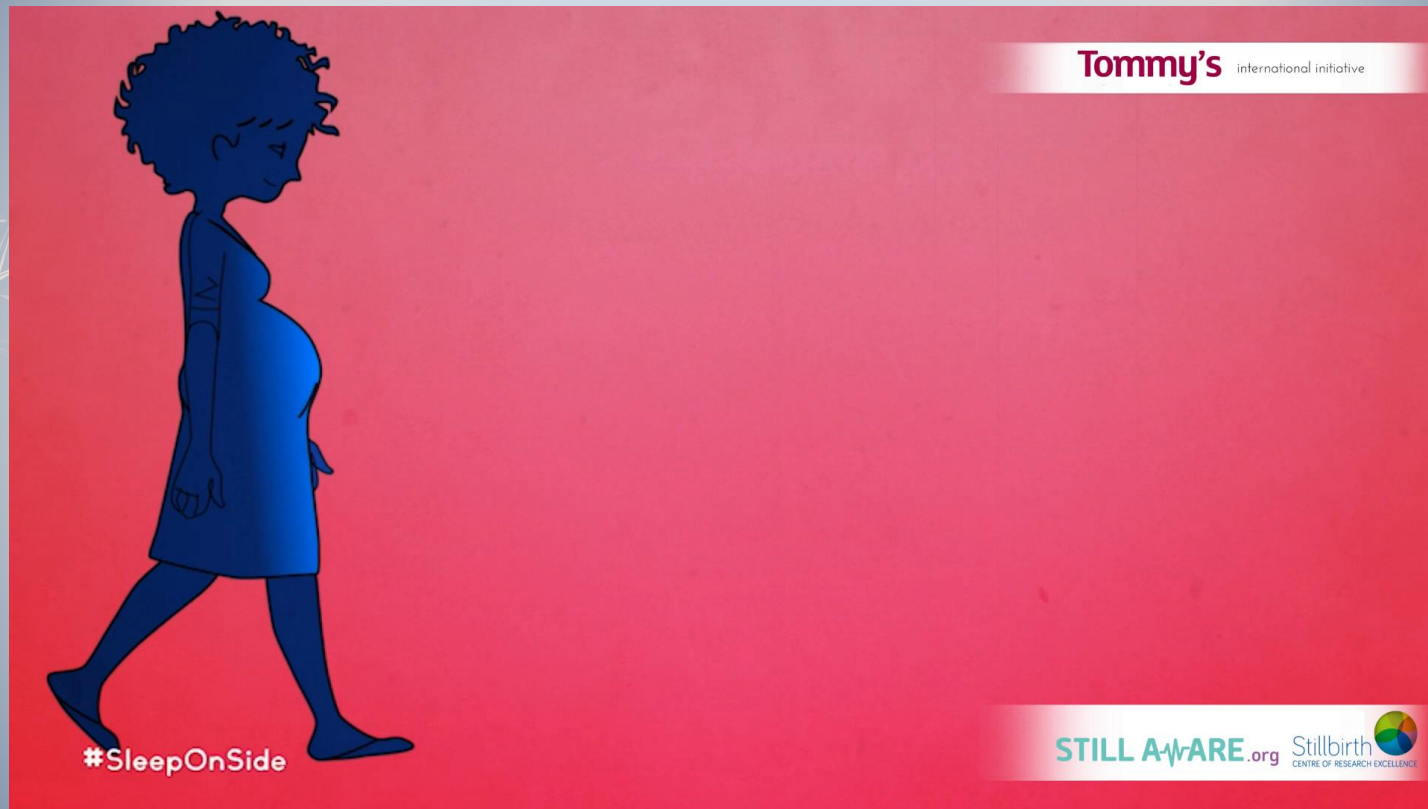
15.71 %

OTHER

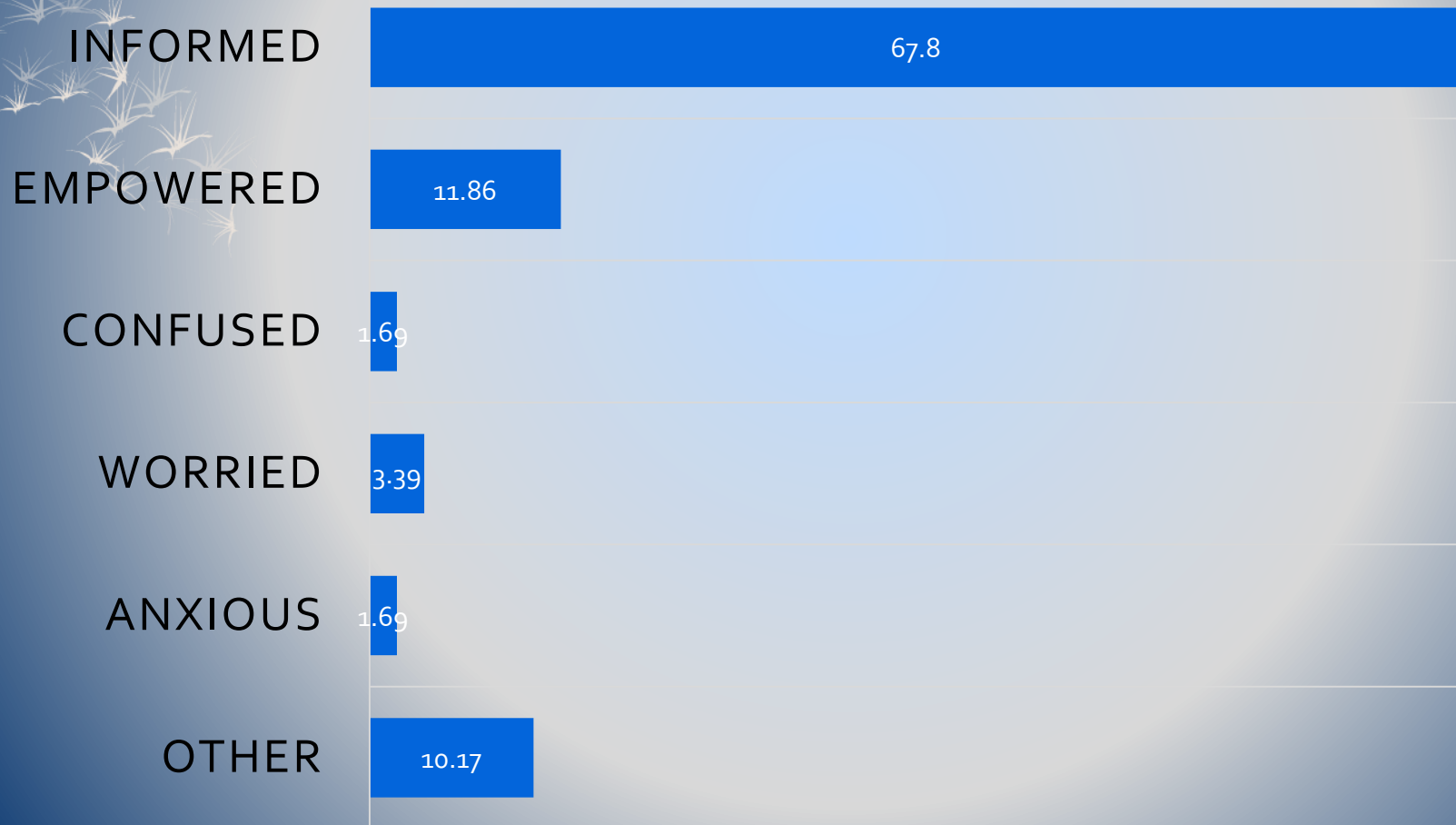
2.86 %



Q: Jenny is in the last three months of her very first pregnancy. After watching this video what do you think Jenny's strongest feeling would be?



STRONGEST FEELING



Jenny comes to see you for her next antenatal visit and mentions she has seen the video and is now trying to settle to sleep on her side. Please outline what your response to Jenny might be?

Good Choice

That's Great

Pillow

Don't worry if you wake up on
your back

Encourage

Good Work

Care providers educating pregnant women



- ✿ Say something like:
- ✿ *Recent research is showing that settling to sleep on your back is not best for baby. I'd like you to try to settle to sleep on your side. Don't worry if you wake up in the middle of the night on your back, that's normal, just settle back to sleep on your side?*

Recommendation

- A consensus guideline to provide a standardised, evidenced based approach to MCP information about what is currently known about sleep position and stillbirth risk seems warranted.



Remaining Questions:



How much?

- How much supine sleep is needed to cause harm ?
- ✕ We don't know and may never know so best to avoid

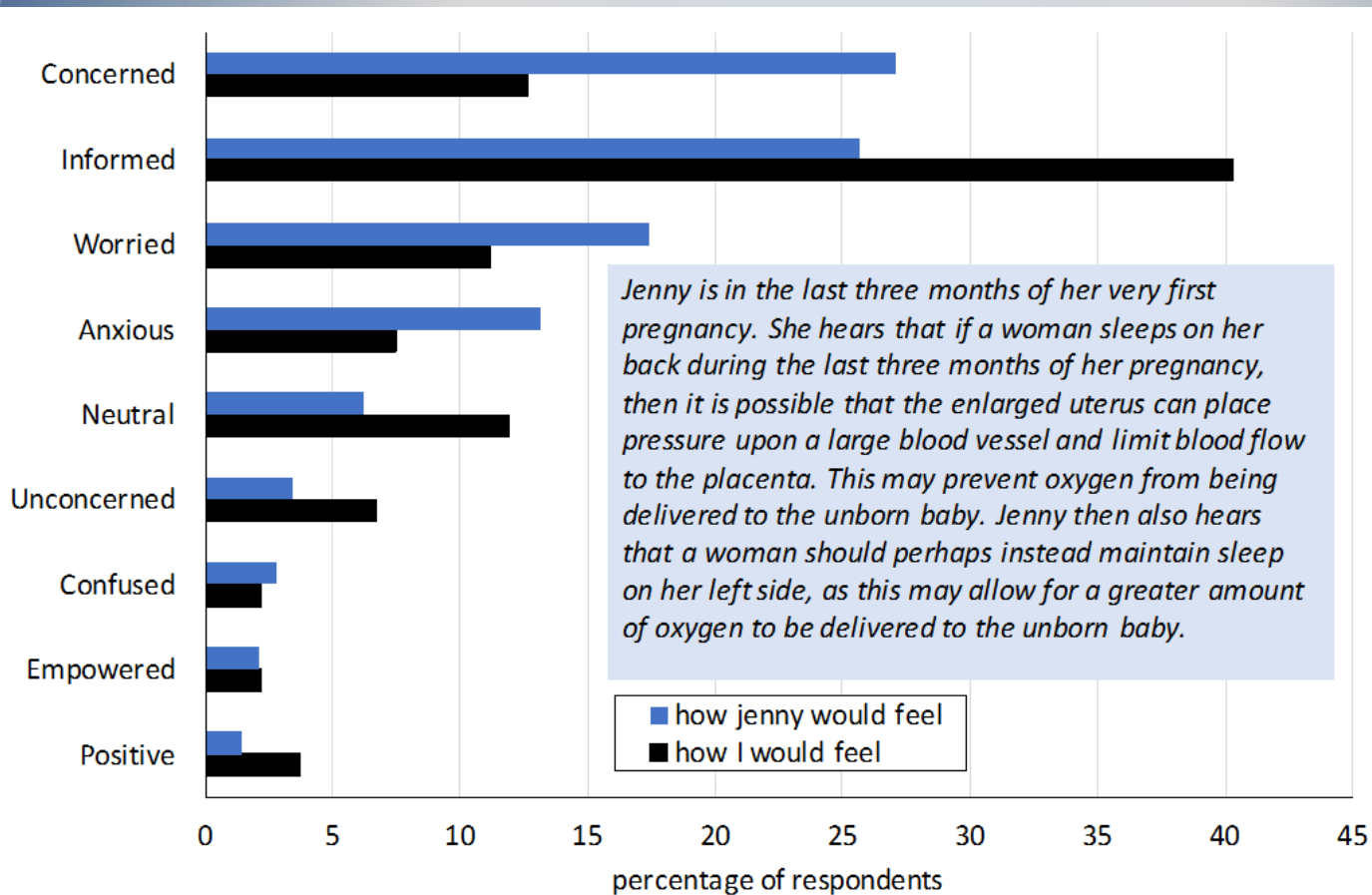
Who do we tell?

Everyone....irrespective of
perceived riskjust like SIDS
safe sleep messaging

Wont we make women anxious

- Online survey of 537 women, analyses are presented of 176 women who reported being currently pregnant (mean age=27.9, SD=5.5y). For 37%, this was their first pregnancy.
- Respondents from Australia, U.S.A, England, Italy, Ghana, Lesotho, Northern Ireland, Malaysia, Pakistan, the Philippines, Saudi Arabia, New Zealand, and Norway.

Anxiety



Summary

- Settling to sleep supine is associated with increased stillbirth risk
- Public health campaigns have been launched or are being considered
- Maternity care providers (MCPs) can influence women's knowledge and practices during pregnancy.
- MCPs are currently providing inconsistent information about sleep and sleep position during pregnancy
- Further research to determine the effectiveness of interventions to encourage side sleep are needed...and are underway....or planned

References

- Gordon A, Sleep position, fetal growth restriction, and late-pregnancy stillbirth: the Sydney stillbirth study. *Obstet Gynecol* 2015;125:347–55.
- Heazell AEP et al Association between maternal sleep practices and late stillbirth – findings from a stillbirth case-control study. *BJOG* 2017; <https://doi.org/10.1111/1471-0528.14967>.
- Heazell AEP et al Going to sleep position and risk of late stillbirth – A systematic review and meta-analysis. Paper to PSANZ congress Auckland March 2018
- Humphries A The effect of position on maternal haemodynamics in late pregnancy Paper to PSANZ congress Auckland March 2018
- McCowan LME, et al Going to sleep in the supine position is a modifiable risk factor for late pregnancy stillbirth; findings from the New Zealand multicentre stillbirth case-control study. *PLoS One* 2017;12:e0179396.
- Stacey T, et al Association between maternal sleep practices and risk of late stillbirth: a case-control study. *BMJ* 2011;342:d3403.
- Warland J, Dorrian J, Morrison JL, O'Brien LM, (2018) Maternal sleep during pregnancy and poor fetal outcomes: A scoping review of the literature with meta-analysis. *Sleep Medicine Reviews* March 27.
- Warland J, Beaufoy G, Dorrian J (2017) Giving sleep position advice in pregnancy: will we make women anxious? *BMC Pregnancy and Childbirth* P33 doi.org/10.1186/s12884-017-1457-7.

