

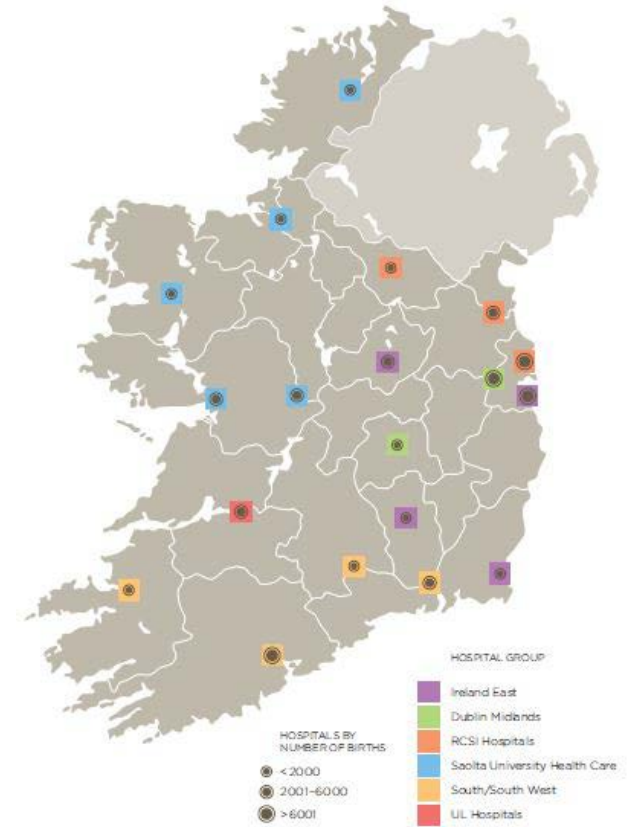


NATIONAL PERINATAL EPIDEMIOLOGY CENTRE

National Audit : Improved Care Marking 10 years of NPEC & Clinical Audit in the maternity services

NOCA Annual Conference 2019
6TH FEBRUARY 2019
RCSI, 26 YORK STREET

Professor Richard A Greene, Director



#NPECCbeyondthenumbers
#NPECC10Years



NATIONAL PERINATAL EPIDEMIOLOGY CENTRE



The NPEC

- Establishment of the Centre announced in Dáil Éireann on 8th March 2006 by then Minister for Health and Children, Mary Harney T.D.
- *...every time a mother gives birth, the important interventions, good outcomes and complications will be recorded and analysed at a national specialist centre. Unusual trends will be easily and quickly observed and, most importantly, acted on. The centre has been designed based on models from Australia and its immediate priorities are to devise a single identical maternity chart for every maternity hospital in the country. This is the first very important step in re-establishing trust and ensuring that services to mothers and their babies born here are based on the best possible research.* Minister For Health and Children, Mary Harney, 2006, Dáil Éireann



Strategic Goals

- To translate outcome data for mothers and children into improved clinical practice.
- To act as an independent source of advice for the HSE.
- To publish annually an analysis of national perinatal data.
- To develop research thematic areas in the perinatal space.
- To encourage the development of a national uniform obstetrics chart/record → NMHCR → MN_CMS
- To establish appropriate expert sub-committees to assess and review material and sign off on reports, e.g. maternal mortality, perinatal mortality, maternal morbidity, births defects.
- To enhance public and patient involvement in NPEC activities and to foster awareness of NPEC outputs amongst patients and the public



NPEC

HIPE Data Analysis	Electronic Maternity Chart (MN-CMS)	Caesarean Section	PRAMS
	Person Centred Experience		
Robson - 10 Groups Classification System	Severe Maternal Morbidity	Perinatal Mortality	Planned Home Births
	Mid Trimester-PROM + Delayed Interval Delivery-PMP	Vermont Oxford Network	Maternal Death Enquiry



Focus for NPEC in 2019

- To highlight the work, that the maternity services have contributed to in the last 10 years
 - To acknowledge the effort and time spent participating in the audits
Currently we have 64 representatives on Governance Committees and 101 audit coordinators across the hospitals
- To learn from one another: what works in units and what doesn't work
 - How are we closing the loop – recommendations



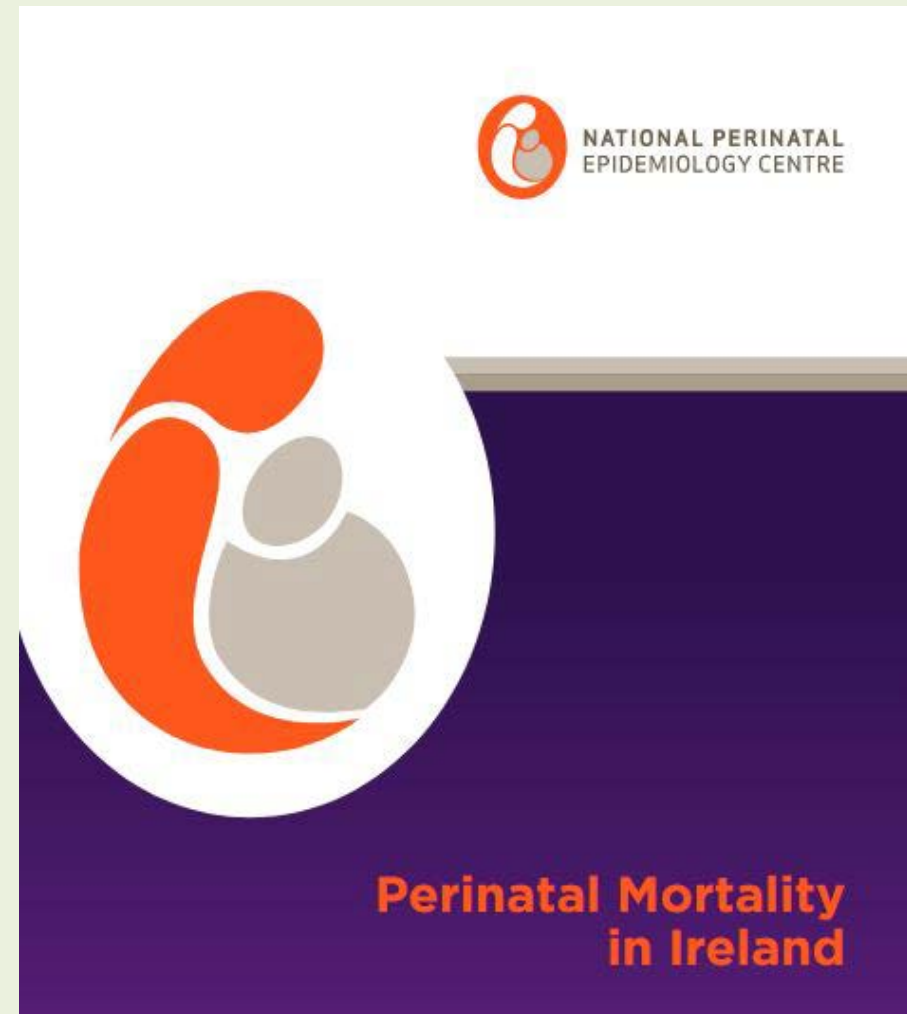
The Audit Agenda

- The data
- The lessons
- Action – National & Local Use
- Patient Involvement
 - Audit Governance
 - Lay Summaries
 - Report feedback

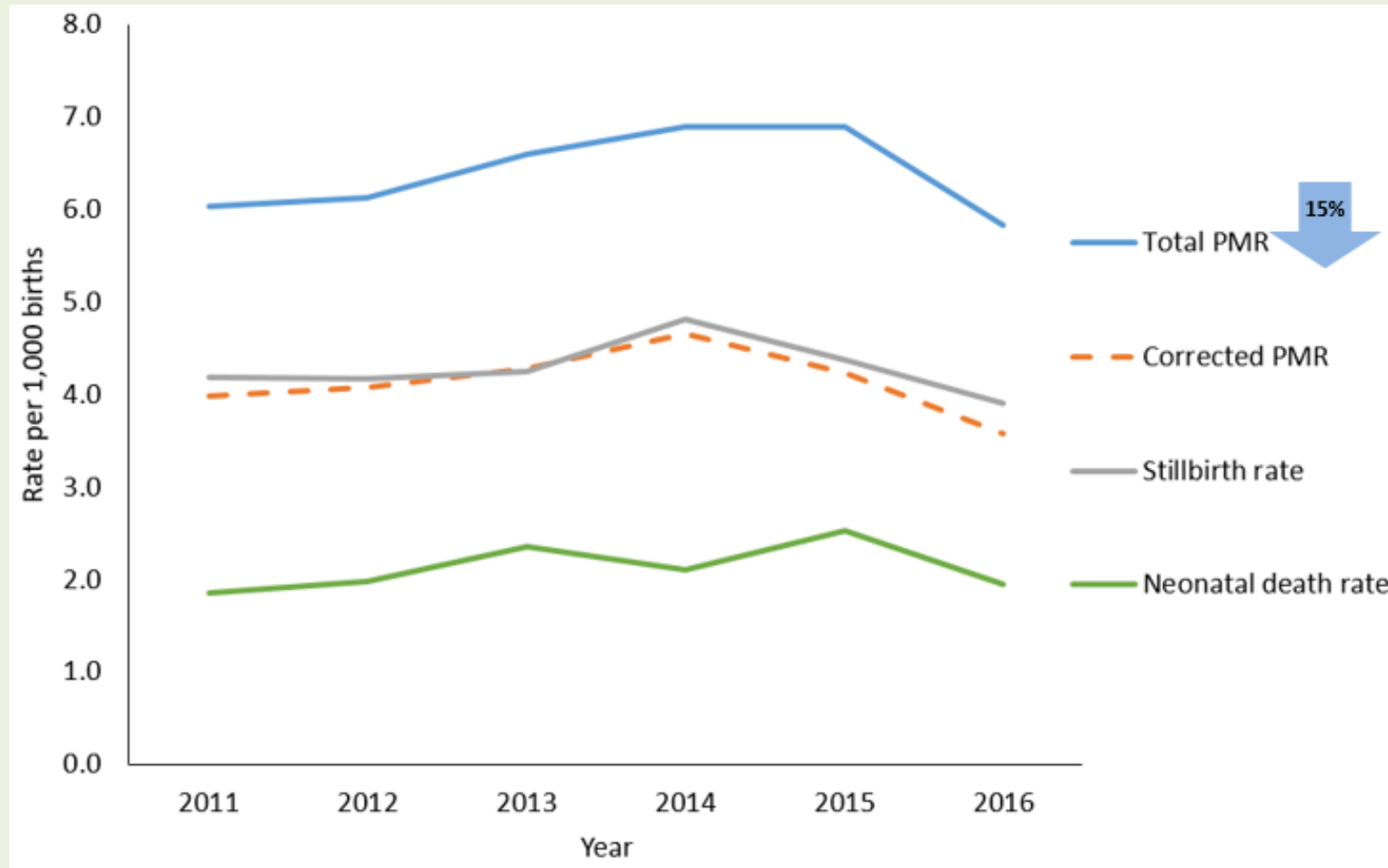
*No stories without data, No data without stories
Beyond the numbers*



Perinatal Mortality in Ireland: National Perspective



Perinatal mortality trend, 2011 -2016



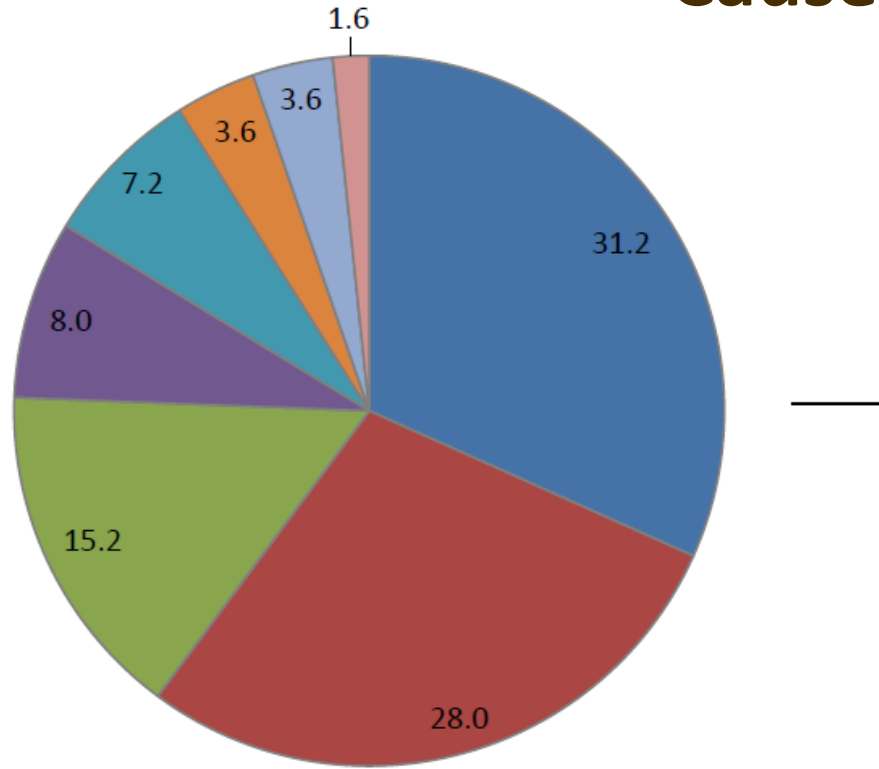
Perinatal mortality trend, 2011-2016

		2011	2012	2013	2014	2015	2016	RR(95% CI)
Total births	N	74,265	71,755	69,146	67,663	65,904	64,133	
Stillbirths	n	311	299	294	325	288	250	
	rate	4.2	4.2	4.3	4.8	4.4	3.9	0.89(0.75-1.06)
Early neonatal deaths	n	137	141	162	141	166	124	
	rate	1.9	2.0	2.4	2.1	2.5	1.9	0.77(0.61-0.97)
Perinatal deaths	n	448	440	456	466	454	374	
	rate	6.0	6.1	6.6	6.9	6.9	5.8	0.85(0.74-0.97)
Corrected perinatal deaths	n	296	292	296	315	279	229	
	rate	4.0	4.1	4.3	4.7	4.2	3.6	0.84(0.71-1.01)

Note: Rates are per 1,000 births; RR=Rate ratio comparing rate in 2016 versus rate in 2015; 95% CI=95% confidence interval; Corrected perinatal deaths exclude deaths due to a congenital malformation.

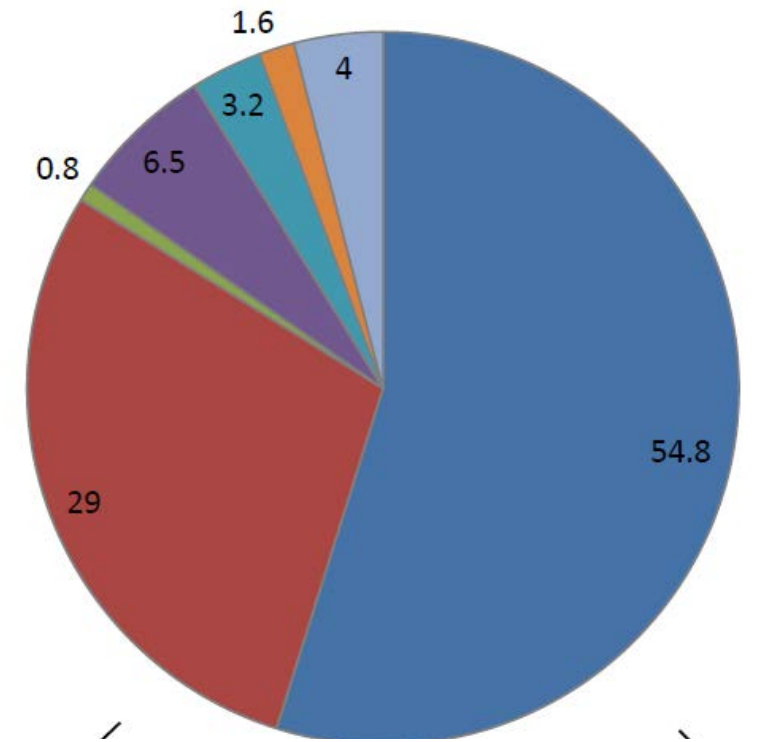


Stillbirth



- Major congenital anomaly (31.2%)
- Specific placental conditions (28%)
- Unexplained (15.2%)
- Mechanical (8%)
- Antepartum or intrapartum haemorrhage (7.2%)
- Infection (3.6%)
- Specific fetal conditions (3.6%)
- Intra-uterine growth restriction (1.6%)

Cause of death

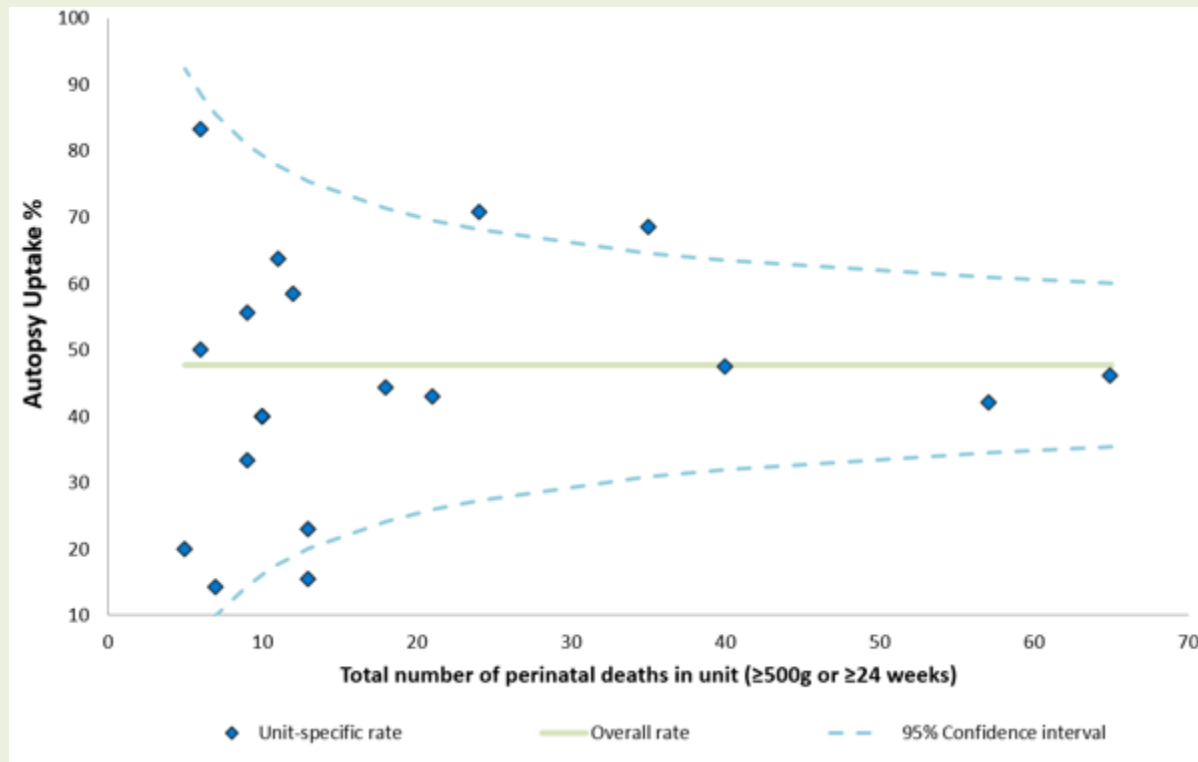


- Major Congenital Anomaly (54.8%)
- Respiratory disorders (29%)
- Gastro-intestinal disease (0.8%)
- Neurological disorder (6.5%)
- Infection (3.2%)
- Other specific causes (1.6%)
- Unexplained (4%)

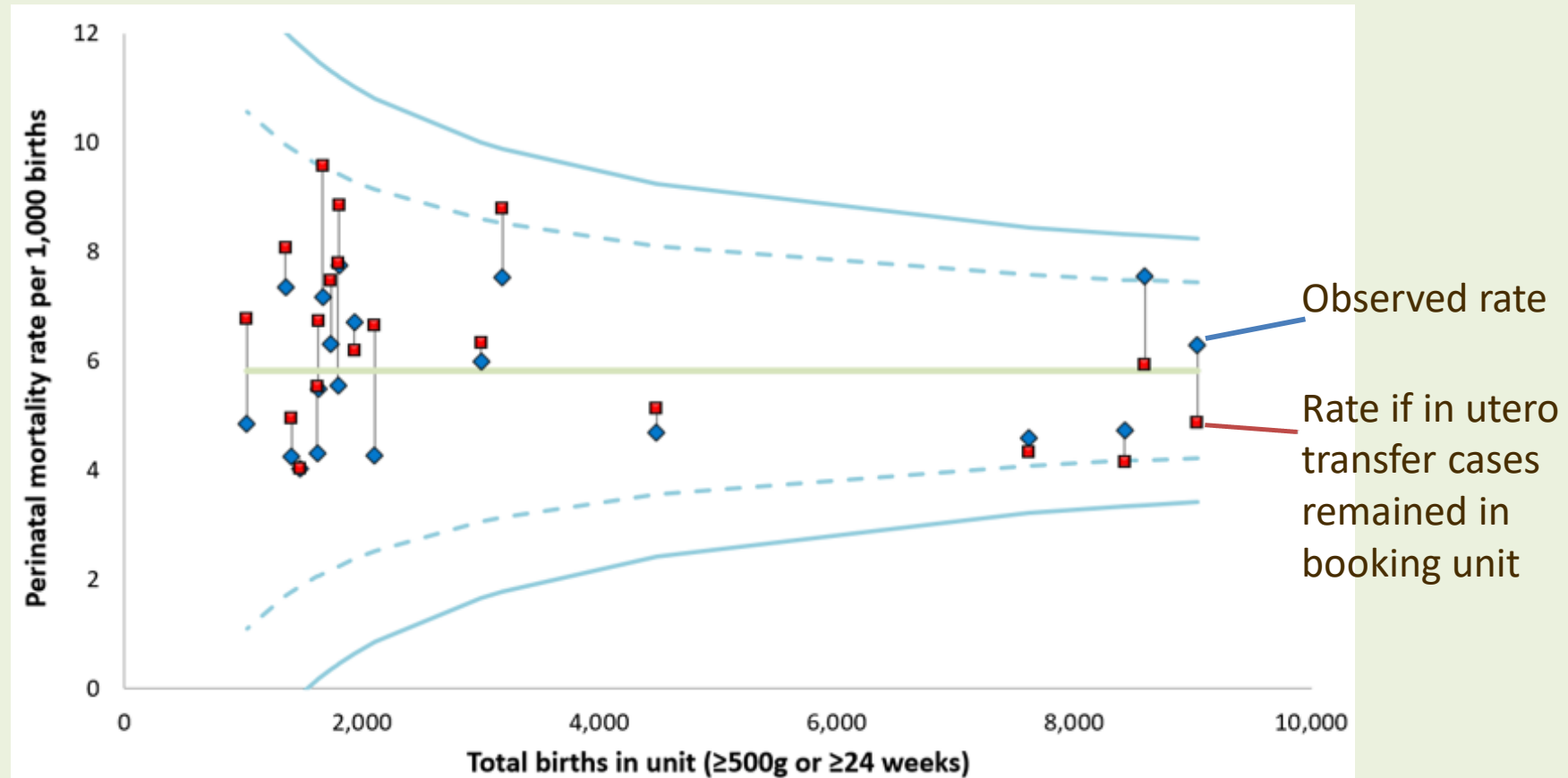
Autopsy uptake

Variation in the autopsy rate across the 19 maternity units

May reflect access to dedicated perinatal pathology services



In utero transfer* and total PMR by unit, 2016



* Pregnant woman's care and intended place of delivery changed from the maternity unit where she had her booking appointment to another unit - 36 of the 374 perinatal deaths followed in utero transfer (10%)



Recommendations being progressed by the National Women's and Infants Health Programme

Establishment of a confidential enquiry for stillbirth and neonatal death. An initial step is the establishment of a standardised review of a series of unexpected perinatal deaths associated with intrapartum events.

Resourcing of perinatal pathology services on a regional and national basis, as recommended by the Faculty of Pathology.

As recommended by the Institute of Obstetrics and Gynaecology, second trimester fetal anomaly ultrasound scanning should be universally available.



Severe Maternal Morbidity: National Perspective



National Audit of Severe Maternal Morbidity 2011-2017

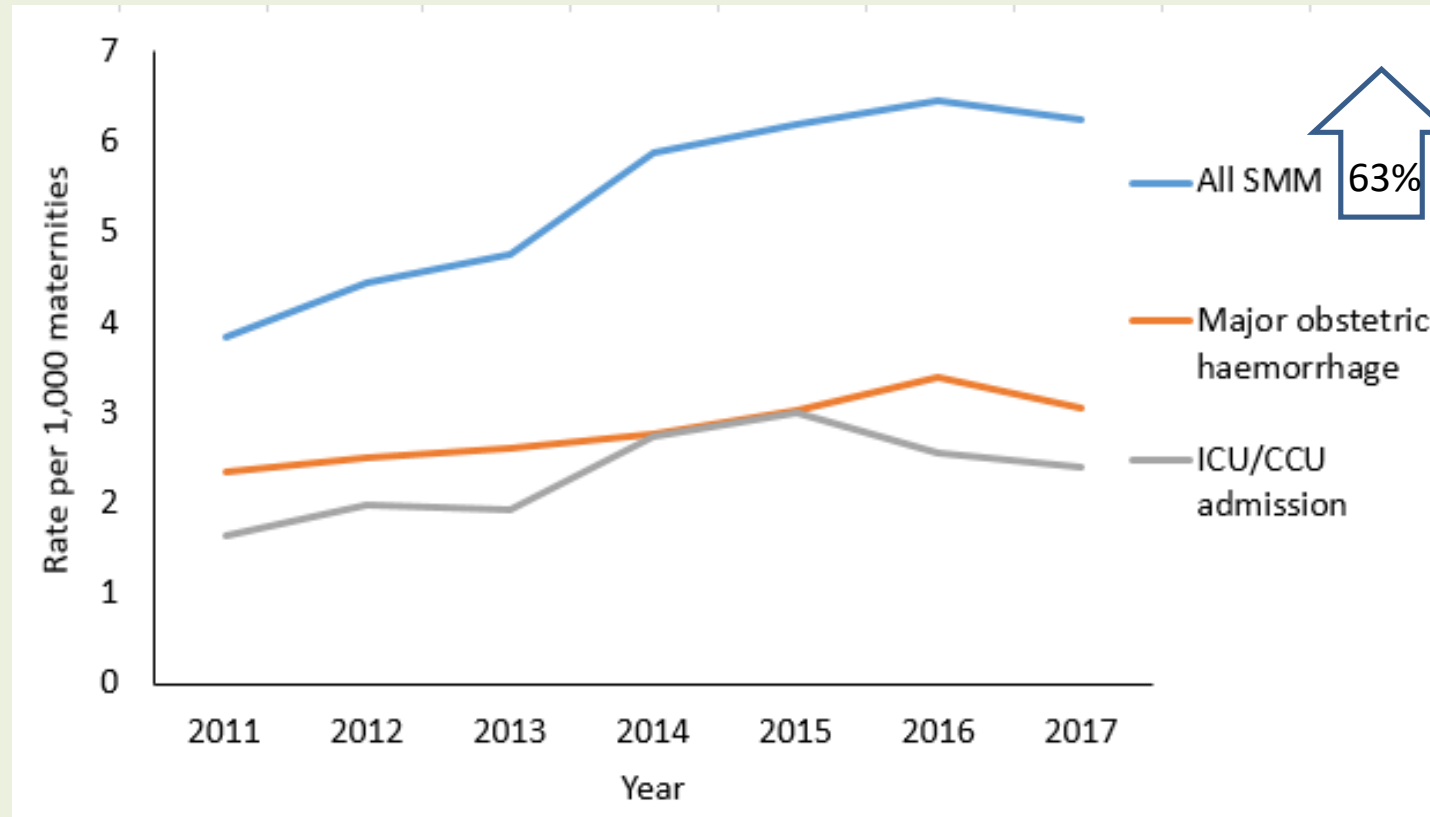
- **Severe Maternal Morbidity (SMM) audit:**
16 categories of SMM occurring during pregnancy or up to 42 days postpartum

Triennial topic specific audits

- Major Obstetric Haemorrhage (MOH)
in-depth audit 2011,2012,2013
- Critical Care in Obstetrics in-depth audit 2014,2015,2016
- Pulmonary Embolism 2017 – 2019
- 2020 – 2022 MOH planned



SMM trend, 2011 - 2017



- Increase in SMM rate 63% (p-value<0.001)
- Increase in MOH rate - 30% since 2011 (p-value=0.016)
- 47% ICU/CCU admissions had no other SMM as defined in this audit
 - (associated with few small units with on-site ICU but no obstetric HDU)



Specific SMMs, 2011-15 vs. 2017

	2011-2015		2016		2017	
	n(%)	Rate(95% CI)	n(%)	Rate	N(%)	Rate(95%CI)
Major obstetric haemorrhage	850(52.7)	2.67 (2.49-2.86)	215(53.0)	3.39	191 (48.7)	3.04 (2.6-3.5)
ICU/coronary care unit admission	725(45)	2.28 (2.11-2.45)	160(39.4)	2.54	150 (38.3)	2.39
Renal or liver dysfunction	152(9.4)	0.48 (0.4-0.56)	34(8.4)	0.54	50(12.8)	0.80 (0.6-1.0)
Septicaemic shock	76(4.7)	0.24 (0.18-0.29)	28(6.9)	0.45	13(3.3)	0.21 (0.1-0.3)
Peripartum hysterectomy	102(6.3)	0.32 (0.26-0.38)	27(6.7)	0.43	33(8.4)	0.52 (0.3-0.7)
Pulmonary embolism	79(4.9)	0.25 (0.19-0.3)	24(5.9)	0.38	25(6.4)	0.40 (0.2-0.6)
Acute respiratory dysfunction	37(2.3)	0.15 (0.1-0.2)	14(3.4)	0.22	9(2.3)	0.14 (0.05-0.2)
Eclampsia	51(3.2)	0.16 (0.12-0.21)	14(3.4)	0.22	10(2.6)	0.16 (0.06-0.3)
Pulmonary oedema	44(2.7)	0.14 (0.1-0.18)	12(3.0)	0.19	13(3.3)	0.21 (0.1-0.3)
Uterine rupture	45(2.8)	0.14 (0.1-0.18)	8(2.0)	0.13	9(2.3)	0.14 (0.05-0.2)
Total women effected	1612	5.07 (4.82-5.32)	406		392	6.23 (5.6-6.8)

? True increase in sepsis or increased awareness of sepsis

30%



63%



Characteristics of women experiencing SMM

- 60% of women had a high BMI (i.e. overweight/ obese)
- Higher SMM rate among women 35-39 years and women over 40 years of age
- Multiple pregnancy was associated with a fourfold increased of morbidity
- Perinatal mortality rate (PMR) = seven times the PMR for all births in Ireland



Summary

Severe maternal morbidity

- There has been a statistically significant increase in the rate of Severe Maternal Morbidity (SMM) and major obstetric haemorrhage (MOH) since the base year 2011
- Variation in rates of SMM and MOH across units
- MOH remains the most commonly reported morbidity
- Multiple pregnancy was associated with an almost fourfold increased risk of SMM

Critical care in obstetrics audit

- One in 129 women required critical care (Level 2 Care and or Level 3 Care)
- While Level 3 Care was provided in ICU setting, Level 2 Care was provided in a number of settings. There is a higher use of ICU/CCU facilities in smaller units
- The need for higher levels of maternal care is not predictable in approximately half of cases and thus has implications for resource planning



Selected recommendations

A quantitative approach involving volume and weight assessment to **EBL** should be considered in all units

National implementation of a specific proforma to improve management and documentation during a MOH event

Appropriate resources and training for the care of the critically ill woman in obstetrics within the ICU/CCU

For maternity units with > 2,500 births per annum, consider **resourcing the unit with the capacity to provide Level 2 Care**

All pregnant or recently pregnant women: **equitable access to the most appropriate critical care facility** and a national maternal retrieval service should be provided



Very Low Birth Weight (VLBW) Infants: Mortality Risk in Ireland, 2014-2016



Vermont Oxford Network (VON)

- Based on data submitted to the VON by all 19 neonatal units in Ireland.
- The VON is the single largest international database to benchmark outcomes of VLBW babies.
- The VON mission is to improve the quality and safety of medical care for newborn infants.
- Clinical Governance Group: NICORE Ireland
(**N**eonatal **I**ntensive **C**are **O**utcomes **R**esearch and **E**valuation)
- NICORE Membership: one neonatologist/paediatrician from each of 19 neonatal units in Ireland



Purpose

- The NICORE Group, under the auspices of the HSE Clinical Care Programme in Paediatrics and Neonatology has remit to review the care of VLBW Infants in Ireland.
- First national report in 2014 showed higher mortality risk than expected in VLBW infants.
- Neonatology & Obstetric Chairs & National Clinical Leads stated that a dataset comprising 3-5 years data would be more insightful for reviewing outcomes.



VLBW mortality in 2014-2016

Definition: A VLBW infant is born alive with a birth weight of 401-1500 grams **OR** a gestational age of 22 weeks to 29 weeks 6 days

1,812 VLBW infants born in the ROI in 2014-2016

Findings based on 1,765 infants with records from their birth hospital

	Republic of Ireland			VON			P-value
	Deaths	N	%	Deaths	N	%	
2014-2016	298	1,765	16.9	27,229	186,911	14.6	0.007
2014	108	580	18.6	8,786	61,016	14.4	0.004
2015	96	608	15.8	9,141	62,183	14.7	0.448
2016	94	577	16.3	9,302	63,712	14.6	0.250



Summary

Did VLBW infants born in Ireland in 2014-2016 have a higher than expected risk of death?

The findings show that VLBW infants born in Ireland in 2014-2016 had a higher than expected risk of death. The excess mortality was estimated at 17% (95% CI: 1.05, 1.29).



Summary

Did VLBW infants born at specific gestational ages have a higher than expected risk of death?

- VLBW infants born at 22-23 weeks had a 23% higher mortality risk than expected (95% CI: 1.02, 1.44).
- Infants born at 24-27 weeks who were not born in a tertiary unit had a 70% higher mortality risk than expected (95% CI: 1.25, 2.15).
- VLBW infants born in Ireland with a gestational age of at least 28 weeks did not have a higher mortality risk than expected.



Summary

For any such specific gestational age, was the increased risk of death related to an established clinical practice or model of care?

- The excess mortality observed at 22-23 weeks was almost wholly due to the infants not administered resuscitation. At this gestational age, a higher proportion of infants were not administered resuscitation in Ireland compared to the VON.
- The excess mortality amongst infants born at 24-27 weeks was associated with those born in non-tertiary centres, in particular those born in peripheral units.

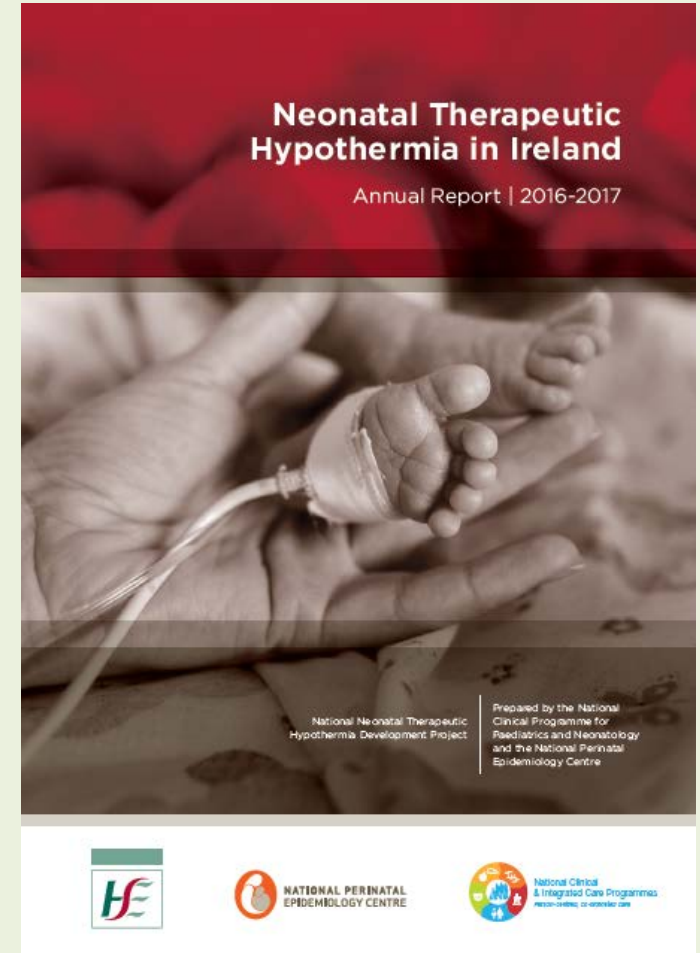


Recommendations

- All women anticipated to deliver at a gestational age of 23 weeks should be administered antenatal steroids and magnesium sulphate and the neonatology team should be alerted prior to delivery.
- Resuscitation should be administered to all infants born at 23 weeks who present in favourable condition, i.e. without congenital anomaly, severely small for gestational age, severe hypoxia or severe infection.
- In line with the existing Model of Care for Neonatal Services in Ireland, infants born before reaching a gestational age of 28 weeks should ideally be delivered at one of the four tertiary neonatal units.



National Therapeutic Hypothermia (TH) in Ireland



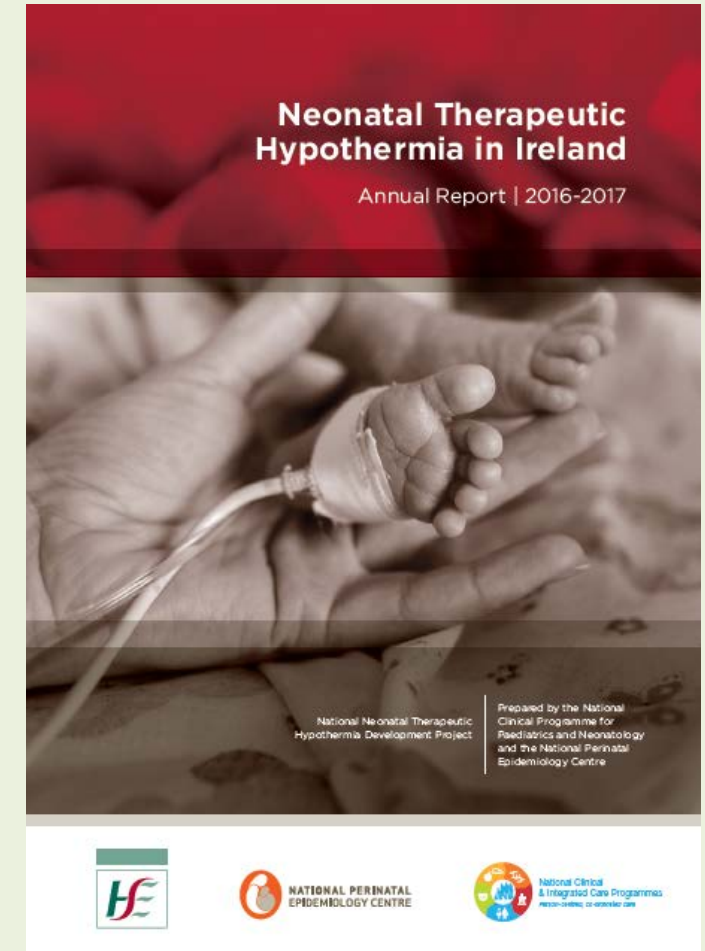
Overview

- This report is a collaborative initiative between the National Clinical Programme for Paediatrics and Neonatology (NCPN) and the National Perinatal Epidemiology Centre (NPEC).
- This report is based on data submitted to the NPEC from all 19 maternity sites in Ireland.
- The Therapeutic Hypothermia (TH) steering committee has overseen the governance for this project.
- A Multi-Disciplinary Team (MDT) approach has been adopted in order to best inform this process.



Overview

- There had been no national overview of the current status and outcomes of Therapeutic Hypothermia (TH).
- First national investigation of TH and incorporates comprehensive data on every infant who underwent TH in the years 2016 and 2017
 - baseline data on the maternal, infant and clinical characteristics associated with TH
- Current project aims to inform the development and implementation of a National Therapeutic Hypothermia E-Register for Ireland.



Number of Infants born in who underwent TH

- 140 infants who underwent TH in 2016-2017
- 60% were born in a tertiary hospital with 40% of infants requiring transfer from a regional or local hospital

63
infants

63 infants underwent TH in **2016**

77
infants

77 infants underwent TH in **2017**

1/900

1 in 900 infants born in Ireland during 2016/2017 required TH



Concerns and complications

- There were concerns documented during the pregnancy for 38% of the mothers.
 - The most common concern documented was for women who developed hypertensive disorders during pregnancy (9%)
- There was an overrepresentation of complications preceding and during the delivery of the infants.
- Many of these complications occur in the labour ward including maternal pyrexia during labour (19%), shoulder dystocia (13%) and uterine rupture (4%).



TH Next Steps

- A future aspiration is the reduction of the condition that necessitates TH.
- Any information that signposts the way to avoid such outcomes is to be welcomed.
- This report serves as a platform to continue the national review process in order to attain valuable data which can influence clinical practice in a constructive way.
- Recommence anonymous data collection related to infants who required TH in 2018.
- Development of the E-register in collaboration with the NCPPN.



Data Collected

Perinatal Mortality	10 years
Severe Maternal Morbidity	7 years
Planned Homebirths	5 years
Vermont Oxford Network	4 years
Robson 10-Group Classification System	4 years
Therapeutic Hypothermia	2 year
Mid Trimester-PROM + Delayed Interval Delivery-PMP	1 year

One national uniform obstetrics
chart/record ➡ MN-CMS

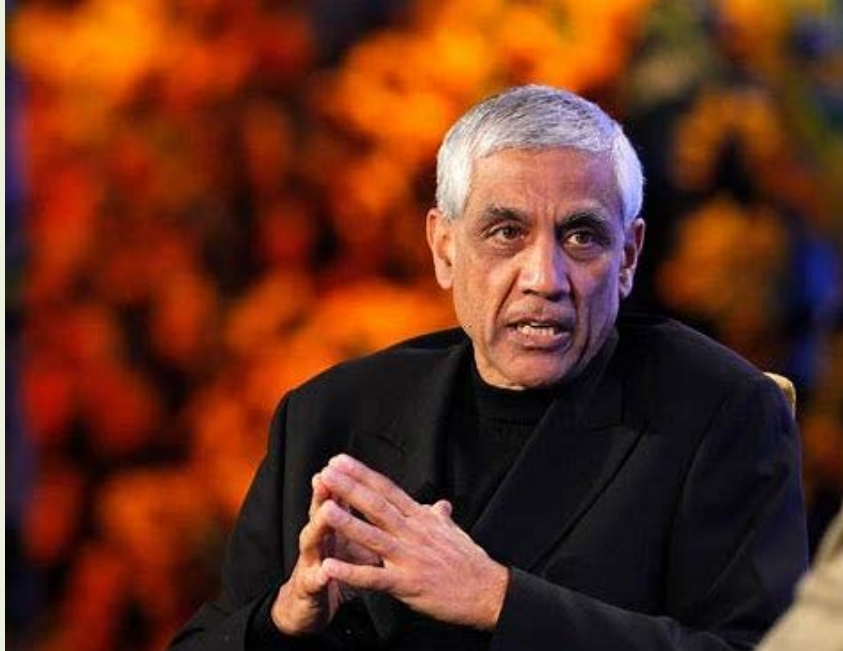


Learning points

- Patience
- Change takes time
- Not everyone will think it is a good idea
- Persistence
- Importance of your colleagues
- Challenge your colleagues and yourself
- Acknowledge the importance of the work
- Take time to appreciate the staff



Big Data – EHR (MNCMS)?

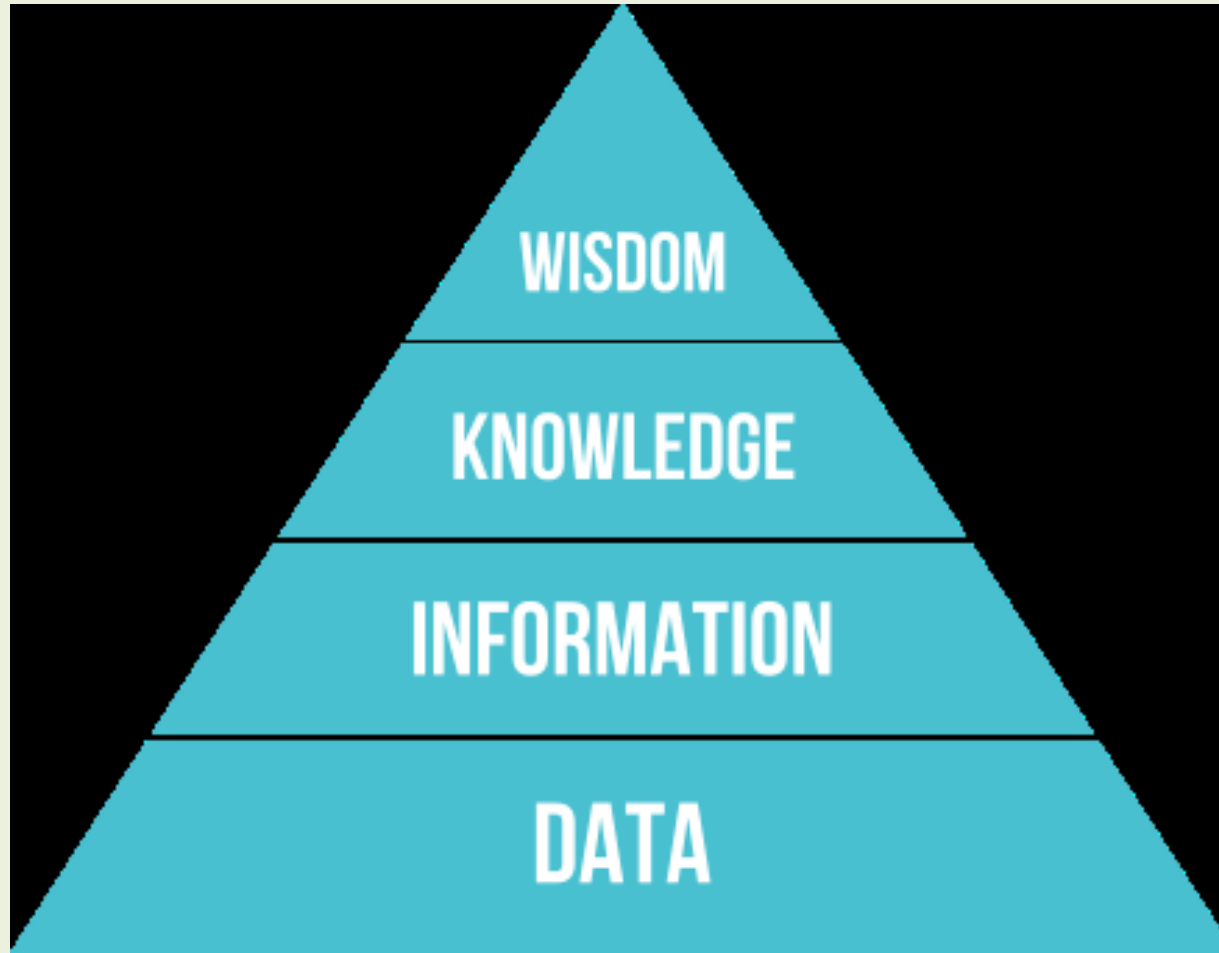


“In the next 10 years data science will do more for medicine than all the biological sciences combined”

Vinod Khosla



The future



The maternity services in Ireland through the NPEC are collecting data that can influence and improve patient care

Please use the data from the national reports and from the individual hospital reports

When you go back to your unit tell 5 people about the work that is been carried out in audit and about what is produced every year!

All NPEC material is available on the NPEC website
<https://www.ucc.ie/en/npec/>

Contact npec@ucc.ie with any queries



‘Everyone in healthcare has two jobs when they come to work everyday: to do their work and to improve it’

- Prof Paul B Batalden, IHI



Thank you!

SAVE THE DATE

NPEC Study Day 2020

January 17th 2020

