International comparisons of selected service lines in seven health systems

ANNEX 8 – REVIEW OF SERVICE LINES: MATERNITY

Evidence Report

October 27th, 2014

Executive summary for intrapartum maternity care

- There is significant variation in models of intrapartum maternity care in different regions which makes some international comparisons, for example of standards setting approach, or workforce requirements difficult. Major differences in delivery models include:
  - In the US, **most births are managed by an independent (non-hospital based) obstetrician** who has 'admission rights' at one or more hospitals where the delivery takes place. The hospital is required to provide essential services and facilities but is not primarily responsible for the quality of the delivery.
  - In France, **patients can choose between care provided by an independent obstetrician at a private hospital, and shared obstetrician/midwife care provided by a public hospital**. While in Germany, patients can choose for an independent (non-hospital based) midwife to deliver their baby at a hospital, or for a hospital-based midwife/obstetrician team to provide this care.
  - In Australia and Canada, **specialist GPs with training in obstetrics or anaesthesia may provide delivery care** particularly in remote areas
  - In Sweden, intrapartum delivery care looks most similar to the NHS model but there appears to be a much **higher level of workforce (obstetrician and midwife) availability**
- In addition to the differences in delivery models, we observe major differences in the approach to standards of care:
  - Some regions – for example, Ontario, and Victoria - create **networked, finely tiered services** and set specific standards and **requirements for each tier** including the **risk profile of activity that the provider is permitted to undertake** rather than expecting every unit to do everything or linking standards to volume rather than risk profile of activity
- Many regions – Stockholm, Ontario, Victoria, France - have **clearly defined gestational age limits for maternity units** with only highly specialist units able to deliver babies outside of a defined gestational age ranges. The NHS does not do this
- **No country except the UK sets hours/week standards for consultant presence.** In other regions, the requirement is almost always defined by type of presence (on call, on site, in unit) by physician level (specialist/consultant, specialist GP, etc.) for type of unit (level 1, level 2 etc.) and the requirement is 24/7
- Given differences in delivery model, we have also looked briefly at the **comparative costs of service delivery** to the health system. Comparing DRG (or equivalent) prices for normal, uncomplicated vaginal delivery, the **NHS appears to have the lowest price for any region studied** (though data should be analysed further to ensure comparability)
- **There is wide variation in births per obstetrician/midwife** due to different delivery models and working patterns (as well as differences in data collection/definitions) which we could explore further in the detailed case studies
- It is challenging to compare **quality of intrapartum maternity care** internationally, as serious adverse events are relatively rare and often due to a wide range of factors unrelated to provider quality. Notwithstanding these caveats, the indicators available suggest that Sweden may offer some interesting lessons for the NHS

Intrapartum maternity care – NHS core standards

NHS standards setting bodies

- Royal College of Obstetricians and Gynaecologists
- Royal College of Midwives
- Royal College of Anaesthetists
- Royal College of Paediatrics and Child Health

Core NHS standards

Input

- **24/7 consultant presence for units ≥5,000 births/yr and/or complex caseload**
- ≥1 24/7 consultant team for "very large" units
- **98 hrs/week consultant presence for units with 4,000-5,000 births/yr**
- **60 hrs/week consultant presence for units with 2,500-4,000 births/yr**
- 28-35 births/midwife depending on setting (RCM)
- **Co-located service requirements:**
  - 24/7 anaesthesia service
  - Neonatal care (co-located or network)
  - Emergency surgery including interventional radiology and emergency radiology and ≥1 dedicated co-located operating theatre
  - 24/7 lab services including blood transfusion
  - HDU areas and protocols for critical care
  - Ambulance for home births (9-45% transfer rate)
  - Links to perinatal psychiatry
  - One-to-one midwife care through labour and delivery

Access

- **Access to anaesthetist within 30-60 mins of request for epidural**
- **Access to emergency c-section ≤30 mins**

Process

- Suturing of tears ≤1hr
- Junior doctors (ST1/2) should not work unsupervised

Critical standards

		Level achieved
1	**24/7 consultant presence for units ≥5,000 births/yr and/or complex caseload**	100% of NHS obstetric units (of this size) **do not meet** recommended level[1]
2	**98 hrs/week consultant presence for units with 4,000-5,000 births/yr**	68% of NHS obstetric units (of this size) **do not meet** recommended level[1]
3	**60 hrs/week consultant presence for units with 2,500-4,000 births/yr**	24% of NHS obstetric units (of this size) **do not meet** recommended level[1]
4	**Co-located service requirements**	Not available
5	**Access to anaesthetist within 30-60 mins of request for epidural**	12% of NHS obstetric units **do not have** one consultant anaesthetist FTE[1]
6	**Access to emergency c-section ≤30 mins**	Not available

1 Maternity Services in England, National Audit Office, 2013 (see also Public Accounts Committee, Maternity Services in England, 2014)

SOURCE: Royal College of Obstetricians and Gynaecologists, 2007, Safer childbirth: minimum standards for the organisation and delivery of care in labour; RCOG, 2013, Reconfiguration of women's services in the UK , Good Practice No 15

Intrapartum maternity care – International standards

Topic of standards	Standard specifics						
	England	**Victoria**	**Ontario**	**France**	**Germany**	**Stockholm[1]**	**Arkansas**
Obstetrician presence	24/7 >5k births; 98 hrs/wk for 4-5k births; 60 hrs/wk for 2.5-4k births	24/7 access/on call for service levels 4-6 (access/referral to for level 3)[2]	24/7 for levels 3-7; GP with surgical training for level 2; 24/7 GP/Midwife for level 1	24/7 >1.5k births or on call available in 20 mins for smaller units	Within 10 minutes (can be on call)	24/7 on call and available in 30 mins	24/7 on call and readily available if hosp.; <30min (ambulance) if free-standing birth center
Anaesthetist presence / time to epidural	Access to epidural within 30-60 mins	24/7 access/on call for service levels 4-6[2]	24/7 coverage for all service levels where possible; <30 mins for levels 3-7	24/7 >2k births or on call available in 20 mins for smaller units	Within 10 minutes (can be on call)	Available on site 24/7	Physician must be "immediately available" if epidural admin-istered by CNA[3]
Time to emergency c-section	Available in 30 mins	Access to emergency c-section for levels 2-6 (no time target)[2]	Available in 30 mins for levels 3-7; "timely access" for level 2; no access at level 1	Must be available on site	Available within 20 mins	No time target	No time target
Co-location requirements (summarised)	Anaes., neo-natal care, emergency surgery, HDU, pathology/blood, perinatal psych.	Varies by service level (6 tiers) - not defined by size	Varies by service level (7 tiers) - not defined by size	Varies by volume of deliveries (many levels) and service level (3 tiers)	Gynecologist, midwife, anesthetist, pediatrician, nurses, lab, full-time surgery	Neonatal care,[4] ICU, emergency surgery, joint beds for post-natal care, pathology/blood	Not specified but hospital must be resourced to manage obstetric emergencies
No NHS equivalent:							
Distance and access targets	None	None	None	30 mins access (cross-pathway guarantee for emergency care)	None	None	None

1 Each Swedish local authority is independent and may set different requirements
2 GP Obstetricians and GP Anaesthetists (equivalent to GPs with additional specialty training) may be used in lower levels
3 Certified Nurse Anesthetist
4 May be provided on an alternative site provided there is a defined transfer protocol

Intrapartum maternity care – Comparison of standards

Stricter target than NHS
Same target than NHS
More lenient target than NHS
No target

	England	Victoria[1]	Ontario[1]	France[1]	Germany	Sweden	Arkansas	NHS strict?
24/7 Obstetrician presence	✓- >5k births	✓ × - on call	✓ ×	✓- >1.5k × - on call	× - on call	✓	✓ - hospitals	
Time to epidural	<30-60 min	×	<30 min	<20 min	<10min	×	×	
Time to emergency c-section	<30 min	×	<30min	×	<20min	×	×	
Co-located requirements	✓	✓ - depending on level	✓ - depending on level	✓ - depending on level	✓	✓	✓	
Distance and access targets	×	×	×	30 min	×	×	×	

1. Different standards for different service levels: **Higher** service level units / **Lower** service level units

Intrapartum maternity care – Reasoning behind critical standards

Topic of standards	Why critical?
Obstetrician presence	▪ England is the only country that sets a 24/7 consultant presence standard ▪ Several larger hospitals are close to 24/7 presence, but none have achieved this yet
Anaesthetist presence / time to epidural	▪ Presence of an anaesthetist or a minimum time to epidural may be more difficult for smaller hospitals, especially during out of hours, where the total volumes of births are lower and a 24/7 coverage would be underutilised ▪ It also requires hospitals to recruit and/or train the right personnel, and recruiting qualified staff is challenging for smaller, rural hospitals
Time to emergency c-section	▪ Minimum time to c-section may be more difficult for smaller hospitals, especially during out of hours, where the total volumes of births are lower and a 24/7 coverage would be underutilised ▪ It also requires hospitals to recruit and/or train the right personnel, and recruiting qualified staff is challenging for smaller, rural hospitals
Co-location requirements	▪ Requirements for co-located services such as specialised operation rooms and neonatal ICUs can be difficult for smaller hospitals, where lower volumes do not warrant these investments
No NHS equivalent:	
Distance and access targets	▪ In more rural areas it may be more difficult to meet the time and distance standards set, which mainly affects smaller hospitals

SOURCE: Research team's analysis of why these standards are critical

Intrapartum maternity care – Sources

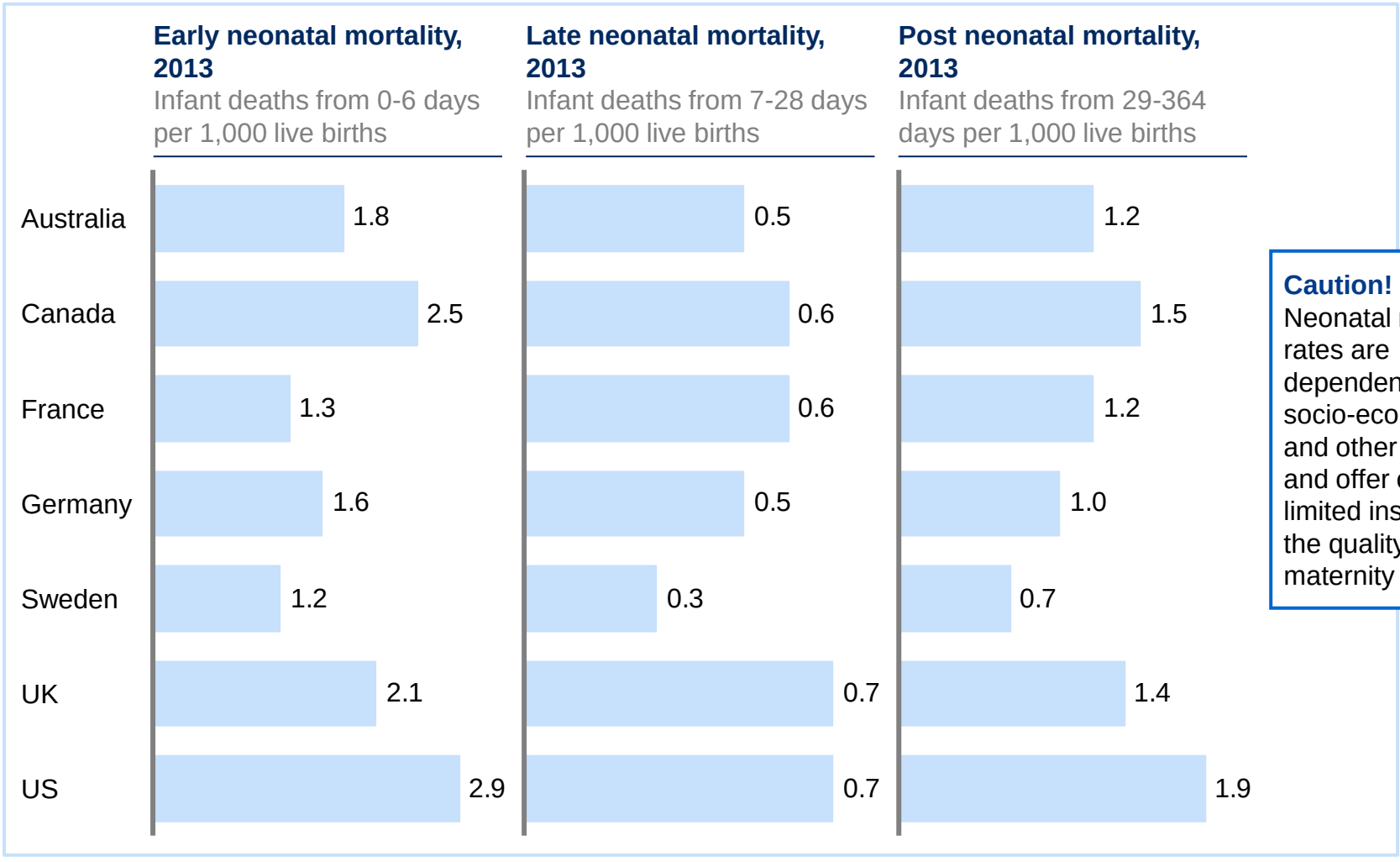
	Sources for standards
England	▪ Royal College of Obstetricians and Gynaecologists, 2007, Safer childbirth: minimum standards for the organisation and delivery of care in labour
Victoria	▪ Standing Council on Health, 2012, National maternity services capability framework 2012 ▪ Victoria Department of Health, 2012, Capability framework for Victorian maternity and newborn services
Ontario	▪ Provincial Council for Maternal and Child Health, 2013 update, Standardized maternal and neonatal levels of care definitions
France	▪ Haute Autorité de Santé, 2014, Qualité et sécurité des soins dans le secteur de naissance: Guide méthodologique
Germany	▪ Deutschen Gesellschaft für Gynäkologie und Geburtshilfe, 2011, Mindestanforderungen an prozessuale, strukturelle und organisatorische Voraussetzungen für geburtshilfliche Abteilungen,
Stockholm[1]	▪ Hälso–och sjukvårdsförvaltningen, Stockholms Läns Landstig, 2013, Regelbok för förlossningsenheter, 2013,
Arkansas	▪ Rules and Regulations for Free-Standing Birthing Centers, and Rules and Regulations for Hospitals and Related Institutions in Arkansas 2007, Arkansas Department of Health (http://www.healthy.arkansas.gov/aboutADH/Pages/RulesRegulations.aspx)

1 Each Swedish local authority is independent and may set different requirements

Intrapartum maternity care – Standard setting context

	Standard setting context
England	▪ Professional review: The Royal College of Obstetricians and Gynaecologists undertakes over 50 reviews of individuals or organisations a year. The College is invited in usually after a series of errors or complaints ▪ In addition, the National Audit Office and parliamentary committees publish occasional reviews into standards of maternity services, and there is a high level of political interest in the configuration of maternity services.
Victoria	▪ Standards are set out in Standing Council on Health (2012) National maternity services capability framework and professional college guidance - used to set state approach on standards ▪ Standards require services to operate in managed networks with clear leadership and accountability ▪ Outcomes data (10 indicators) is published by MoH
Ontario	▪ Since 2011, the Provincial Council for Maternal and Child Health has required all maternity service providers to be categorised according to 7 tiers of service which define the service requirements ▪ In addition, individual LHINs (regional payors) will manage and monitor service standards as part of the contractual commissioning process
France	▪ The Haute Authorité de Santé (HAS) sets standards1 required for provider authorisation and service provision level based on maternity unit size, defined by annual volume of deliveries and tier. ▪ On top of maternity service requirements set by HAS, the French President has guaranteed availability of emergency services within 30 minutes (travel time) across all of France
Germany	▪ The German Association for Gynecology and Obstetrics (Deutschen Gesellschaft für Gynäkologie und Geburtshilfe) has set out minimal standards for processes, structure and organisation ▪ In addition to regulatory requirements and clinical protocols, providers compete actively for patients and quality and access are used as key differentiators
Sweden	▪ Clinical guidelines are published by the national Swedish Society of Obstetricians and Gynaecologists (SSOG) ▪ Each regional Local Authority sets local standards based on SSOG recommendations: e.g. Stockholm County Council publishes a Rule Book for maternity units which requires sets out the requirements that all maternity units (including midwife-led units) must meet relating to workforce availability and availability of dependent services ▪ Providers are only commissioned to deliver care as defined by local agreements (e.g. risk profile)
Arkansas	▪ Arkansas Department of Health manages state-level of accreditation requirements which set out minimum requirements (often focused on availability of equipment and fit out etc.) for units providing intrapartum care ▪ The state has recently introduced an episode-based for perinatal care (similar in concept to the maternity pathway tariff in the NHS) for low-risk uncomplicated pregnancies, which allows for gain-sharing if quality and cost thresholds are met ▪ ACOG (American College of Obstetricians and Gynaecologists) publish best practice clinical guidelines but these are not directly linked to mandatory standards though threat of malpractice litigation may provide a strong incentive to follow guidelines

International comparison of neonatal mortality outcomes

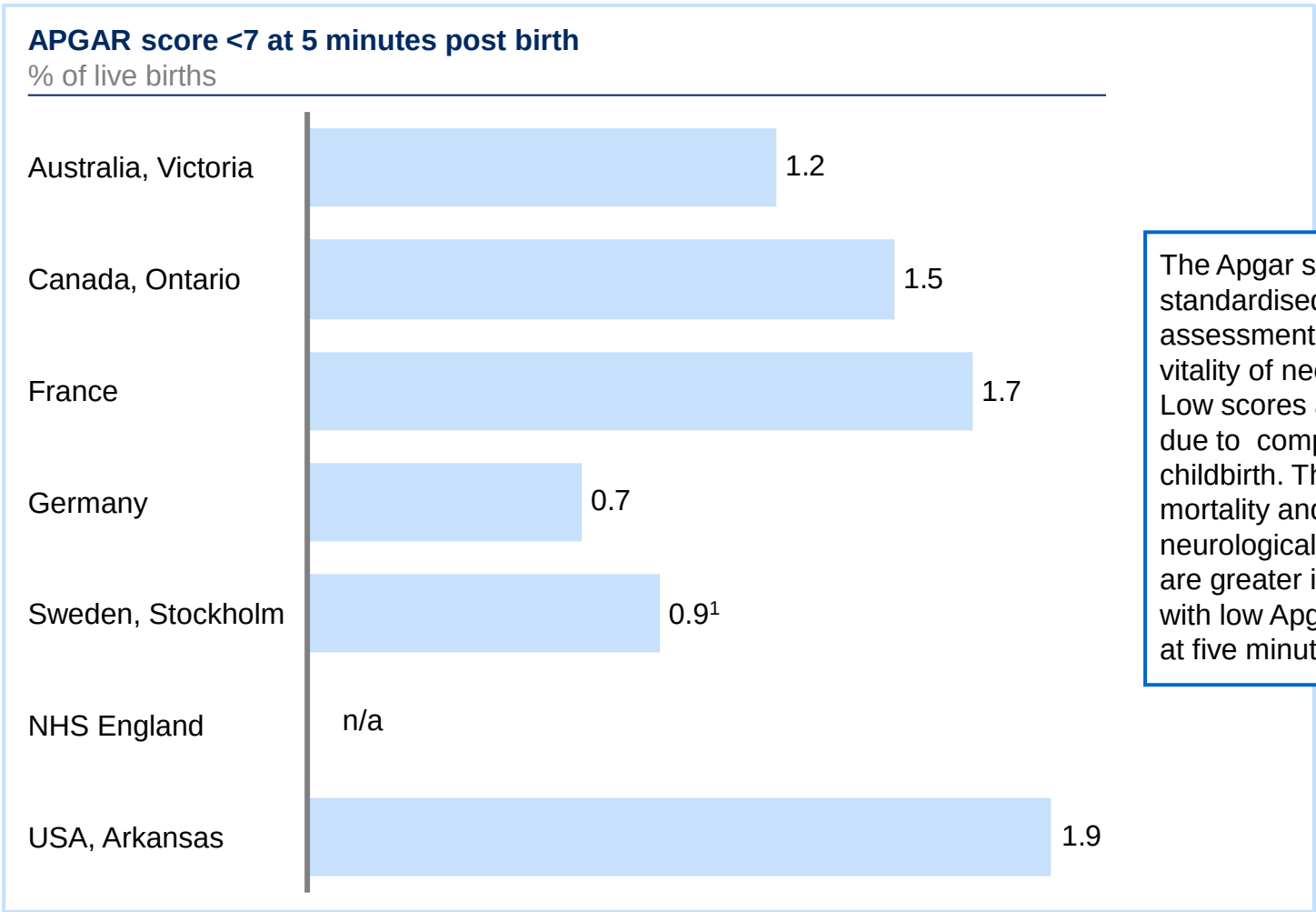


Caution!
Neonatal mortality rates are dependent on socio-economic and other factors and offer only a limited insight into the quality of maternity care

Note: Regional (i.e. state/province-level) data is available for some neonatal mortality indicators but this study provides the most recent, systematic review from a single source, thus avoiding interpretation errors due to methodological differences in data analysis and collection.

SOURCE: Wang et al, 2013, Global, regional, and national levels of neonatal, infant and under-5 mortality during 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013, The Lancet

International comparisons of quality of intrapartum care

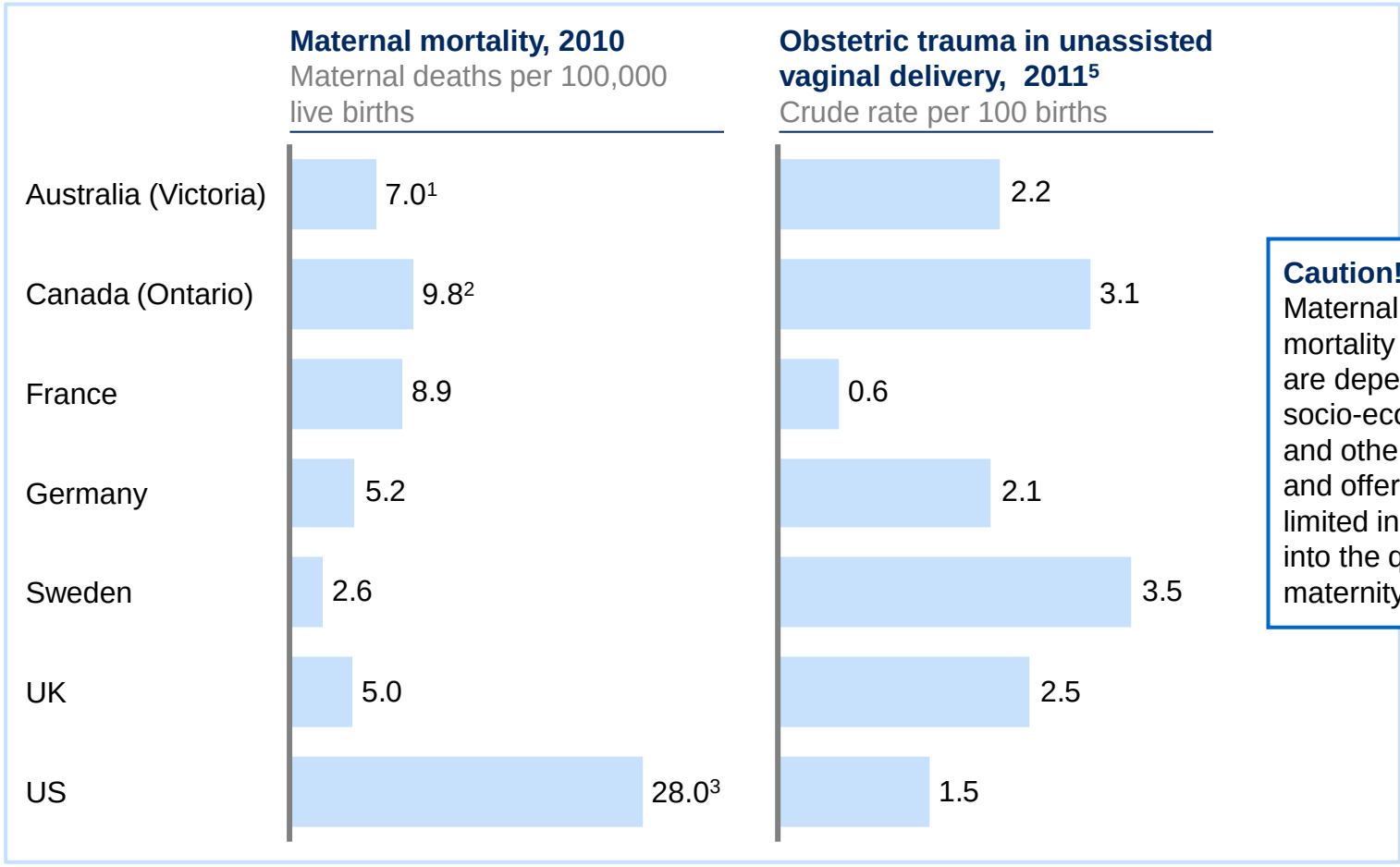


The Apgar score is a standardised assessment of the vitality of neonates. Low scores are usually due to complications in childbirth. The risks of mortality and serious neurological damage are greater in neonates with low Apgar scores at five minutes.

Note: Data is for most recent year available.
1 1.2 for Sweden as a whole.

SOURCES: National Core Maternity Indicators, AIHW, 2009 (Victoria); Provincial Overview of Perinatal Health in 2011-12 (Ontario); Enquête Nationale Périnatale, 2010 (France); Quality and Efficiency in Swedish Healthcare 2012; Maternal and Child Health Statistics, Department of Health, Arkansas, 2003; Straube et al, Arch Gynecol Obstet. Aug 2010; 282(2): 135–141 (Germany)

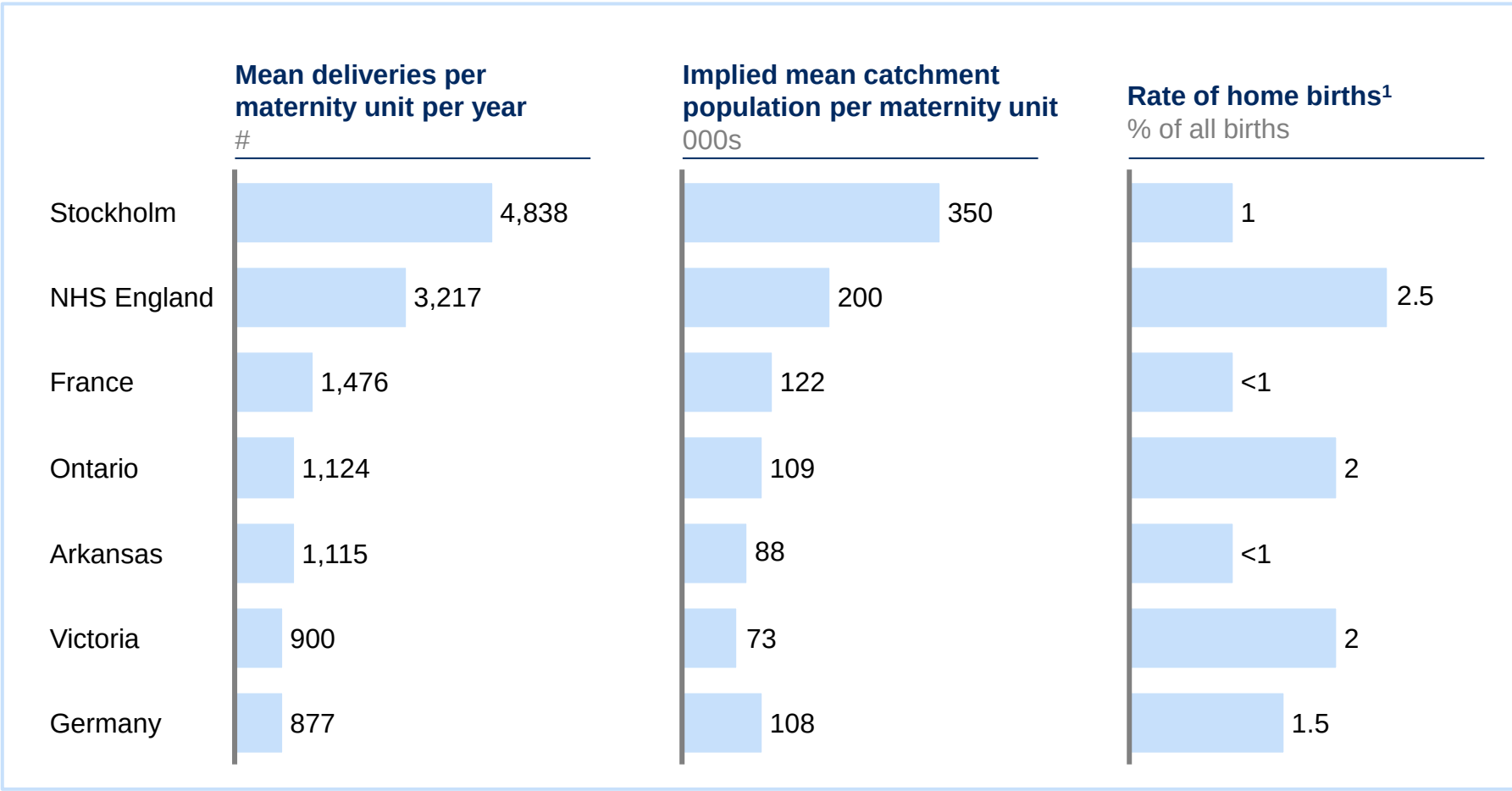
International comparison of maternal health outcomes



1 Data for 2009
2 Pooled estimate for 1996/7 to 2009/10 per 100,000 deliveries. Note the national rate for most recent year (2009) is 7.8 compared to 9.0 over the pooled period 1996/7 – 2009/10
3 Pooled modeled estimate for 2009-2013. Note: all World Bank estimates are higher than OECD equivalents but US is still a major outlier (e.g. Germany 7, UK 8, France 12 using World Bank source).
5 Data is for 2011 or latest available year (from OECD Health Data); data is national only (not regional)

SOURCE: OECD Health Data, 2013; Statistics Canada, Births, 2009; CCOPMM Annual Report 2009 (for Victoria, Australia); World Bank (for US maternal mortality)

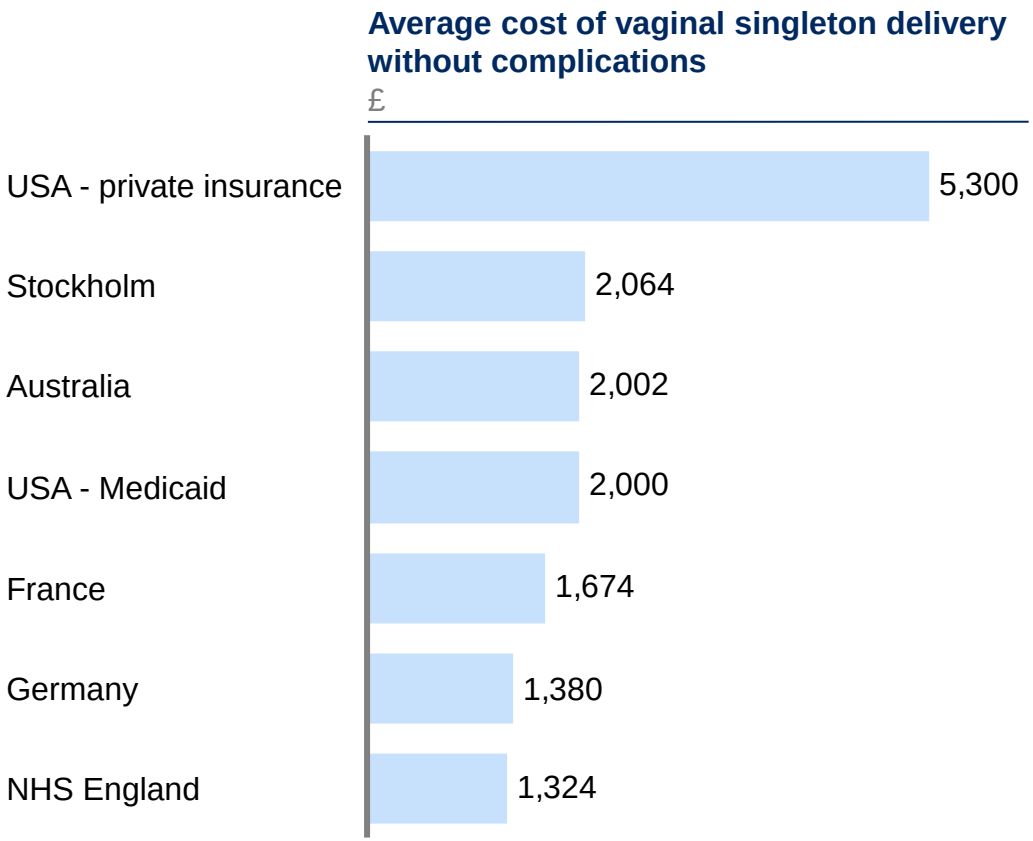
International comparisons of average maternity unit size



1 Data for Germany includes births in midwife-only birth centres.

SOURCES: Genomlysning av Stockholms läns förlossningsenheter, Hälso-och sjukvårdsförvaltningen, Stockholms Läns Landsting, 2014 (Sweden); Hospital Episode Statistics (NHS England); Enquête Nationale Périnatale, 2010 (France); Born Ontario, Provincial Overview of Perinatal Health in 2011/12 (Ontario); Arkansas Department of Health, 2013 (Arkansas); Australian Institute of Health and Welfare and University of New South Wales, Australia's mothers and babies 2011 (Victoria); IGES (Germany)

International comparisons of the average cost of normal, vaginal delivery



Caution!

- DRG systems vary by country. This analysis takes the closest available DRG (to vaginal, singleton delivery without complications) but definitions and parameters will vary which will mean that some models are capturing a broader case mix.
- Payment models also vary by country and the DRG payment may not include all relevant elements of provider income.

Notes: USA numbers are approximate and take into account discounts on the total cost charged by the provider (total cost are around USD13-16k) and exclude postpartum and prenatal care. Currency conversion rates used: €1 = £0.814; SEK1 = £0,09; AUD1 = £0.558; US$1 = £0.59

SOURCES: Payment by Results, National Tariff, 2012/13 (tariff for NZ11B and NZ11D without MFF) for NHS England; Genomlysning av Stockholms läns förlossningsenheter, Hälso-och sjukvårdsförvaltningen, Stockholms Läns Landsting, 2014 for Sweden; Independent Hospital Pricing Authority, National Hospital Cost Data Collection Australian Public Hospitals Cost Report 2011-2012, Round 16, 2014 – for Australia; ATIH, 2014 (DRG cost per delivery, data for 2013) for France; DRG catalogue, 2014, Association of SHIs (cost per delivery, data for 2014) for Germany; The cost of having a baby in the United States – Truven Health Analytics Marketscan Study, 2013 for USA.

Intrapartum maternity services in France

Service line definition

- Patients are free to choose their provider (from any service level) provided that the service is equipped to manage their risk profile:
  - Level I obstetric units can manage normal risk deliveries only (49% of births)
  - Level II obstetric and neonatology units (with NICU) can manage normal to moderate risk deliveries (40% of births)
  - Level III services can manage all risk levels and are competent to provide neonatal reanimation (11% of births)

Service delivery model

- Patients have a free choice of maternity care
- In general, maternity units are smaller than their UK counterparts:
  - 17% of births take place in units <1,000 deliveries year (2.5% <500)
  - 35% take place in units of 1-2,000 deliveries/yr
  - 29% take place in units of 2-3,000 deliveries/yr
  - 19% take place in units of >3,000 deliveries/yr
- Early antenatal care is provided by the patient's usual (non-hospital based) gynaecologist
- By 22 weeks, the patient must register at the hospital where they would like the delivery to take place:
  - Private providers (36% of deliveries) tend to be level I or II and intrapartum care is provided by the patient's obstetrician/gynaecologist who is available 24/7 to manage the delivery when the patient goes into labour
  - Public providers (64% of deliveries) tend to be levels II and III and care is provided by midwives and obstetricians employed by the hospital and working in teams/shifts providing the same level of coverage 24/7:
    - Care tends to be midwife-led until and unless an obstetrician is required
    - Continuity of care is not the norm

Comparison to NHS

- In France there exists a tiered maternity system based on clearly defined gestational age limits for maternity units with only highly specialist units able to deliver babies outside of a defined gestational age ranges, which the NHS does not do
- In France, the patient chooses their own (non-hospital based) gynaecologist
- In France, patients can choose between care provided by an independent obstetrician at a private hospital, and shared obstetrician/midwife care provided by a public hospital

SOURCE: Haute Autorite de Sante, Qualité et sécurité des soins dans le secteur de naissance: Guide méthodologique, 2014 (in French): Enquête National Perinatale, 2010

Configuration of maternity care in France

Maternity units by type, 2010

Number and per cent

Type of unit	# of units	% of units	% of births	Risk profile	Summarised service requirements
Level 1	263	49	28	▪ No premature deliveries or multiple births ▪ Low maternal/fetal risk profile	▪ Delivery room(s) and facilities for neonatal resuscitation
Level 2 (2a + 2b)	212	40	48	▪ From 30+ to 33+ weeks depending on level of NICU ▪ Moderate maternal/fetal risk profile	▪ Delivery room(s) ▪ Neonatal ICU - level determines gestational age limits
Level 3	60	11	24	▪ All risk profiles and gestational ages	▪ Delivery room(s) ▪ Neonatal ICU ▪ Dedicated neonatal resuscitation room

Equivalent to ~1 per 1.1 million population

Workforce and other standards are set out in earlier pages with further details in Appendix

SOURCE: Haute Autorite de Sante, Qualité et sécurité des soins dans le secteur de naissance: Guide méthodologique, 014 (in French):Enquete National Perinatale, 2010 (DREES); Sante-medicine.net (accessed May 2014)

Intrapartum maternity services in Ontario

Service line definition

- The patient has a free choice of provider from those where their LHIN (local payor) has a contractual agreement
- The risk status of the pregnancy (gestational age, co-morbidities, singleton vs multiple births etc) is used to determine the service providers that are eligible to provide care (see Standards Appendix for details)
- For lower levels of care provision, the patient must be informed of – and consent to - the risks due to lack of services (e.g. emergency caesarean-section)

Service delivery model

- Almost all deliveries are performed by obstetricians in a hospital setting (2% home births) supported by maternity care nurses:
  - Obstetricians - 84%
  - GPs with obstetric /anaesthetics training (concentrated in remote areas) – 10%
  - Certified midwifes - 5%
  - Others – 1%
- Service providers are tiered according to level of provision provided and risk profile of patients that they are permitted to treat
  - There exist 7 distinct levels of maternity care providers
  - Full details of the requirements and restrictions at each tier are in the appendix
- Midwife-led care is still not a well-integrated and established model of care
  - Midwife-led care was first legalised in Ontario in the 1990s
  - Demand (from patients) for midwife-led care cannot be met with the current midwife workforce available
  - If a person is able to access midwife-led care, the named midwife (or midwife team) delivers ante-natal care and has admitting rights at ≥1 hospital (or birth centre) and is on call 24/7 to manage the delivery
- Workforce shortages mean patients may need to "search" for an obstetrician able to take them due to existing caseload

Comparison to NHS

- Compared to the NHS, maternity care in Ontario is more likely to be Obstetrician or GP-led supported by nurses and midwives
- Providers offering level III services (i.e. able to care for higher-risk deliveries) tend to have >3,000-7,000 births/year
- Units operate at a broadly similar scale to the NHS (most providers falling between 2,000 and 7,000 births a year) with some smaller providers (500 to 1,500 births) offering lower tier services only
- Unlike the NHS, not all acute providers offer intrapartum maternity care

SOURCE: PCMCH, Standardized maternal and neonatal levels of care definitions, 2013 update; Born Ontario, Provincial Overview of Perinatal Health, 2011/12

Configuration of intrapartum maternity care in Ontario

Maternity units by type, 2013

Number and per cent

Type of unit	# of units[1]	% of units[1]	% of births (2011-12)	Risk limitations
Level 1 (1a and 1b)	48	51	12	▪ 1a: singleton births at 36+ wks; no VBAC or c-sections; informed consent required ▪ 1b: uncomplicated singleton/twin births at 36+ wks gestation; c-sections if Anaesthetist/GP Anaesthetist present
Level 2 (2a, 2b, 2c)	39	41	68	▪ 2a: 36+ wks gestation with low risk of obstetric/medical complications ▪ 2b: 34+ wks gestation with low risk of obstetric/medical complications ▪ 2c: 32+ wks gestation and moderate risk profile including uncomplicated triplets
Level 3 (3a, 3b)	8	8	20	▪ 3a: All risk profiles and gestational ages; with onsite NICU and adult ICU ▪ 3b: As 3a with onsite emergency surgical capability

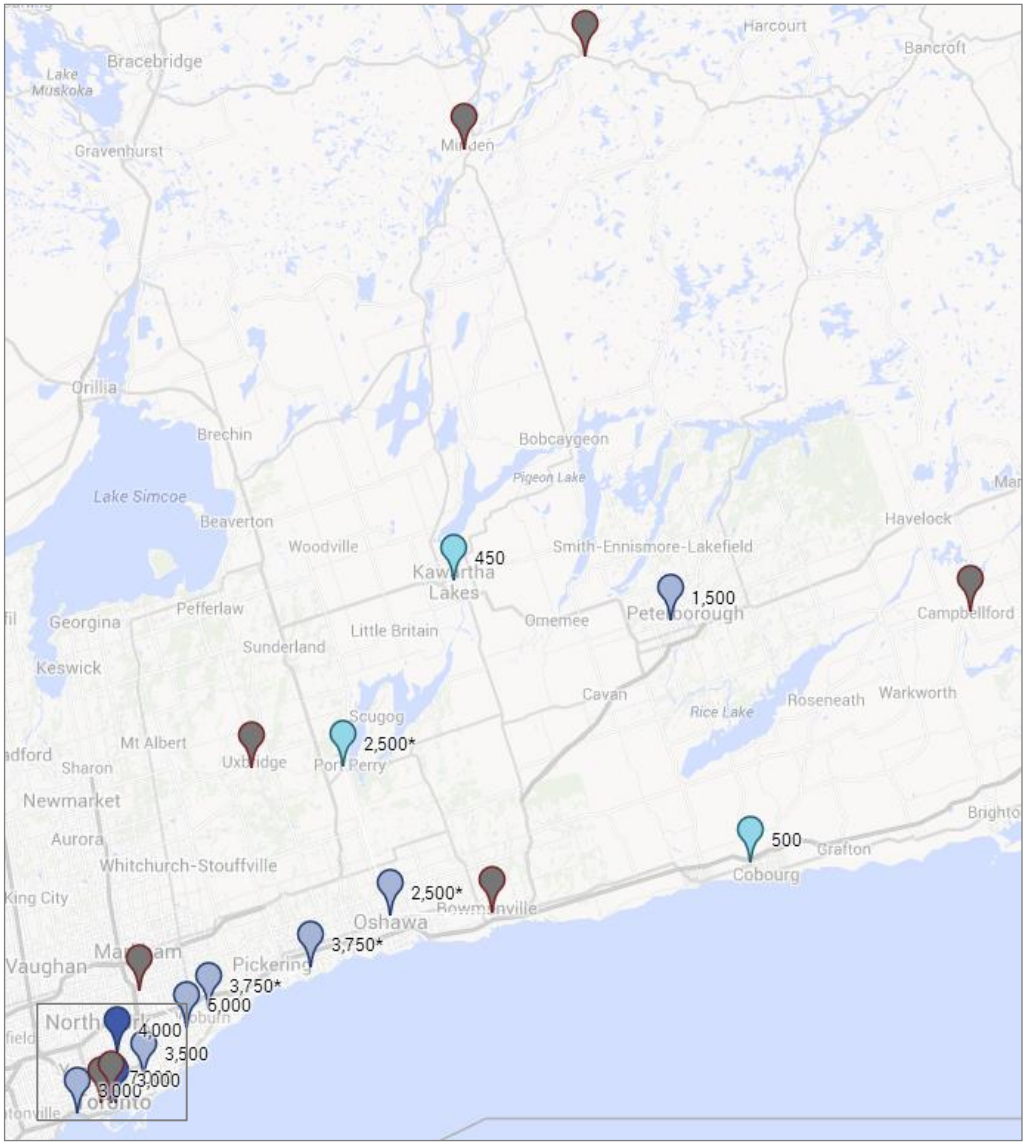
Equivalent to ~1 per 1.7 million population

Workforce and other service standards are set out in earlier pages with further details in Standards Appendix

1 Excludes units for which no categorisation is yet available

SOURCE: PCMCH, Standardized maternal and neonatal levels of care definitions, 2013 update

Risk-tiered intrapartum maternity care is available at just over half of all providers in the region



- Patients have a free choice of provider
- Only a small number of units offer midwife-led deliveries and there are no midwife-led units

- Level 3 maternity unit (all gestational ages/risk categories)
- Level 2 maternity unit (≥32-34 weeks, limited risks)[1]
- Level 1 maternity unit (≥36 weeks, very low risk)[1]
- No maternity services
- Neonatal care only (including only site for neonatal surgery)
- # Births per year
- #* Births per year shared between two locations

Note: Detailed definitions for risk categories available in Standards Appendix
SOURCE: Central Toronto LHIN; Central East LHIN; hospital websites and Annual Reports

Intrapartum maternity services in Sweden

Service line definition

- Maternity care is provided through the national health system
- Midwife-led care is the norm for normal risk mothers covering ante-natal, intra-partum and post-natal care
  - Midwives work in teams and one-to-one continuity of care is not the norm
  - Midwives transfer patients to obstetrician-led care according to established clinical protocols

Service delivery model

- Maternity services are tiered and providers have clearly defined risk profiles
  - Each provider is only able to deliver care for patients within their clearly defined risk profile (based on gestational age and other factors)

- Pregnant women are considered suitable for midwife-led care unless risk factors are present
  - Gestation at time of delivery outside of 37 to 42 weeks +6
  - Multiple pregnancy
  - Previous c-section unless following by a subsequent normal delivery
  - Co-morbidities including high blood pressure, diabetes, gestational diabetes, epilepsy and risk factors

- 99% of births take place in hospitals with different maternity unit models
  - Obstetrician-led maternity units – where midwives deliver care but with more direct access to obstetrician support (i.e. no formal transfer of care required)
  - Birth centres (not available everywhere and always located within a hospital complex) with emphasis on low-intervention approach to delivery but obstetricians available on site when required

- C-section rate is very low (14.8%) split approximately equally between elective and emergency procedures

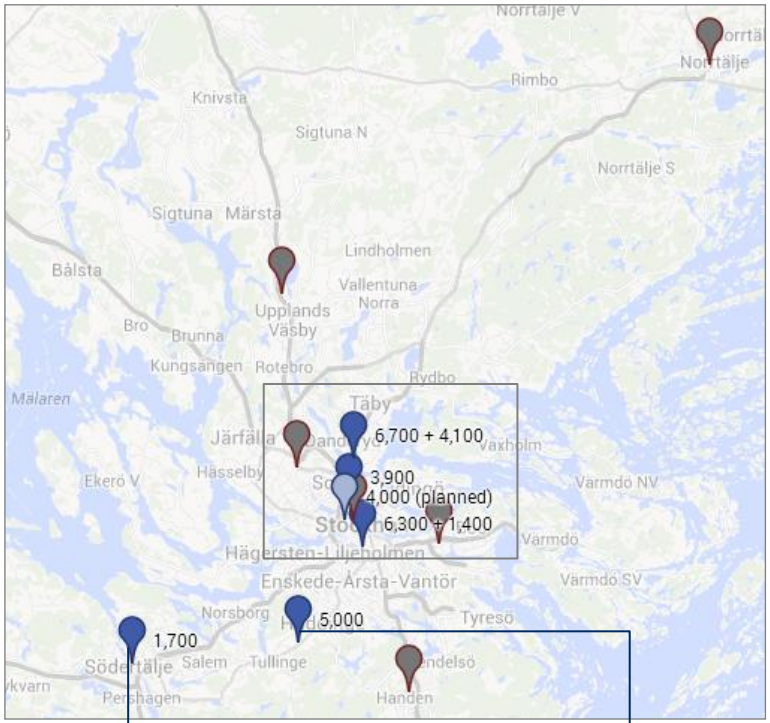
Comparison to NHS

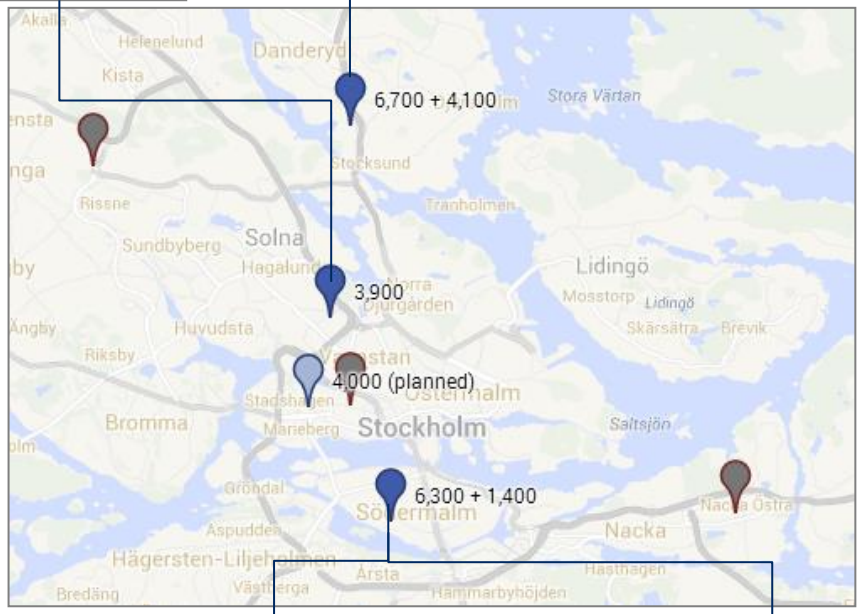
- In Sweden, midwife-led care is the norm, where in the NHS obstetrician-led care accounts for the vast majority
- Contrary to the NHS, maternity services in Sweden follow a clear tiered model, where lower acuity units can provide care to low risk patients
- Clear referral agreements are in place to allow for tiered services

SOURCES: Regelbok för förlossningsenheter, 2013 (Swedish language publication); Gottvall et al, Safety of birth centre care: perinatal mortality over a 10 year period, BJOG, 2004, Vol 111, 71-8

Clear transfer agreements exists for maternity services in Stockholm County

- Maternity unit
- Planned maternity unit (2018)
- No maternity unit
- # Births per year
- Transfer agreement





Karolinska Solna
- Public hospital
- 3,916 births in 2013 (13% share)
- 22+ wks gestation
- 20 NICU beds
- Specialist unit for very premature deliveries

Danderyds
- Public hospital
- 6,711 births in 2013 (23% share)
- 28+ wks gestation
- 20 NICU beds (run by Karolinska)

BB Stockholm
- Private hospital
- 4,111 births in 2013 (14% share)
- 28+ wks gestation
- Neonatal transfer agreement with Danderyds

Sodertalje
- Public hospital
- 1,680 births in 2013 (6% share)
- 37+ wks gestation
- Transfer agreement for NICU with Karolinska Huddinge

Karolinska Huddinge
- Public hospital
- 4,955 births in 2013 (17% share)
- 26+ wks gestation
- 18 NICU beds
- Specialist for HIV

Södersjukhuset
- Public hospital
- 6,260 births in 2013 (21% share)
- 28+ wks gestation
- 30 NICU beds

Södra BB
- Public hospital
- Birth unit (on site of Sodersjukhuset)
- 1,400 births in 2013 (5% share)
- 37+ wks gestation uncomplicated vaginal births only; no epidurals

SOURCE: Hospital websites; Genomlysning av Stockholms läns förlossningsenheter, Hälso-och sjukvårdsförvaltningen, Stockholms Läns Landsting, 2014

Intrapartum maternity services in Germany

Service line definition

- Pregnant women can choose their care provider and care delivery model (within the limits of what is covered by statutory health insurance)
- Clinical guidelines are available to risk stratify pregnancies and define treatment, but these are not embedded in the service delivery model: e.g. some centers will specialize in offering spontaneous vaginal delivery for breech births, although the guidelines recommend c-section, and normal risk patients can opt for care in a high-intensity setting

Service delivery model

- Antenatal care is provided by the patient's usual (non-hospital based) gynaecologist and a self-employed midwife chosen by the patient
- Self-employed midwives have "delivery rights" at ≥1 hospital and the patient can choose whether to have delivery care from this midwife or not
- During the pregnancy, the patient will register with their preferred maternity unit for delivery (if no registration is made, the patient can attend any maternity unit as an emergency)
- Maternity units compete for patients offering a range of benefits, e.g.:
  - Access (and distance) to NICU
  - Availability of birthing pools and other facilities
  - Single rooms for post-delivery care
  - Rapid access to epidural
  - Low c-section rates
  - Quality indicators
- When labour begins, if the patient has chosen "known midwife" care, they call that person (24/7 availability) and meet at the hospital[1]
- If hospital care (no "known midwife") is chosen, the hospital provide midwife-led delivery care with access to an obstetrician/anaesthetist and related services as required (no formal transfer required from midwife to obstetrician care)

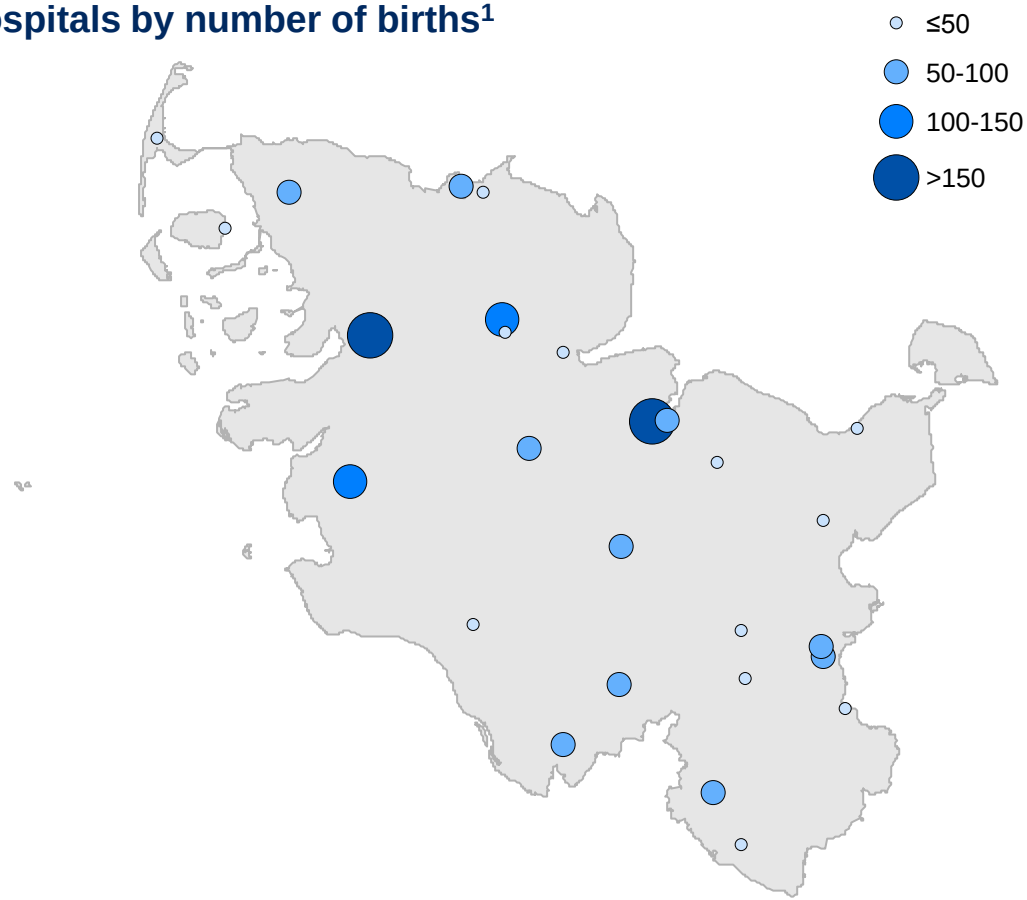
Comparison to NHS

- The maternity care delivery model in Germany is very different from the NHS'
  - In Germany, the patient usually chooses their own (non-hospital based) gynaecologist and/or midwife
  - The midwife has admission rights at a hospital and meets the patient at time of labour
- There exist competition between maternity units through a range of benefits and quality indicators

SOURCE: Deutschen Gesellschaft für Gynäkologie und Geburtshilfe

The number of deliveries per year varies significantly and has led to the introduction of different perinatal treatment levels

Hospitals by number of births[1]



- Number of deliveries per clinic varies by up to factor 21
- Regulator introduced different levels of perinatal care:
  - Level 1: High risk pregnancies with estimated birth weight < 1,250g or < 29 week of pregnancy
  - Level 2: Medium risk pregnancies with estimated birth weight between 1,250g and 1,499g or between 29th and 31st week of pregnancy
  - Perinatal focus: Pregnancies with estimated birth weight > 1,500g or births between 32nd and 35th week of pregnancy; pregnancies with insulin-dependent diabetes
  - Regular obstetrics ward from 36th week of pregnancy

1 ICD O80-O82, single deliveries including caesarean section, 2010 data

SOURCE: Quality record database; Federal Joint Committee

Hospital providers closed two obstetric departments recently due to volume-related quality concerns

Low birth rates and shortage of skilled labor make it impossible for hospital Oldenburg to secure the **necessary quality levels**

- Hospital CEO, March 2014

The Association of Health Insurance Funds in Schleswig Holstein calls for the **centralization of obstetric departments** in the region. In small facilities, the **infant mortality rate was 3.5 times as high** when compared to units with more than 1,500 births p.a.

- Die Welt, March 2014

According to hospital provider Asklepios, **rising liability premium** for gynecologists and midwives have been a substantial **financial burden**. Hence, the department had to shut down. Additional reason has been the continuously **decreasing number of births** in the region down to **only 89 birth in 2013**. Quality factors have been in Asklepios' argumentation line later on: **"Sylt has a birth mortality risk comparable to Kazakhstan and the Fiji islands and is therefore worse than Romania and Albania"**

- Die Welt, March 2014

- Low birth rates lead to decreasing occupancy rates in obstetric department
- Increasing centralization of obstetric services in Schleswig-Holstein
- Low volumes lead to :
  - Quality problems
  - High costs per case

SOURCE: Press

Intrapartum maternity care in Arkansas - Introduction

Service line definition

- Free-standing birthing centers may only offer care to women with “normal uncomplicated pregnancy … as defined by a reasonable and generally accepted criteria of maternal and fetal health”
- The state has recently introduced an episode-based payment model for perinatal care (similar in concept to the maternity pathway tariff in the NHS) for low-risk uncomplicated pregnancies (see definition and exclusion criteria on next page), which allows for gain-sharing if quality and cost thresholds are met or risk-sharing if they are not

Service delivery model

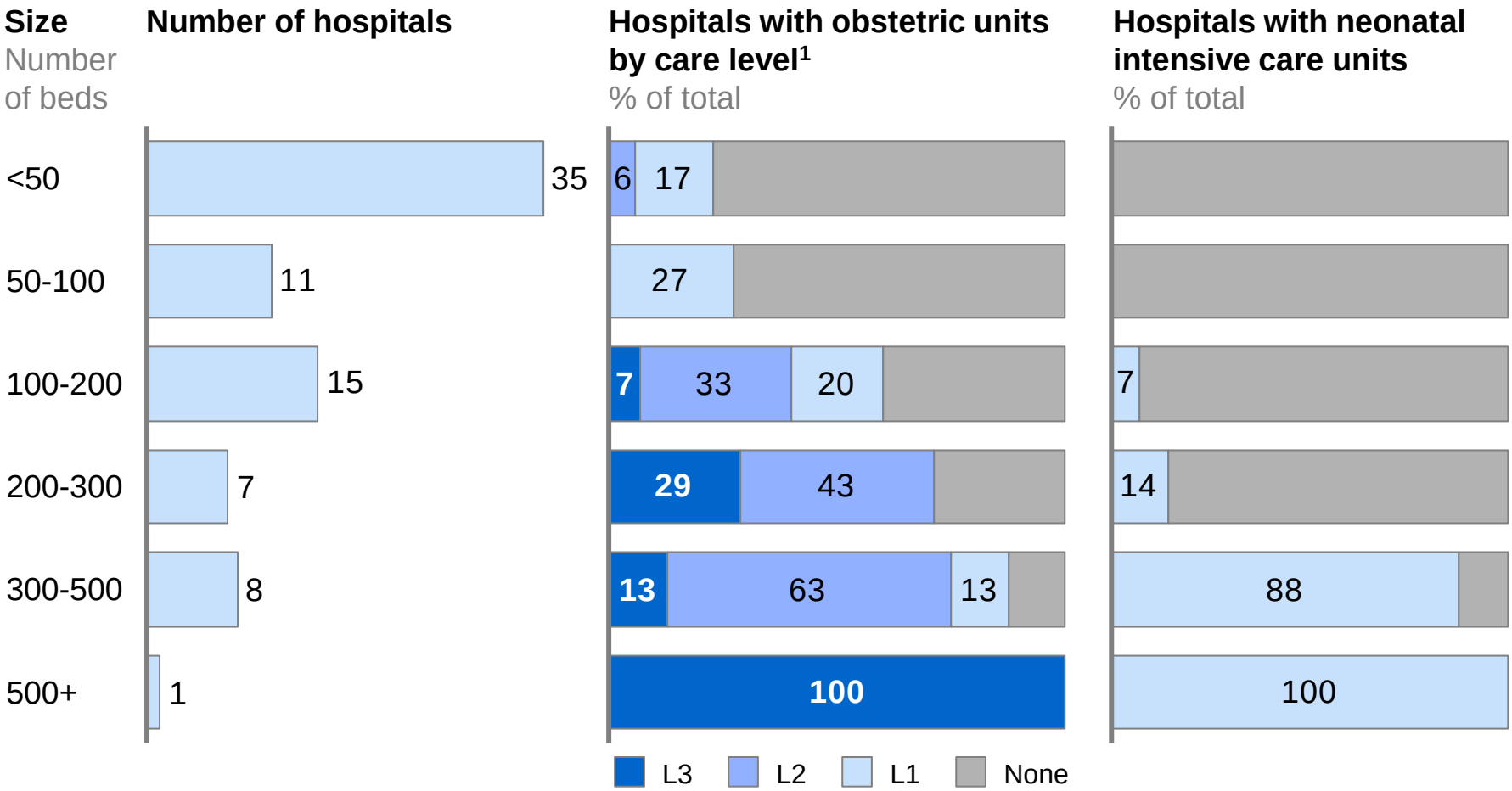
- Most intrapartum care is obstetrician-led with only 9% of deliveries (nationally in 2010) midwife-led and latest statistics suggest Arkansas is lower still (<1% in 2007)
- The dominant delivery model is care led by an independent (non-hospital based) obstetrician:
  - Mothers can choose obstetrican care or shared midwife/obstetrician care choosing from the providers approved by their insurer
  - Most obstetricians and midwives work in practices with admitting rights at various local hospitals
  - At the onset of labour, patient and obstetrician (or midwife) meet at the designated hospital which provides facilities and support services (nursing, critical care, emergency theatre, anaesthetics, etc)
  - Emergency c-section, if required, this is performed by the admitting obstetrician
  - Obstetricians/midwives may offer group practice care
- Arkansas permits free-standing birthing centers provided they have a formal written agreement with unit offering a 24/7 obstetric service including emergency c-section accessible within 30 mins (by ambulance) – the first birthing center opened in 2013
- Very small hospitals (e.g. Critical Access hospitals) may offer intrapartum services provided they meet accreditation requirements but are not required to do so

Comparison to NHS

- Maternity care in Arkansas is delivered on a very different model to the NHS
- Almost all care is delivered by independent obstetricians, supported by hospital-based nursing staff
- There is not size requirement for hospitals offering maternity care – though there are accreditation requirements which set the equipment and facilities that must be available
- Cesarean-section rates (including elective c-section) are high relative to the NHS: 35% vs 26%

SOURCE: Rules and Regulations for Free-Standing Birthing Centers, and Rules and Regulations for Hospitals and Related Institutions in Arkansas 2007, Arkansas Dept of Health (http://www.healthy.arkansas.gov/aboutADH/Pages/RulesRegulations.aspx; Arkansas Center for Health Statistics, Current Birth Data, 2014; National Women’s Law Center (http://hrc.nwlc.org/status-indicators/maternal-mortality-rate-100000); HES Maternity Statistics, 2012/13

Few smaller hospitals in Arkansas provided maternity services, and generally at a lower care level

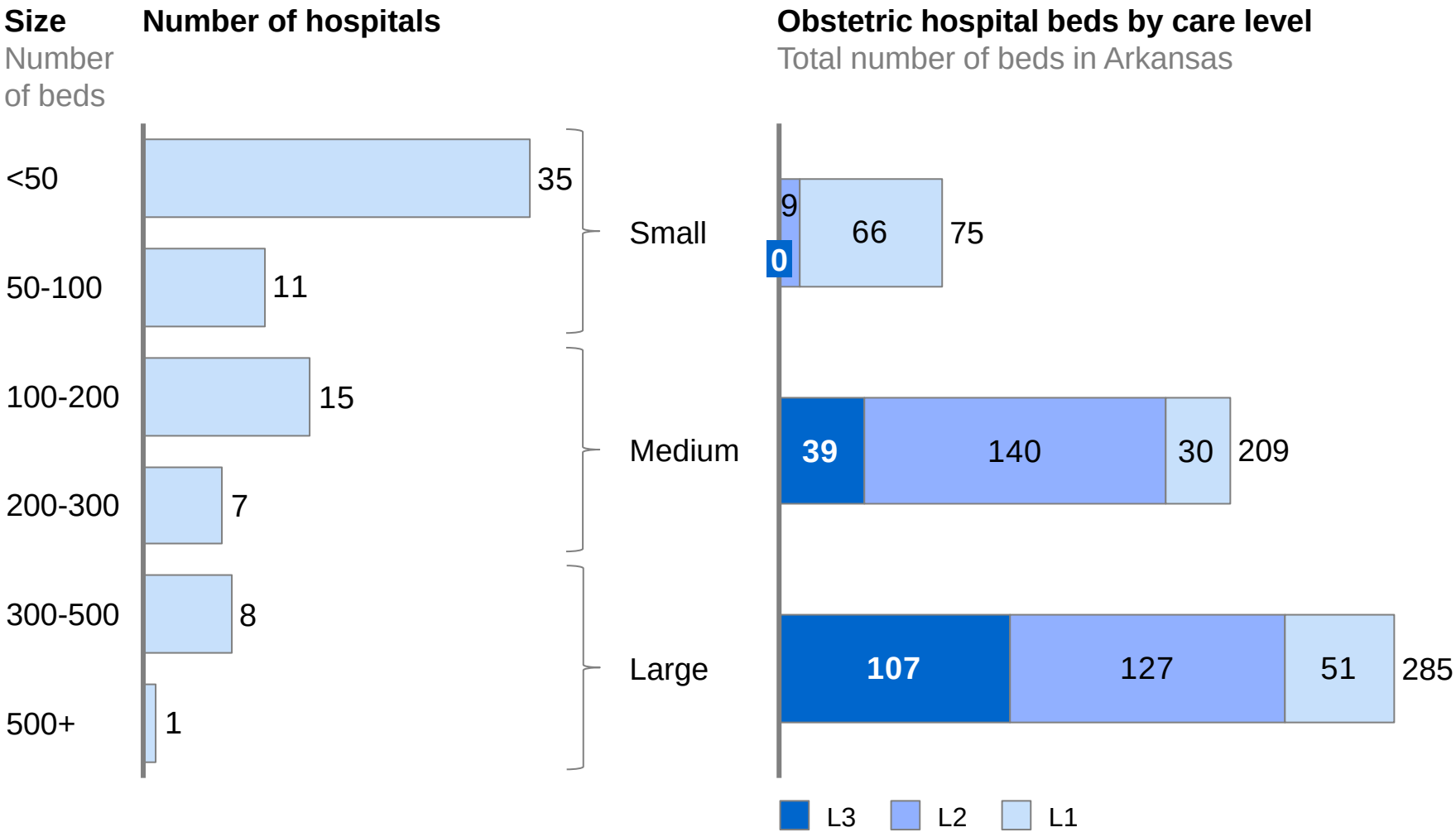


Note: Excludes Central Arkansas Veterans Healthcare System

1. Level 1 unit provides services for uncomplicated maternity cases; Level 2 providers care for the majority of complicated cases and special neonatal services; Level 3 provides services for all cases

SOURCE: AHA Annual survey, 2013

While most obstetric beds are in larger hospitals, medium-sized hospitals contribute a fair share as well

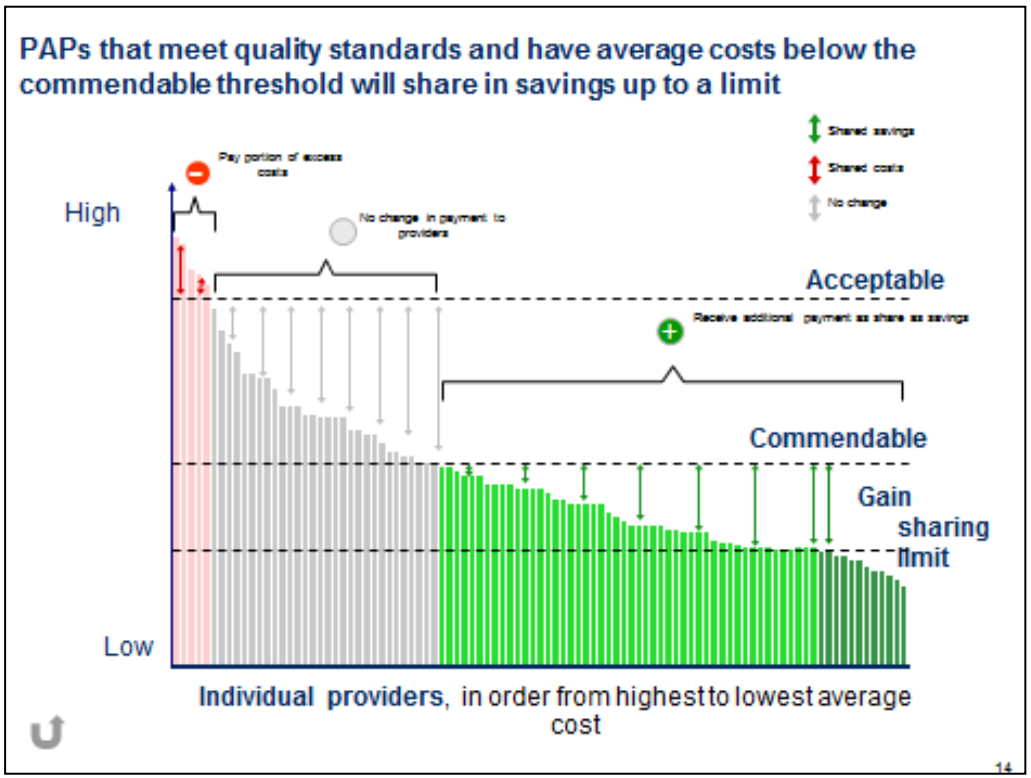


Note: Excludes Central Arkansas Veterans Healthcare System

SOURCE: AHA Annual survey, 2013

In Arkansas, payment for maternity care is linked to selected quality metrics

Episode-based payments for maternity care in Arkansas



Overview

- Episode payment covers all perinatal care: ante-natal, delivery and post-natal to 60 days post-delivery. Excludes neonatal care
- Multi-payor agreement covering both commercial and public insurers, launched in 2013
- Payment is made to a Principal Accountable Provider (PAP) who should be the provider of delivery care (usually an independent obstetrician or obstetrician group)

Inclusion/exclusion criteria

- All live births included, unless:
  - No ante-natal care provided before 60 days prior to delivery
  - Complications of pregnancy/birth[1]
  - Co-morbidities[2]

Quality criteria

- Requirements for gain-sharing (80% minimum threshold):
  - HIV screening
  - Group B streptococcus screening
  - Chlamydia screening
- Metric tracking required (not linked to gain-sharing):
  - Ultrasound screening
  - Screening for gestational diabetes
  - Screening for asymptomatic bacteriuria
  - Hepatitis B specific antigen screening
  - C-section rate

1 Excluded complications: amniotic fluid embolism, obstetric blood clot embolism, placenta previa, severe preeclampsia, multiple gestation ≥3, late effect complications of pregnancy/childbirth, puerperal sepsis, suspected damage to fetus from viral disease in mother.
2 Excluded co-morbidities: including cancer, cystic fibrosis, congenital cardiovascular disorders, DVT/pulmonary embolism, other phlebitis and thrombosis, end-stage renal disease, sickle cell, type 1 diabetes

SOURCE: State of Arkansas, Arkansas Payment Improvement Initiative, Perinatal Episode Webinar (http://www.paymentinitiative.org/episodesOfCare/Pages/Perinatal-.aspx)

Intrapartum maternity services in Victoria, Australia

Service line definition

- Pregnancies are stratified by risk (see Appendix for definitions): Normal/Moderate complexity/High complexity
- The risk level – level of needs combined with gestational age at time of delivery – determines the level of provider that the patient can choose from (e.g. a moderately complex pregnancy must be delivered at a ≥level 4 provider)
- Patients treated at lower tier providers must be informed of (and consent to) the associated risks

Service delivery model

- **Maternity services are delivered by managed clinical networks**:
  - Providers in a network have a defined service delivery level (from 1 to 6) with the lowest level delivering ante/postnatal care only. And the highest level leading state-wide tertiary services. With each increase in service delivery level the complexity profile of services that can be delivered increases in line with the workforce and service requirements
  - More senior service level providers are required to offer escalation services and 24/7specialist advice to lower level service providers in their network
  - Level 5 (regional) and 6 (state) service providers provide clinical leadership for the lower level providers in their network and level 6 providers are accountable for emergency obstetric retrieval procedures services
  - However, few hospitals publish their level and there is no central enforcement[1]

- **Obstetric workforce patterns are broadly comparable to the NHS with some key differences**
  - 64% of births are obstetrician-led; 29% midwife-led; 6.4% GP-led; 0.6% have no recorded (or inadequately recorded) care provider
  - GPs with specialist training in obstetrics and delivery rights (GP Obstetricians) are a core part of the maternity care workforce
  - GPs with specialist training in anaesthetics (GP Anaesthetists) provide epidurals etc in lower tier units

Comparison to NHS

- Maternity services in Australia are tiered, whereas in England there is a one-size-fits-all approach
- Within the tiering system, providers in Australia are allowed to provide lower levels of care than in England, provided they inform patients and have referral relationships with higher level care providers
- Contrary to the NHS, in Australia GPs can provide maternity services in the form of GP obstetricians and GP anaesthetists

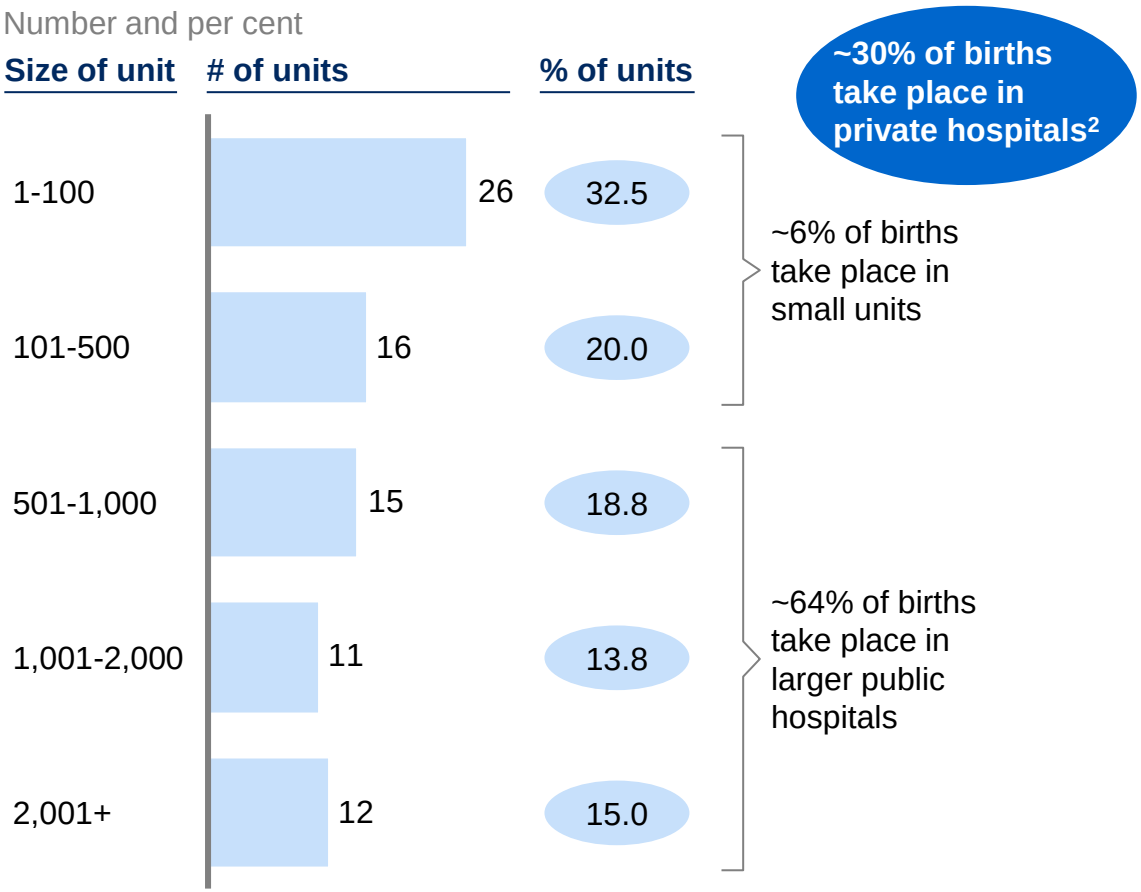
SOURCE: QCMB: The National Maternity Services Capability Framework; RANZCOG, Standards of Maternity Care in Australia and New Zealand, 2014; Victoria Maternity Services Performance Indicators www.health.vic.gov.au/maternitycare/publications.htm

1. Information from Danielle Cosgriff, Health Information Manager at Department of Health Victoria

Configuration of maternity care in Victoria, Australia

Maternity units by size[1], 2011

Number and per cent



Service risk profiles

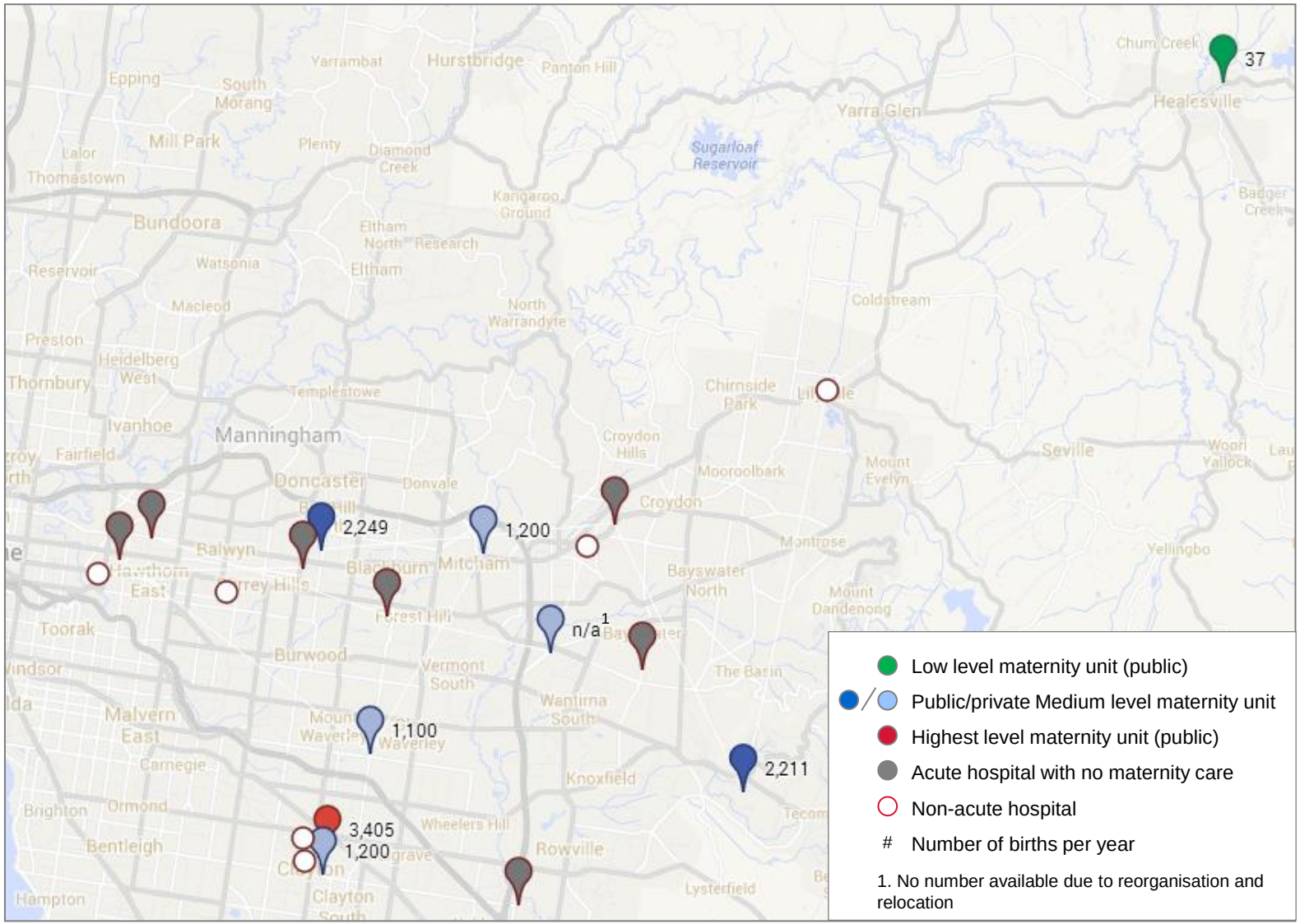
Very summarised[3]

Level	Risk profile	Staffing
1	▪ No planned births	▪ Midwife ▪ GP Obs
2	▪ 37+ wks ▪ Normal risk ▪ No c-section	▪ Midwife ▪ GP Obs
3	▪ 37+ wks ▪ Normal risk ▪ C-section	▪ Midwife ▪ Obstet. ▪ GP Anaes. GP Paeds.
4	▪ 34+ wks ▪ Moderate risk	▪ Midwife ▪ Obstet. ▪ Anaesth. ▪ Paeds.
5	▪ 34+ wks ▪ High risk	▪ Full range
6	▪ All gestational ages and risk	▪ Full range

1 Hospitals and birth centres by number of births/deliveries
2 Not covered by same data collection requirements and standards-setting processes
3 See full details in the Appendix

SOURCE: Australian Institute of Health and Welfare and University of New South Wales (2013) Australia's mothers and babies 2011 (http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129545698); Capability Framework for Victorian maternity and newborn services, 2011

In the Eastern Met region, there is a tertiary hospital providing high-level maternity care, and one low-level unit in a rural area



SOURCE: Victoria Department of Health; hospital websites; Victorian maternity services performance indicators