

Senate Community Affairs Submission

Inquiry into Health Legislation Amendment (Midwives and Nurse Practitioners) Bill 2009 and two related Bills)

From:

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My background:

I am a New Zealand trained general practitioner who has enjoyed four homebirths in Australia (1990 to 2000).

Currently I am a full-time writer on pregnancy, birth and parenting and my 2009 book *Gentle Birth, Gentle Mothering* has chapters on homebirth and on the hormonal orchestration of labour, which is a special interest to me and which I will mention further below, among many other topics.

My submission

My understanding is that, unless changes are made, the currently proposed legislation will effectively make the practice of midwives who work in the community and assist women giving birth at home illegal, due to the unavailability of indemnity insurance to cover their practice.

I understand that this was not the direct intention of this legislation, but a consequence of the requirement for indemnity insurance for the new national register of midwives, Indemnity insurance is currently unavailable to midwives working outside of hospitals, largely due to the small pool of midwives, whose combined fees would be inadequate to cover a payout of the order of recent settlements.

My submission urges legislators to remedy this unintended and inequitable situation and, further, to provide active support for midwives and their clients who wish to give birth at home.

Homebirth- the big picture

For most of human history, women have given birth in familiar surroundings and been supported by people familiar to them. The move to hospital is very recent, beginning in

the 18th century in Europe. In most Westernized countries, including Australia, the majority of women birthed at home until the last 2 generations or so.

As detailed below, birth in familiar surroundings has major physiological benefits for mother and baby, and also avoids iatrogenic risks associated with hospital birth. Homebirth is also a safe option for the majority of women, again discussed below in detail.

The exclusion of domiciliary midwives and homebirth from the medical system in Australia is a historical anomaly that has led to the current situation.

In New Zealand, the UK and the Netherlands, homebirth services have always been available as part of public maternity care. In NZ, for example, when a social security system was introduced in 1938, the free maternity care included domiciliary midwifery care. In Australia, the introduction of Medicare occurred at a nadir of domiciliary midwifery, which was therefore overlooked.

This exclusion has had other negative consequences. Not only has it meant that women choosing homebirth are the only ones whose maternity care receives no government funding, it also has created a divide between practitioners, with little institutional support for, and at times, frank hostility towards, domiciliary midwives.

With the current extremes in Australian rates of intervention, including caesarean surgery, homebirth offers a model with extremely low need for intervention. For example, the largest-ever prospective study of homebirth, published in the prestigious British Medical Journal in 2005, found a 3.7% caesarean rate among over 5000 North American women who chose homebirth.(Johnson and Daviss 2005).

In the UK, the National Centre for Clinical Excellence (NICE) has recommended increasing access to homebirth in order to decrease the caesarean risk, and state: “During their discussions about options for birth, healthy pregnant women with anticipated uncomplicated pregnancies should be informed that delivering at home reduces the likelihood of CS.”(National Institute for Clinical Excellence 2004)

In parts of Scotland, women are being encouraged to choose homebirth to reduce the strain on maternity services. (see <http://news.scotsman.com/scotland/Pregnant-women-are-urged-to.4770315.jp>)

From a consumer perspective, homebirth is an important option that would be inequitable to outlaw. Current maternity care options are limited and standard maternity care, in private or in public, involves high rates of intervention, even for women at low risk of complications.(Tracy, Sullivan et al. 2007)

Women who prefer to avoid unnecessary intervention have few choices, as birth centres are available in very few centres (only 2% of women birthed in birth centres in 2006)(Laws and L 2008) and are unable to meet with demand in many areas.

Note that, according to an internationally-published survey from Brisbane, 93.5% of the 300 pregnant women questioned would prefer a spontaneous vaginal birth, (Gamble and Creedy 2001) and yet our caesarean rate is almost 1 in 3. (30.7% in 2006). (Laws and L 2008) with even higher rates for first-time mothers and those birthing in private hospitals.

In contrast, a detailed analysis from the World Health Organization recommends a caesarean rate of no more than 10-15% in any country. (World Health Organization 1985) Recent research continues to support this rate, showing increased perinatal mortality at higher rates in developing countries, and no benefit in wealthy countries. (Althabe, Sosa et al. 2006).

As I discuss below, caesarean surgery may have significant detrimental ongoing effects for mother and baby, including well-documented increased risks to the newborn and to mother and baby in subsequent pregnancies.

It is also important to note that current homebirth statistics are likely to be significantly underestimated (anecdotally, some midwives describe many more births than are listed in the formally collected statistics).

I also believe that these figures do not reflect the unmet demand for homebirth, which is unavailable in many places due to absence of midwifery support. It is also likely that many women who might consider homebirth are put off by inaccurate information from the media and from medical advisors. One consumer survey from the UK, where homebirth is regarded as a valid and safe choice, found that 22% of women would opt for homebirth, given a free choice. (Department of Health 1993)

Homebirth in other countries

The Netherlands has the highest rate of homebirth in the Western world, which is consistent with its philosophy of protecting low-risk women from unnecessary interventions. (Smulders 1999) In the Netherlands, specialist obstetric care is provided by the state only to women who need it, whereas midwifery care (for home or hospital birth) is free to every pregnant woman. The Netherlands has some of the lowest rates of intervention (including low rates of cesareans and epidurals) in the Western world, with good outcomes for mothers and babies.

Midwifery care for homebirth is also provided free in the UK, although in the public system women are not able to choose their own midwife and may not have the same caregiver through pregnancy and birth. Some mothers report that there are biases against homebirth within the system, although homebirth has been recognized at a governmental level (by the Changing Childbirth Report), and UK policy makers have been working toward offering homebirth as a choice for all women. (Department of Health 1993)

In New Zealand there has been a renaissance of midwifery care in the last twenty years, which has increased the homebirth rate to an estimated 7 percent (Home Birth Aotearoa)—although rates vary widely among regions. Women can choose their own midwife, who will care for them at home or in the hospital and is paid by the government. Nationwide, outcomes for mothers and babies have continued to improve with this choice of care, and the gap between white and Maori outcomes has significantly lowered.

There has also been a resurgence of midwifery care and homebirth in Canada, with the first training and recognition of midwives in 1999 in some provinces where practice was previously illegal. Midwifery care is also increasing in the United States, with the number of births attended by midwives (mostly in the hospital) increasing from 1 percent in 1975 to 7.9 percent in 2005.

Homebirth safety

In terms of outcomes for mothers and babies, most studies of planned homebirth show perinatal mortality figures (the numbers of babies dying around the time of birth) that are at least as good as the hospital figures, with lower rates of complications and interventions.

For example, Johnson and Daviss's landmark 2005 study of over five thousand U.S. and Canadian women intending to deliver at home under the care of certified professional midwives (CPMs) showed equivalent perinatal mortality, with rates of intervention that were up to ten times lower, compared with low-risk women birthing in the hospital. Rates of induction, intravenous drip (IV), rupture of membranes, fetal monitoring, epidural, augmentation, episiotomy, and forceps were each less than 10 percent, and, as noted above, 3.7 percent of women required a cesarean. (Johnson and Daviss 2005)

Note that women in this study were cared for by midwives who did not have medical training, but had passed an exam to gain the qualification of professional certified midwife (CPM), which is recognized in many US states

In a review of the safety of homebirth for the authoritative Cochrane Collaboration, Olsen states:

There is no strong evidence to favour either home or hospital birth for selected low-risk pregnant women. In countries where it is possible to establish a home birth service backed up by a modern hospital system, all low-risk women should be offered the possibility of considering a planned home birth... (Olsen and Jewell 2000)

In the Netherlands, where around one-third of babies are born at home under the care of a midwife, one study found that outcomes for first babies are equivalent to those of babies born to low-risk women in the hospital, and outcomes for second or subsequent babies were better. (Wiegers, Keirse et al. 1996)

The largest-ever survey of homebirth outcomes, involving over 500 000 women and published in the British Journal of Obstetrics and Gynaecology in 2009, found equal perinatal mortality for home and hospital-born Dutch babies. The authors conclude: “This study shows that planning a home birth does not increase the risks of perinatal mortality and severe perinatal morbidity among low-risk women, provided the maternity care system facilitates this choice through the availability of well trained midwives and through a good transportation and referral system” (de Jonge, van der Goes et al. 2009)

There are many other studies showing excellent outcomes for home born babies. Note that it is necessary to use figures for babies born intentionally at home: some research includes unintended homebirth (for example from national datasets) which has well-documented poorer outcomes.

It is also important to ensure that homebirth research is well-conducted: a previous publication that showed higher perinatal mortality amongst Australian homeborn babies included some very unorthodox data collection, including collecting deaths via newspaper notices.(Bastian, Keirse et al. 1998)

UK statistician Marjory Tew has analyzed some of the largest data sets of home and hospital birth in the Netherlands¹² and the UK (before the advent of hospitalization).Her conclusion, accepted by UK Government policy makers, is that birth at home or in small GP (family physician) units is safer than birth in obstetric hospital for mothers and babies in all categories of risk(Tew 1985; Tew 1985; Tew 1986; Tew 1986; Tew 1986; Tew and Damstra-Wijmenga 1991)

She also concludes that modern obstetric interventions, applied to the whole birthing population, have made birth more dangerous, not safer. Her book, *Safer Childbirth? A Critical History of Maternity Care* documents some of the false information that was used to promote a shift from home to hospital birth in the UK in the 1950s to 1980s.(Tew 1998)

It is also important to note the shortcomings of the use of perinatal mortality as an outcome in birth research, including homebirth. While newborn survival is obviously an important outcome, longer-term survival and wellbeing are also crucial, For example, the success of breastfeeding is also important, with recent research showing a 26% increased risk of death in the first 12 months among formula-fed US infants, compared to those who had ever been breastfed.(Chen and Rogan 2004)

Note that rates of breastfeeding are very high among homeborn babies (95.8% of babies in the BMJ study were breastfeeding at 6 weeks, compared with an average of 65.1% of babies breastfed at birth and 7.9% at 6 months, according to national CDC data). Obviously there is some selection bias, but it also noteworthy that the vast majority of homeborn babies avoid interventions such as caesareans and epidurals that are associated

with problems with, and/or lower rates of, breastfeeding.(Matthews 1989; Righard and Alade 1990; Riordan, Gross et al. 2000; Ransjo-Arvidson, Matthiesen et al. 2001; Baumgarder, Muehl et al. 2003)

Homebirth benefits for the mother

My personal belief, supported by the material I have gathered over 10 years of interest in this area, is that giving birth in a situation of emotional safety will enhance the processes of labour and birth, and improve efficiency, reward and also survival for mother and baby.

The article excerpted at the end of this explains the hormonal physiology of normal birth and the impact of disruptions on this and possible effects on mother and baby. Note the information about the impact of the fight-or-flight hormones adrenaline and noradrenaline, which are elevated when the labouring female (this applies to all mammals) feels unsafe in labour.

This reflex is designed to enhance survival in the wild, where a labouring females' sense of danger is very sensitive, and any hint of danger will slow or stop labour, allowing her the time to fight flee to safety. Note also the diversion of blood away from uterus and baby to major muscle groups with these hormones, enhancing her ability to fight or flee. Because of this, the baby will be deprived of blood and oxygen to some extent while the mothers flight/fight hormones are elevated. Research has shown that women with elevations in adrenaline in early labour are more likely to have a slow labour and fetal distress due to lack of blood and oxygen..

My belief is that many many women labouring in hospital have elevated levels of these hormones, so that their labours slow and their babies may experience fetal distress. Note that slow labour and fetal distress are the two main reasons for intervention in labour.

In summary, homebirth is the only current choice that allows a woman to birth in her own familiar environment with her chosen familiar helpers, and these factors are likely to enhance her chances of normal birth by optimizing her hormonal physiology.

The extremely low levels of intervention needed in women who labour at home underscores this physiological explanation.

Benefits for baby

As documented in the article below, babies also benefit from a drug-free physiological birth such as is most common at home. Not only do they avoid the possible direct harms of drugs in labour, as documented in my article below, but also enjoy the full benefits of the catecholamine surge, making them perfectly prepared for breastfeeding and attachment, the two major postnatal tasks that enhance long-term survival and wellbeing.

Homeborn babies are also much less likely to be separated from the mother in the hour or hours after birth, and to enjoy the benefits of immediate skin to skin contact, as advocated in the WHO Baby Friendly Hospital Initiative as the best possible start to breastfeeding. UNICEF, #4076}

Homeborn babies also enjoy the lowest possible risk of caesarean surgery, which is increasingly recognized as potentially harmful in the short term, increasing risks of respiratory problems and need for intensive care treatment. There is also evidence of increased long-term risks of diseases such as asthma, allergies, diabetes and changes in oral bacteria that may lead to cavities. (Buckley 2009)A recent study suggesting that birth by caesarean may change gene expression by altering epigenetic factors is especially concerning.

Avoiding trauma

Research by Brisbane authors has suggested that one in three women suffers at least one symptom of post traumatic stress following childbirth, which is a shocking reflection on our current maternity care system.(Creedy, Shochet et al. 2000)

Women who choose homebirth may have already had a significantly negative birth experience and seek to avoid this again, or may know of others who have had this experience. The experience of significant trauma coupled with the tasks of new motherhood compromise a very difficult start for both mother and baby.

In summary

I urge the Senate committee to consider this and all of the evidence and to support homebirth as a safe beneficial and easily-available option for Australian mothers and babies,

I also urge you to increase the support for domicillary midwifery, financially and within institutions, so that the quality of care will ensure the best possible outcomes.

I would be delighted to expand on any of these topics for the committee.

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Additional material

Ecstatic Birth- Nature's Hormonal Blueprint for Labor

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Previous versions of this article have been published in Mothering Magazine, issue 111, March-April 2002, and Byron Child (Australia), issue 5, March 2003. This material has been further expanded and updated as "Undisturbed Birth: Mother Nature's blueprint for safety, ease and ecstasy" available in Sarah's book, Gentle Birth, Gentle Mothering: A Doctors Guide to Natural Childbirth and Gentle Early Parenting Choices (Celestial Arts, 2009). See www.sarahjbuckley.com for more of Sarah's writing and to buy her book.

Giving birth in ecstasy: this is our birthright and our body's intent. Mother Nature, in her wisdom, prescribes birthing hormones that take us outside (*ec*) our usual state (*stasis*), so that we can be transformed on every level as we enter motherhood.

This exquisite hormonal orchestration unfolds optimally when birth is undisturbed, enhancing safety for both mother and baby. Science is also increasingly discovering what we realize as mothers: that our way of birth affects us life-long, both mother and baby, and that an ecstatic birth -- a birth that takes us beyond our Self -- is the gift of a life-time.

Four of our major hormonal systems are active during labor and birth. These produce, during labor and birth, peak levels of oxytocin, the hormone of love; endorphins, hormones of pleasure and transcendence; epinephrine and norepinephrine, hormones of excitement; and prolactin, hormone of tender mothering. These systems are common to

all mammals and originate in our mammalian or middle brain, also known as the limbic system.

For birth to proceed optimally, this part of the brain must take precedence over the neocortex, or rational brain. This shift can be helped by an atmosphere of quiet and privacy, with, for example, dim lighting and little conversation, and no expectation of rationality from the laboring woman. Under such conditions a woman will intuitively choose the movements, sounds, breathing, and positions that will birth her baby most easily. This is her genetic and hormonal blueprint.

All of these hormonal systems are adversely affected by current birth practices. Hospital environments and routines are not conducive to the shift in consciousness that giving birth naturally requires. A woman's hormonal physiology is further disturbed by practices such as induction, the use of painkillers and epidurals, caesarean surgery, and separation of mother and baby after birth, as described below.

Hormones in Birth

Oxytocin

Perhaps the best-known birth hormone is oxytocin, the hormone of love, which is secreted during sexual activity, male and female orgasm, birth, and breastfeeding. Oxytocin engenders feelings of love and altruism; as Michel Odent says, "Whatever the facet of love we consider, oxytocin is involved." (Odent 2001)

Oxytocin is made in the hypothalamus, deep inside the mammalian brain, and stored in the posterior section of the pituitary, the "master gland" of the endocrine (hormonal) system, from where it is released in pulses. It is a crucial hormone in reproduction and mediates what have been called the ejection reflexes: the sperm ejection reflex with male orgasm (and the corresponding sperm introjection reflex with female orgasm); the fetal ejection reflex at birth (a phrase coined by Odent for the powerful contractions at the end of an undisturbed labor, which birth the baby quickly and easily) (Odent 1992); and, postpartum, the placental ejection reflex, and the milk ejection or let-down reflex in breastfeeding.

As well as reaching peak levels in each of these situations, oxytocin is secreted in extra amounts in pregnancy, when it acts to enhance nutrient absorption; reduce stress; and conserve energy by making us more sleepy. (Uvnas-Moberg and Eriksson 1996) Oxytocin also causes the rhythmic uterine contractions of labor, and levels peak at birth through stimulation of stretch receptors in a woman's lower vagina as the baby descends. (Dawood, Raghavan et al. 1978)

High maternal oxytocin levels during labor and birth also benefit the baby. Research has found that maternal oxytocin crosses the placenta and enters the fetal brain during labor, when it acts to protect brain cells by switching them off, giving low oxygen consumption at a time when fetal oxygen levels may be naturally low. (Tyzio, Cossart et al. 2006)

High maternal oxytocin levels continue after birth, culminating with the birth of the placenta, (Nissen, Gustavsson et al. 1998) and are enhanced by the baby's pre-breastfeeding and breastfeeding behaviors.(Matthiesen, Ransjo-Arvidson et al. 2001) Elevated maternal levels of oxytocin will protect against postpartum hemorrhage at this crucial time by ensuring efficient uterine contractions.(Odent 1998)

The baby also has been producing oxytocin during labor, perhaps even contributing to the processes of labor;(Chard 1989) so, in the minutes after birth, both mother and baby are bathed in an ecstatic cocktail of hormones. At this time, ongoing newborn oxytocin production is enhanced by skin-to-skin and eye-to-eye contact. Newborn levels subside during the first hour after birth, but are elevated above normal for at least 4 days.(Leake, Weitzman et al. 1981) Infant oxytocin levels are also elevated during and following breastfeeding, through activation of the vagal nerve.(Uvnas-Moberg 2003)

During breastfeeding, oxytocin mediates the let-down reflex and is released in pulses as the baby suckles. During the months and years of lactation, oxytocin continues to act to keep the mother relaxed and well nourished. One researcher calls it "a very efficient anti-stress situation which prevents a lot of disease later on." In her study, mothers who breastfed for more than seven weeks were calmer, when their babies were six months old, than mothers who did not breastfeed.(Chapman 1998, 7 August)

Outside its role in reproduction, oxytocin is secreted in other situations of love and altruism, for example, sharing a meal.(Uvnas-Moberg 2003) Researchers have implicated malfunctions of the oxytocin system in conditions such as schizophrenia,(Feifel and Reza 1999) autism,(Insel, O'Brien et al. 1999; Carter 2007) cardiovascular disease(Knox and Uvnas-Moberg 1998; Uvnas-Moberg 2003) and drug dependency,(Sarnyai and Kovacs 1994) and have suggested that oxytocin may mediate the antidepressant effect of drugs such as Prozac.(Uvnas-Moberg, Bjokstrand et al. 1999)

More recent research has implicated oxytocin in trusting interactions between individuals, (Zak, Kurzban et al. 2005) which may reflect its role in lowering activity in the amygdala: a brain structure that processes fearful emotions.(Kirsch, Esslinger et al. 2005)

Beta-endorphin

As a naturally occurring opiate, beta-endorphin has properties similar to opiate drugs such as pethidine (meperidine, Demerol), morphine, and heroin, and has been shown to work on the same receptors of the brain. Beta-endorphin is also secreted from the pituitary gland, (and other parts of the brain and nervous system) and high levels are present during sex, pregnancy, birth, and breastfeeding.

Beta-endorphin is also a stress hormone, released under conditions of duress and pain, when it acts as an analgesic (pain killer) and, like other stress hormones, suppresses the

immune system. This effect may be important in preventing a pregnant mother's immune system from acting against her baby, whose genetic material is foreign to hers.

Like the addictive opiates, beta-endorphin induces feelings of pleasure, euphoria, and dependency or, with a partner, mutual dependency. Beta-endorphin levels are high in pregnancy and increase throughout labor,(Brinsmead, Smith et al. 1985) when levels of beta-endorphin and corticotrophin (another stress hormone) reach those found in male endurance athletes during maximal exercise on a treadmill.(Goland, Wardlaw et al. 1988) Such high levels help the laboring woman to transmute pain and enter the altered state of consciousness that characterizes an undisturbed birth.

Beta-endorphin has complex and incompletely understood relationships with other hormonal systems.(Laatikainen 1991) In labor, high levels will inhibit oxytocin release. It makes sense that when pain or stress levels are very high, contractions will slow, thus "rationing labor according to both physiological and psychological stress."(Jowitt 1993)

Beta-endorphin also facilitates the release of prolactin during labor,(Rivier, Vale et al. 1977) which prepares the mother's breasts for lactation and also aids in the final stages of lung maturation for the baby.(Mendelson and Boggaram 1990)

Beta-endorphin is also important in breastfeeding. Levels peak in the mother at 20 minutes(Franceschini, Venturini et al. 1989) and beta-endorphin is also present in breast milk,(Zanardo, Nicolussi et al. 2001) inducing a pleasurable mutual dependency for both mother and baby in their ongoing relationship.

Fight-or-Flight Hormones

The hormones epinephrine and norepinephrine (adrenaline and noradrenaline) are also known as the fight-or-flight hormones, or, collectively, as catecholamines (CAs). They are secreted from the adrenal gland, above the kidney, in response to stresses such as fright, anxiety, hunger or cold, as well as excitement, when they activate the sympathetic nervous system for fight or flight. Noradrenaline is also part of an important brain signalling system that activates (and is activated by) the fight-or-flight response.

High maternal CA levels are associated with the inhibition of labor, which may reflect their direct inhibiting effects on uterine muscle(Segal, Csavoy et al. 1998) and possibly a reduction in oxytocin release, as suggested in mice.(Douglas, Leng et al. 2002) As part of the fight-or-flight response, CAs also act to divert blood to major muscle groups: this leads to reduced blood flow to the uterus and placenta (and therefore also to the baby).

This makes sense for mammals birthing in the wild, where the presence of danger would activate this fight or flight response, inhibiting labor and providing the muscular energy to flee to safety. In humans, high levels of CAs have been associated with longer labor and adverse fetal heart rate patterns (an indication of lack of blood and oxygen for the baby in labor).(Lederman, Lederman et al. 1985)

After an undisturbed labor, however, when the moment of birth is imminent, these hormones may act in a different way. A sudden increase in CA levels, especially noradrenaline, can activate the 'fetal ejection reflex'. This gives the mother a sudden rush of energy; she will usually adopt an upright, alert position and may experience the dry mouth and shallow breathing associated with high adrenaline/epinephrine levels, and may also have the urge to grasp something. She may express fear, anger, or excitement, and the CA rush will cause several very strong contractions, birthing her baby quickly and easily. (Odent 1992)

This physiological model is supported by research showing that low levels of epinephrine inhibit uterine contractility, while very high levels of mixed epinephrine/norepinephrine, as may occur at the end of an undisturbed labor, increase contractility. (Segal, Csavoy et al. 1998) Studies also show a wide range of maternal CA levels at birth, with some women having 5 to 10 times higher levels of epinephrine or norepinephrine than others. (Lederman, McCann et al. 1977; Lederman, Lederman et al. 1978; Lederman, Lederman et al. 1985)

Some birth attendants have made good use of this reflex when a woman is having difficulties in the second stage of labor. For example, one anthropologist working with an indigenous Canadian tribe recorded that when a woman was having difficulty in birth, the young people of the village would gather together to help. They would suddenly and unexpectedly shout out close to her, with the shock triggering her fetal ejection reflex and a quick birth. (Odent 1992)

After the birth, the mother's CA levels drop steeply, and she may feel shaky or cold as a consequence. A warm atmosphere is important, as if the mother is not helped to warm up, the ongoing cold stress will keep her CA levels high, inhibiting her natural oxytocin release and therefore increasing her risk of postpartum hemorrhage. (Saito, Sano et al. 1991)

Noradrenaline, as part of the ecstatic cocktail, is also implicated in instinctive mothering behavior. Mice bred to be deficient in noradrenaline will not care for their young after birth unless noradrenaline is injected back into their system. (Thomas and Palmiter 1997)

For the baby also, birth is an exciting and stressful event, reflected in high CA levels. (Lagercrantz and Bistoletti 1977) In the final stages of labor, the baby experiences a CA surge, which assists during birth by protecting against the effects of hypoxia (lack of oxygen). These hormones also prepare the baby for life outside the womb by enhancing lung function; increasing metabolic fuels; and activating newborn thermogenic (heat producing) systems. (Lagercrantz and Slotkin 1986)

High CA levels at birth also ensure that the baby is wide-eyed and alert at first contact with the mother. (Lagercrantz and Slotkin 1986) The baby's CA levels also drop rapidly after an undisturbed birth, being soothed by contact with the mother.

Prolactin

Known as the mothering hormone, prolactin is the major hormone of breast milk synthesis and breastfeeding. Traditionally it has been thought to produce aggressively protective behavior (the “mother tiger” effect) in lactating females, and human studies suggest that prolactin increases vigilance and aggression.(Uvnas-Moberg 1989)

Levels of prolactin increase in pregnancy, although milk production is inhibited hormonally until the placenta is delivered. Levels in labor initially decrease, and then increase in late labor, peaking at birth.(Stefos, Sotiriadis et al. 2001)

Prolactin is also a hormone of submission or surrender -- in primate troops, the dominant male has the lowest prolactin level(Keverne 1978) -- and produces some degree of anxiety. In the breastfeeding relationship these effects activate the mother’s vigilance and help her to put her baby’s needs first.(Uvnas-Moberg 1989)

The baby also produces prolactin in pregnancy, and levels are high following labor,(Heasman, Spencer et al. 1997) where it may enhance newborn adaptation of the respiratory (Mendelson and Boggaram 1990) and heat regulating(Mostyn, Pearce et al. 2004) systems.

Undisturbed Birth

Undisturbed birth is exceedingly rare in our culture, even in birth centers and home births.

Two factors that disturb birth in all mammals are firstly being in an unfamiliar place and secondly the presence of an observer. Feelings of safety and privacy thus seem to be fundamental. Yet the entire system of Western obstetrics is devoted to observing pregnant and birthing women, by both people and machines, and when birth isn’t going smoothly, carers respond with yet more intense observation. It is indeed amazing that any woman can give birth under such conditions.

Some writers have observed that, for a woman, having a baby has a lot of parallels with making a baby: same hormones, same parts of the body, same sounds, and the same needs for feelings of safety and privacy. How would it be to attempt to make love in the conditions under which we expect women to give birth?

Impact of Drugs and Procedures

Induction and Augmentation

In the US, between 22.5%(Martin, Hamilton et al. 2009) and 41% (Declercq, Sakala et al. 2006) of women have their labor induced, and up to 55% of women have an

augmentation (Declercq, Sakala et al. 2006)--stimulation or speeding up of labor--with synthetic oxytocin (syntocinon, Pitocin).

Synthetic oxytocin administered in labor does not act like the body's own oxytocin. First, Pitocin-induced contractions are different from natural contractions, and these differences can cause a reduced blood flow to the baby. For example, Pitocin-induced contractions can occur almost on top of each other when too high a dose is given, and it also causes the resting tone of the uterus to increase, (33) which can lead to a precipitate (overly fast) labor.

Second, oxytocin, synthetic or not, cannot cross from the mother's bloodstream to her brain through the blood-brain barrier. This means that Pitocin, introduced into the body by injection or drip, does not act as the hormone of love, and may interfere with the labouring woman's own oxytocin system.

Research has shown that, following the use of Pitocin, the number of oxytocin receptors in the labouring woman's uterus is down-regulated (reduced) by the body to prevent over-stimulation.(Phaneuf, Rodriguez Linares et al. 2000) This means that a woman who has been administered a Pitocin infusion during labor will be at higher risk of bleeding after the birth, because her own oxytocin release, critical at this time for contracting her uterus to prevent bleeding, will be ineffective because of low receptor numbers.

Further, given our growing understanding of the life-long psycho-emotional effects of oxytocin, a major hormone of the 'emotional brain' (limbic system), we might also be concerned about the developmental and maternal consequences of interfering with this calming, connection-enhancing system at birth.(Carter 2003) (See also the chapter on Undisturbed Birth for an account of Csaba's concept of hormonal imprinting,(Csaba 2007) which may occur when drugs and hormones are introduced around the time of birth.(Buckley 2009))

As Michel Odent comments, "Many experts believe that through participating in this initiation of his own birth, the fetus [unborn baby] may be training himself to secrete his own love hormone." (Odent 1992) Odent speaks passionately about our society's deficits in our capacity to love self and others, and he traces these problems back to the time around birth, particularly to interference with the oxytocin system.(Odent 2001)

Opiate Painkillers

Opiate drugs are derived from, or chemically related to, substances found in the opium poppy. In the U.S., several opiate drugs have been traditionally used in labor. These include the classical opiates meperidine (Demorolol, pethidine) and morphine, as well as nalbuphine (Nubain), butorphanol (Stadol), alphaprodine (Nisentil), hydromorphone (Dilaudid), and fentanyl citrate (Sublimaze).

The use of simple opiates, usually administered via the muscle (IM) or intravenously (IV), in the labor room has declined in recent years, with many women now opting for epidurals, which may also contain these drugs (see below).

The use of opiate drugs will likely reduce a woman's own BE production in labor,(Thomas, Fletcher et al. 1982) as well as producing possible side effects such as nausea, drowsiness, pruritis (itching) and dysphoria.(American College of Obstetricians and Gynecologists 1996) Several studies have suggested that the analgesic effect of these drugs is modest, and that the major effect is heavy sedation.(Olofsson, Ekblom et al. 1996; Tsui, Ngan Kee et al. 2004)

Note also that, at a brain level, opiates reduce oxytocin release from the pituitary, which is reflected in findings from the small number of studies of the impact of these drugs on labor duration.. Thomson and Hiller summarize, 'There is a strong suggestion in the literature that the use of this drug [pethidine/meperidine] is associated with a lengthening of labor and this association is dose-related. Studies in animals support this view.'(Thomson and Hillier 1994)

And again we must ask: What are the psychological effects for mother and baby of laboring and birthing without peak levels of these hormones of pleasure and co-dependency? Beta-endorphin powerfully activates the brain reward system, and some researchers believe that endorphins are the mammalian reward for performing crucial reproductive functions such as mating and birthing.(Kimball 1979)

It is interesting to note that most countries that have adopted Western obstetrics, which prizes drugs and interventions in birth above pleasure and empowerment, have experienced steeply declining birth rates in recent years. As feminist Germaine Greer presciently noted in 1984, "...if we succeed in crushing all pride and dignity out of child bearing, the population explosion will take care of itself."(Greer 1984)

Of perhaps greater social concern is a study that looked at the birth records of 200 opiate addicts born in Stockholm from 1945 to 1966 and compared them with the birth records of their non-addicted siblings. When the mothers had received opiates, barbiturates, and/or nitrous oxide gas during labor, especially in multiple doses, the offspring were more likely to become drug addicted. For example, when a mother received three doses of opiates, her child was 4.7 times more likely to become addicted to opiate drugs in adulthood.(Jacobson, Nyberg et al. 1990)

This study was recently replicated with a U.S. population, with very similar results.(Nyberg, Buka et al. 2000) The authors of the first study suggest an imprinting mechanism, but perhaps it is equally a matter of ecstasy--if we don't get it at birth, as we expect, we look for it later in life through drugs. Perhaps this also explains the popularity (and the name) of the drug Ecstasy.

Animal studies suggest a further possibility. It seems that drugs and other substances administered around the time of birth, even in single doses, can cause effects in the brain structure and chemistry of offspring that may not be obvious until adulthood,(Kellogg, Primus et al. 1991; Livezey, Rayburn et al. 1992; Mirmiran and Swaab 1992; Golub 1996; Nyberg, Buka et al. 2000; Csaba and Tekes 2005) Golub also found developmental abnormalities in infant rhesus monkeys exposed to epidurals around the time of birth.(Golub 1996) Whether such effects apply to humans is not known; but one

researcher warns, “During this prenatal period of neuronal [brain cell] multiplication, migration and interconnection, the brain is most vulnerable to irreversible damage.”(Mirmiran and Swaab 1992)

Epidural Drugs

Epidural drugs are administered over several hours via a catheter (tube) into the space around the spinal cord. Such drugs include local anesthetics (all cocaine derivatives, e.g. bupivacaine/Marcaine), more recently combined with low-dose opiates such as fentanyl/Sublimaze.. Spinal pain relief involves a single dose of the same drugs injected through the coverings of the spinal cord, and is usually short acting unless given as a combined spinal-epidural (CSE).

Epidural pain relief has major effects on all of the above-mentioned hormones of labor. Epidurals inhibit beta-endorphin production(Browning, Butt et al. 1983; Scull, Hemmings et al. 1998) and therefore also inhibit the shift in consciousness that is part of a normal labor. This may be one reason why epidurals are so acceptable in labor and delivery rooms, where carers may not have the resources to deal with the irrationality, directness, and physicality of a woman laboring on her own terms.

When an epidural is in place, oxytocin levels decline, and the oxytocin peak that occurs at birth is also inhibited(Rahm, Hallgren et al. 2002), possibly because the stretch receptors of a birthing woman’s lower vagina, which trigger this peak, are numbed. This effect likely persists even when the epidural has worn off and sensation has returned, because the nerve fibers involved are smaller than the sensory nerves and therefore more sensitive to drug effects.(Goodfellow, Hull et al. 1983)

A woman giving birth with an epidural will therefore miss out on the strong final contractions of labor, designed to birth her baby quickly and safely. She must then use her own effort, often against gravity, to compensate. This explains the increased length of the second stage of labor and the extra need for forceps when an epidural is used.(Lieberman and O'Donoghue 2002)

Use of epidurals also inhibits catecholamine release,(Neumark, Hammerle et al. 1985) which may be advantageous if the labouring woman is very stressed in the first stage of labor; close to the time of birth, however, a reduction in CA levels may inhibit the fetal ejection reflex and also prolong the second stage.(Lieberman and O'Donoghue 2002)

Another hormone also appears to be adversely affected by epidurals. Prostaglandin F2 alpha helps to make a laboring woman’s uterus contractible and levels increase when women labor without epidurals. In one study, women with epidurals actually experienced a decrease in PGF2 alpha, and average labor times were increased from 4.7 to 7.8 hours.(Behrens, Goeschen et al. 1993)

Drugs administered by epidural enter the mother's bloodstream immediately and go straight to the baby at equal, and sometimes effectively greater, levels.(Brinsmead 1987; Fernando, Bonello et al. 1997) Some drugs will be preferentially taken up into the baby's brain,(Hale 1998) and almost all will take longer to be eliminated from the baby's immature system after the cord is cut. For example, the 'half life 'of bupivacaine- the time it takes to reduce blood level by 50%- is 2.7 hours in the adult, but around 8 hours in a newborn baby.(Hale 1997)

Another indication of the effects of epidurals on mother and baby comes from French researchers who gave epidurals to laboring sheep. The ewes failed to display their normal mothering behavior; this effect was especially marked for the ewes in their first lambing that were given epidurals early in labor: seven out of eight of these mothers showed no interest in their offspring for at least 30 minutes.(Krehbiel, Poindron et al. 1987) These researchers subsequently showed lower brain oxytocin levels amongst epidural sheep and also demonstrated a partial reversal of the effects on maternal behavior when oxytocin was administered into the new mother's brain.(Levy, Kendrick et al. 1992)

Some studies indicate that this disturbance may apply to humans also. Mothers given epidurals in one study spent less time with their babies in hospital, in inverse proportion to the dose of drugs they received and the length of the second stage of labor.(Sepkoski, Lester et al. 1992) In another study, mothers who had epidurals described their babies as more difficult to care for one month later.(Murray, Dolby et al. 1981)

Such subtle shifts in relationship and reciprocity may reflect hormonal dysfunctions and/or drug toxicity and/or the less-than-optimal circumstances that often accompany epidural births--long labors, forceps, and cesareans.

A recent Swedish study found that epidural mothers did not experience the psychological shifts that normally occur after birth, adapting the mother to her new role by increasing her sociability and decreasing her anxiety.(Jonas, Nissen et al. 2008)

There have been few high-quality studies of the effects of epidurals on breastfeeding, which is surprising given the widespread use of this intervention. Babies born after epidural may have subtle neurobehavioral deficits, as above, that interfere with breastfeeding.

Epidural studies confirm that babies with higher drug levels have worse neurobehavior scores(Radzynski 2005) and that babies with worse scores have less breastfeeding abilities,(Chang and Heaman 2005) including diminished suckling reflexes and capacity(Riordan, Gross et al. 2000).

Two studies have particularly implicated epidural opiates in breastfeeding difficulties. Researchers randomized 176 women (who had previously breastfeed and intended to breastfeed again) into epidurals containing nil, low-or high-dose fentanyl. At six weeks, 19% of women in the high-dose group had ceased breastfeeding, compared to 6% and 2%

in the low-dose and nil fentanyl groups respectively All women with breastfeeding problems attributed them to their infant, not themselves.(Beilin, Bodian et al. 2005)

The mother's breastfeeding physiology may also be affected: researchers found that women who had received an epidural plus Pitocin during labour had a marked reduction in their oxytocin release during breastfeeding. In this study, the more Pitocin the mother had received during labor, the lower her breastfeeding oxytocin release, two days after birth.(Jonas, Johansson et al. 2009)

Another detailed observational study that included over 500 epidural mothers found that the chances of their babies not suckling within the first four hours was almost four times higher, and the chance of the baby receiving formula in hospital was doubled, compared with mothers and babies not exposed to epidurals. In this study, the opiate sufentanil was routinely administered in the epidural.(Wiklund, Norman et al. 2009)

Caesarean Surgery

In 2006 31.1% of US women gave birth by caesarean: the largest percentage in US history, and representing over 1.25 million babies born by 'vaginal bypass'.(Hamilton, Minino et al. 2007) . Caesarean section involves major abdominal surgery and increases the risk of maternal death by about four times overall, and around two times for low-risk mothers having elective surgery.(Enkin, Keirse et al. 2000; Deneux-Tharoux, Carmona et al. 2006). Recent research also suggests higher infant mortality following caesarean birth,(MacDorman, Declercq et al. 2006) which may reflect increased risks of respiratory problems for caesarean newborns.(Levine, Ghai et al. 2001)

As well as these short-term risks, a previous caesarean will increase risks for mother and baby's health in all subsequent pregnancies. Increased long-term risks include: infertility and ectopic pregnancy;(Hemminki and Merilainen 1996) unexplained stillbirth;(Smith, Pell et al. 2003) placental problems including placental abruption,(Odibo, Cahill et al. 2007) placenta previa, placenta accreta and percreta,(Wu, Kocherginsky et al. 2005) and emergency postpartum hysterectomy,(Habek and Becarevic 2007) all of which represent life-threatening risks for mother and baby

Obviously there is a shorter or absent labor with caesarean birth, and the peaks of oxytocin, endorphins, catecholamines, and prolactin are absent. Furthermore, mothers and babies are usually separated for some hours after birth, so the first breastfeed is usually delayed. Both will also be affected to some extent by the drugs used in the procedure (epidural, spinal, or general anaesthetic) and for post-operative pain relief.

The consequences of such radical departures from our hormonal blueprint are suggested in the work of Australian researchers who interviewed 242 women in late pregnancy and again after birth. The 50 percent of women who had given spontaneous vaginal birth were the most likely to experience a marked improvement in mood and an elevation of self-esteem after delivery. In comparison, the 17 percent who had caesarean surgery were more likely to experience a decline in mood and self-esteem. The remaining women had

forceps or vacuum assistance, and their mood and self-esteem were, on average, unaltered.(Fisher, Astbury et al. 1997)

Another study looked at the breastfeeding hormones prolactin and oxytocin on day two, comparing women who had given birth vaginally with women who had undergone emergency cesarean surgery. In the cesarean group, prolactin levels did not rise as expected with breastfeeding, and the oxytocin pulses were reduced or absent. In this study, first suckling had been at 240 minutes average for cesarean babies, and 75 minutes average for babies vaginally born. Duration of breastfeeding was not significantly different for the mothers.

The authors comment, “These data indicate that early breastfeeding and physical closeness may be associated not only with more interaction between mother and child, but also with endocrine [hormonal] changes in the mother.” (Nissen, Uvnas-Moberg et al. 1996)

Other research has shown that early and frequent suckling positively influences milk production and the duration of breastfeeding. (Salariya, Easton et al. 1978)

These studies not only indicate important links between birth and breastfeeding, but also show how an optimal birth experience can influence the long-term health of mother and baby. For example, successful breastfeeding confers advantages such as reduced risk of breast cancer and osteoporosis for the mother and reduced risk of diabetes and obesity long-term for the child. And enhanced self-esteem and confidence after a natural birth is a solid base from which to begin our mothering.

The connections between events at birth and long-term health certainly deserve more study. (See Michel Odent’s Primal Health Database www.birthworks.org/primalhealth for a summary of current research.) But we cannot afford to wait for years for researchers to “prove” the benefits of an undisturbed birth. Perhaps the best we can do is trust our instincts and vote with our birthing bodies, choosing models of care that increase our chances of undisturbed- and ecstatic- birthing.

Early Separation

Even in non-interventionist settings, it is uncommon for the baby to remain in the mother’s arms for the first one to two hours. And yet this time is exceptional, from a hormonal perspective, and will never again occur for this mother and baby. Mother Nature’s superb design, as described above, includes peak levels of the hormones of love, pleasure, excitement and tender mothering, which enhance attachment as well as breastfeeding initiation for both partners. Interference with this opportunity, by separation of mother and baby, may have significant implications in the short, medium, and long terms.

For both mother and baby, the time immediately after birth is associated with high CA levels which increase alertness and energy and enhance breastfeeding initiation. Peak maternal levels of oxytocin in the first hour enhance maternal responsiveness, both in

breast and brain, and activate the “maternal circuit” -- brain areas that mediate instinctive mothering behaviors – in mammalian mothers. High beta-endorphin levels at this time ensure pleasure and reward for maternal-infant interactions, and optimal prolactin levels may be important for longer-term breast milk production.

All of these hormonal systems are enhanced through skin-to-skin contact between mother and baby immediately after birth, which reduces crying and stress, keeps the newborn warm, and enhances physiological adaptation and maturity,(Christensson, Siles et al. 1992; Ferber and Makhoul 2004) even up to two days later.(Bystrova, Widstrom et al. 2003)

For the mother, skin to skin contact with early breastfeeding initiation also enhances early breastmilk production,(Bystrova, Widstrom et al. 2007) and early and frequent breastfeeding is also associated with increased breastfeeding duration.(Salariya, Easton et al. 1978)

Conversely, removal of newborn from mother, even for short periods, disturbs the innate sequence of newborn pre-breastfeeding behaviour, which includes crawling up the mother’s abdomen, locating the breast and spontaneous sucking and rooting behaviour.(Righard and Alade 1990)

As Bergman comments, ‘The neurobehaviour called “breastfeeding” is a critical survival strategy for the newborn human being, and is a behaviour which depends entirely on a limbic system brain programme, which in turn depends entirely on being in the right habitat: the maternal milieu. Any separation results in an opposing and potentially harmful neurobehavioural programme. Thus, the maternal milieu is specifically needed from the moment of birth, and should be continuous. Without this, the neurobehaviour that results is “protest-despair”, which actively shuts off the “breastfeeding behaviour.’(Bergman 2006)

Several older studies have shown advantages, up to age three, for mother-child relationship in dyads who experienced extra contact in the hour after birth. These include more positive interactions;(de Chateau and Wiberg 1977; de Chateau and Wiberg 1977; de Chateau and Wiberg 1984) longer duration of breastfeeding (Klaus, Jerauld et al. 1972; de Chateau and Wiberg 1984); and more complex language interactions at age two.(Ringler, Kennell et al. 1975)

Optimizing the Ecstasy

The following suggestions will help a woman to use her hormonal blueprint and so optimize the experience and safety for herself and her baby. Remember that birth is “orgasmic in its essence”(Baker 2001 p 90) so that conditions for birth are ideally as close as possible to conditions for lovemaking.

- Take responsibility for your health, healing, and wholeness throughout the child-bearing years

- Choose a model of care that enhances the chance of a natural and undisturbed birth (eg home birth, birth center, one-on-one midwifery care).
- Arrange support according to individual needs; trust, a loving relationship, and continuity of care with support people are important.
- Consider having an advocate at a hospital birth- eg private midwife or doula.
- Ensure an atmosphere where the laboring woman feels safe, unobserved, and free to follow her own instincts
- Reduce neocortical stimulation by- keeping lighting and noises soft and reducing words to a minimum.
- Cover the clock and any other technical equipment.
- Avoid drugs unless absolutely necessary.
- Avoid procedures (including obvious observations) unless absolutely necessary.
- Avoid caesarean surgery unless absolutely necessary.
- Don't separate mother and baby for any reason, including resuscitation, which can be done with the cord still attached.
- Breastfeed and enjoy it!

Giving birth is an act of love, and each birth is unique to the mother and her baby. Yet we also share the same womanly physiology and the same exquisite orchestration of our birthing hormones. Our capacity for ecstasy in birth is also both unique and universal, a necessary blessing that is hard-wired into our bodies, yet that requires, especially in these times, that we each trust, honor, and protect the act of giving birth according to our own instincts and needs.

Dutch professor of obstetrics G. Kloosterman offers a succinct summary, which would be well placed on the door of every birth room:

Spontaneous labor in a normal woman is an event marked by a number of processes so complicated and so perfectly attuned to each other that any interference will only detract from the optimal character.

The only thing required from the bystanders is that they show respect for this awe-inspiring process by complying with the first rule of medicine-- nil nocere [Do no harm].(Kloosterman 1982)

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