

## Obstetric Medicine: Interdisciplinary care for pregnancy and for women wishing to conceive

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*The concept of 'obstetrical medicine' was established in the late 19th century, but overshadowed during most of the 20th century by dramatic improvements in surgical, anesthetic, antimicrobial therapeutics, and obstetrical methods and practice. During the last quarter of the 20th century the causes of maternal morbidity and mortality increasingly became pre-existing hereditary and acquired medical disorders and treatable or preventable medical complications of pregnancy. The role of obstetric medicine re-emerged because of surgical, therapeutic, and medical success. New professional associations have been formed to support, through education and research, the growth in numbers of clinicians from many specialties concerned with the medical care of the pregnant patient (Rev Méd Chile 2006; 134: 109-14).*

**(Key-words:** Medical care team; Obstetrics; Prenatal care; Pregnancy complications; Pregnant women)

## Medicina Obstétrica: Atención médica interdisciplinaria para embarazadas y mujeres que deseen concebir

*El concepto de «Medicina Obstétrica» se originó a fines del siglo 19, pero quedó sobrepasado durante la mayor parte del siglo 20 por los avances dramáticos en la terapéutica quirúrgica, en la anestesia, en la disponibilidad de antimicrobianos, y en los métodos y la práctica de la obstetricia. Durante las últimas décadas del siglo 20 las causas de morbilidad y mortalidad maternas cambiaron progresivamente hacia patologías médicas preexistentes, hereditarias o adquiridas, y a complicaciones médicas del embarazo que son prevenibles y tratables. El rol de la medicina obstétrica emergió nuevamente debido a los éxitos quirúrgicos, terapéuticos y médicos. Se han constituido nuevas sociedades profesionales que apoyan a través de la educación y la investigación al número creciente de clínicos de distintas especialidades que se involucran en la atención médica de las embarazadas.*

Manuscrito preparado por invitación de los Editores de la *Revista*. Recibido el 2 de noviembre de 2005. El Dr. Lee es miembro del Comité Asesor Internacional de la *Revista Médica de Chile*.

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The need for the concept of obstetric medicine is a recent development. Social and scientific events have transformed reproductive behavior and clinical practice (Table 1). More women are having babies at the extremes of reproductive age than a century ago. The contemporary increase, natural and artificial, in the fecundity of women past the age of 40 has been superimposed upon an older trend of earlier menarche and earlier adolescent pregnancy. The capacity to prolong the lives of patients suffering from a variety of chronic diseases has allowed a group of chronically ill women to live well enough to successfully reproduce. Medical successes have raised reproductive expectations, causing high-risk pregnancy services to be populated not only with the socially disadvantaged but also with women entering

pregnancy with a panoply of heretofore unusual or serious medical disadvantages (Tables 2, 3 and 4). Technological developments in obstetrics have dramatically altered the spectrum of manageable maternal problems. Ultrasound, karyotyping, DNA probes, fetal surgery, and in vitro fertilization have, for example, opened reproductive opportunities for women previously excluded because of medical or obstetrical problems. Moreover, neonatal pediatrics, a relatively new discipline, allows babies to be born preterm because of threats to maternal health such as preeclampsia and still to be able to survive the threats of prematurity, particularly respiratory distress syndrome. Antenatal maternal glucocorticoid therapy and artificial surfactant given to the neonate have made a huge contribution.

**Table 1. The Origins of Obstetric Medicine**

I. Advances in obstetric care
II. Advances in understanding of physiology and molecular biology
a) Effective contraception
b) Assisted reproductive technologies and clinical practice
III. Changes in social patterns and regulation of reproduction
a) Advanced maternal age
IV. Increased survival of patients with serious chronic disease
a) Hereditary nonfatal and treatable conditions
b) Acquired nonfatal and treatable conditions

**Table 2. Increased Survival and Fertility of Patients with Serious Chronic Disease**

<ul style="list-style-type: none"> <li>• Type 1 diabetes mellitus</li> <li>• Type 2 diabetes mellitus: obesity, polycystic ovary syndromes</li> <li>• Cystic fibrosis</li> <li>• Renal disease: <ul style="list-style-type: none"> <li>- Chronic renal failure with dialysis</li> <li>- Transplantation</li> </ul> </li> <li>• Endocrinopathies</li> <li>• Cardiac transplantation for cardiomyopathy; valvular heart disease</li> <li>• Hemoglobinopathies</li> <li>• Cancer</li> <li>• Epilepsy</li> </ul>
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**Table 3. Hereditary or Congenital Nonfatal or Treatable Risk Factors**

<ul style="list-style-type: none"> <li>• Hemoglobinopathies</li> <li>• Thrombophilias <ul style="list-style-type: none"> <li>- Protein S deficiency</li> <li>- Protein C deficiency</li> <li>- Antithrombin III deficiency</li> <li>- Homocystinemia</li> </ul> </li> <li>• Von Willebrand's syndrome</li> <li>• Congenital heart disease</li> </ul>
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**Table 4. Acquired Nonfatal or Treatable Risk Factors**

<ul style="list-style-type: none"> <li>• Obesity</li> <li>• Antiphospholipid syndrome</li> <li>• Thyroid disease <ul style="list-style-type: none"> <li>- Graves disease</li> <li>- Hashimoto's thyroiditis</li> </ul> </li> <li>• Systemic lupus erythematosus</li> <li>• Infections</li> <li>• Trauma: spinal cord injuries; brain injury</li> <li>• Neurodegenerative disease: multiple sclerosis</li> <li>• Gastrointestinal disease</li> </ul>
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We argue that the contemporary notion of pregnancy is old fashioned; shaped a century ago when the vast majority of pregnancies occurred in healthy young adult women and reproductive tragedy was the consequence of bad luck, carelessness, or sin. Even half a century ago women with serious disease did not survive to reproductive capacity, were unable to conceive, or were advised not to become pregnant. Illegal abortions were common and dangerous. There were abundant orphanages. Maternal mortality and fetal wastage were frequent but considered an expected tragedy.

*«Few subjects can be conceived calculated to attract to themselves more serious thought and attention on the part of obstetricians, than the bearing of organic disease of the heart upon the condition of the pregnant, parturient, and lying-in woman, on account of the important issues at stake; and yet scarcely a subject that borders on the mutual region occupied by the obstetric and the pure physician seems to have received less study from either the one or the other. The reason, no doubt, is partly due to the cramping effects of a too rigid specialism, which tends, on the one hand, to concentrate the attention of the obstetric practitioner exclusively upon matters purely obstetrical and gynaecological, whilst, on the other, it affords the pure physician only comparatively few opportunities to watch the influence of such disorders on particular cases, inasmuch as the patients are at such times pretty exclusively under the care of a physician-accoucheur.*

*But as every woman has not only a uterus and ovaries, but also a liver, heart, lungs, kidneys, etc., it is, I hold, the first duty of every obstetrician to make sure that he is a physician in the first instance, and an obstetrician only in the second place. Unless he does so, he can have only an extremely inadequate idea of the scope and importance of his department of the medical art and science; and he is, at the same time, certain to allow his position in practice to degenerate into the cultivation of what at best is only an outpost of applied surgery. Much of the disfavour and affected hauteur with which obstetrical medicine has frequently been treated by pure physicians and surgeons, is doubtless traceable to the somewhat contracted notion that we ourselves have formed of the value and dignity of obstetrics, and can only be removed by our strongly asserting and proving*

*that neither in loftiness of aim, in scientific precision, nor in practical importance, is gynaecology a whit behind either of her sisters. Only by entertaining an elevated idea of his department and its duties, can the obstetrician expect to practise with success and comfort the all-important branch of the healing art which he has selected as his own»<sup>1</sup>.*

So begins the book by Angus MacDonald, *On the Bearings of Chronic Disease of the Heart upon Pregnancy, Parturition, and Childbed*, published in 1878. He was the first writer in English to coin the label «obstetrical medicine» and to candidly chide both physicians and obstetricians for the «cramping effects of a too rigid specialism».

It is easy to understand the origins of the separation between obstetric and medical practice and practitioners. For time out of mind, the care of pregnancy and parturition were considered «women's work», beneath the dignity of male physicians, or, as Sir Henry Halford, president of the Royal College of Physicians (London), declared in 1827, «Midwifery is not a fit occupation for a gentleman». Obstetrical complications were likely to carry off both mother and child, and women with serious medical conditions were not likely to become pregnant or to survive pregnancy. Even a physician, like Angus MacDonald, interested in the «bearings of chronic disease» upon pregnancy had few opportunities to observe and care for such patients. Moreover, he practiced with limited understanding, ineffective medications, and few tools to provide successful care. The special status of the gravid woman as the mother of children so important for the future of mankind led to societal and religious protection from harm, including extraordinary or experimental medical intrusion; a tradition of respect which continues to the present day.

For two millennia cesarean section was a postmortem event; a procedure to save a child. For two millennia it was also a procedure of maternal sacrifice<sup>2</sup>. In Europe the Chamberlen obstetrical forceps was a closely held technical secret for 150 years, until 1733 when wider use reduced maternal and fetal disasters. Not until the 1880s did improvements in surgical technique reduce the risk of operative delivery and fatal postpartum hemorrhage<sup>2</sup>. Listerian antiseptics and Halsteadian asepsis diminished postpartum infec-

tions setting the stage for major advances in obstetric surgical technique and practice. The last 25 years of the 19th century established the legitimacy and credibility of obstetrics as an important component of medical research and education. Puerperal sepsis nevertheless remained a hazard. Effective anti-microbial treatment for puerperal sepsis took another half century.

Examination of maternal mortality and its causes in the United Kingdom and the United States illustrates the thesis we present. In the United States, deaths from complications of pregnancy have declined from about 850 maternal deaths per 100,000 live births in 1900 to 7.5 in 1982<sup>3</sup>. In the United Kingdom, maternal mortality between 1952 and 1954 was 68 per 100,000 maternities; by 1997-1999 maternal mortality was 11 per 100,000 maternities<sup>4</sup>. The reduction in maternal mortality followed the introduction of improved nutrition, anesthesia and surgical technique, and the introduction of effective antimicrobial medications. At the beginning of the twentieth century pelvic deformities from vitamin D deficiency and limited access to inpatient blood transfusion and surgical delivery contributed to the prevalence of maternal deaths from hemorrhage, prolonged labor, and traumatic delivery. The advent of sulphonamides and penicillin in the late 1930s and 1940s resulted in sharp declines in postpartum sepsis.

The past century has seen the passionate pursuit of the safety of mother and child, liberating women from the tyrannies of fertility and infertility, and diminishing the risks for obstetric

catastrophe. The first half of the 20th century was a time of surgical advances and the incorporation of obstetrics into the clinical practice of doctors. In the first half of the 20th century the problems were indeed mainly surgical. United Kingdom maternal mortality data have been recorded in detail since the 1950s. In the triennium 1952-1954 in England and Wales there were 1094 direct and 316 indirect maternal deaths; the maternal mortality (direct and indirect deaths) was 68 per 100,000 maternities<sup>4</sup>. A direct death is one that can only have been caused by pregnancy; e.g. postpartum hemorrhage. An indirect death is one where pregnancy has contributed to the maternal death; e.g. death from heart disease that has been made worse by pregnancy. The principal causes of death between 1952 and 1954 are shown in Table 5. Deaths from hemorrhage, early deaths, prolonged labor, sepsis and other direct causes of death have been categorized as surgical. All other deaths have been categorized as medical, although it could be correctly argued that «*surgical*» principals such as timely induction and avoidance of trauma could reduce deaths from medical causes such as toxemia and thromboembolism. Nevertheless, even using this classification, over half of the deaths were surgical and in the 1950s obstetrics was very much a surgical specialty.

The last 50 years of the 20th century biomedical science and clinical practice dramatically altered the biologic characteristics of women hosting placentas and fetuses<sup>5</sup>. From fertilization to implantation, to timing of delivery, clinicians became increasingly powerful in preserving marginal or

**Table 5. Causes of Maternal Death 1952-54**

		<b>Surgical</b>	Medical
Hemorrhage	234	<b>234</b>	
Early deaths (include abortion)	212	<b>212</b>	
Toxemia	200		200
Venous thromboembolism	138		138
Prolonged labor and trauma	119	<b>119</b>	
Sepsis	42	<b>42</b>	
Other direct	141	<b>141</b>	
Cardiac	121		121
Other indirect	195		195
<b>Totals</b>	<b>1402</b>	<b>748</b>	<b>654</b>

**Table 6. Maternal Mortality 1997-99**

	Surgical	Medical
Hemorrhage	<b>7</b>	
Early deaths (include abortion)	<b>17</b>	
Toxemia		15
Venous thromboembolism		35
Prolonged labor and trauma	<b>2</b>	
Sepsis	<b>14</b>	
Other direct	<b>5</b>	
Cardiac		35
Other indirect		101
Totals	<b>45</b>	186

threatened conceptions and fetuses. Assisted reproduction, including postmenopausal in vitro fertilized pregnancies, led to a veritable epidemic of multiple gestations and contributed to changes in the epidemiology of maternal morbidity and mortality. As in MacDonald's time pregnant women became sick with medical problems like pneumonia or chronic heart disease. Traditionally the surgically-orientated obstetrician would have consulted one of his medical colleagues. Maybe in the 1920s or 1930s doctors were generalists and the physician would have known something about obstetrics, but increasingly physicians have come to know little about obstetrics in the same way as obstetricians knew little about medicine; in MacDonald's phrase, «*The cramping effects of a too rigid specialism*».

The need for physicians with knowledge and interest in reproduction and pregnancy and with the respect of their obstetrical colleagues led to the initial appointment of consultant obstetric physicians in the United Kingdom in the 1960s. Since the appointment of obstetric physicians in the United Kingdom, departments of obstetrics have realized the importance of medicine in obstetrics and recognized the need for physicians who have a particular skill in the management of medical problems during pregnancy. Again this is best illustrated by the maternal mortality data from the triennium 1997-1999 (Table 6). There has been a very gratifying reduction in maternal mortality compared to the 1950s but now medical causes account for 81 percent of maternal mortality

**Table 7. Causes of Pregnancy-Related Death, By Outcome of Pregnancy and Pregnancy-Related Mortality Ratios (PRMR\*): United States 1991-1999<sup>7</sup>**

Cause of death	All Outcomes	
	%	PRMR
	(N=4,200)	
Embolism	19.6	2.3
Hemorrhage	17.2	2.0
PIH§	15.7	1.8
Infection	12.6	1.5
<b>Cardiomyopathy</b>	<b>8.3</b>	<b>1.0</b>
<b>CVA¶</b>	<b>5.0</b>	<b>0.6</b>
Anesthesia	1.6	0.2
<b>Other**</b>	<b>19.2</b>	<b>2.3</b>
Unknown	0.7	0.1
Total††	100.0	11.8

\*Pregnancy-related deaths per 100,000 live births

†Includes spontaneous and induced abortions

§Pregnancy-induced hypertension

¶Cerebrovascular accident

\*\*The majority of the other medical conditions were cardiovascular, pulmonary, and neurologic problems

††Percentages might not add to 100.0 because of rounding

compared to 47 percent in the 1950s<sup>4</sup>. It is likely that morbidity follows a similar pattern. Certainly the importance of obstetric medicine is now realized. A recent survey from the UK has shown that 10 percent of all pregnant women will be referred to obstetric physicians if the service is available<sup>6</sup>. Similarly maternal mortality data from the United States (Table 7) documents the growing importance of obstetric medical care for the woman with a medical condition contemplating conception and the pregnant patient who develops a medically diagnosable and treatable condition<sup>3,7</sup>.

Obstetric medicine is a young clinical discipline, difficult to define as the property of any single medical or surgical specialty. As the name suggests, it is an interdisciplinary and multidisciplinary activity. Obstetricians, internists, anesthesiologists, neonatologists, intensivists and others can be scholars and practitioners of obstetric medicine. The core, the

essence and emphasis, is knowledge and experience, not technique; knowledge about the biology of reproduction, gestation, and the health and illth of nonpregnant and pregnant women. The breadth of obstetric medicine extends beyond conception, gestation and the puerperium. Knowledge of normal and abnormal growth and development and the chronic illnesses of children and young adults that may interfere with successful pregnancy are fundamental. Knowledge of the long-term sequelae of pregnancy and its complications is equally fundamental. Obstetric medicine does not require its practitioners to perform surgery although a firm grounding in the anatomy and technical requirements of successful obstetrical operations and their complications is essential. Obstetric medicine does not preclude surgical, obstetric, and technologic skills. Obstetric medicine requires not only anatomy and physiology but also familiarity with pharmacology and the pharmacopoeia with special attention to the use of medications during gestation. Obstetric medicine does require its practitioners to be scholars, advisors, and consultants for patients and their obstetrical caregivers. Above all, the obstetric medicine practitioner is a team builder and team player. Indeed obstetric medicine is not a single discipline or specialty, rather it is a unique blend; a fertile mixture eschewing «*the cramping effects of too rigid specialism*». It is not surprising that the pioneers of contemporary obstetric medicine have been generalists regardless of their specialty training and identity.

Threats exist, of course. Specialism may insist upon constructing fences to keep out intruders or demanding that generalism in obstetric medicine be confined to one «*fenced in*» established specialty. Some years ago one of us (RVL) wrote an essay, «*Riding the Fences*»<sup>8</sup>, which used the agricultural metaphor of fencing to illustrate the importance of the generalist state of mind in clinical practice. Prohibitive hostility from established specialties has been and continues to be a barrier to scientific advance and clinical care for pregnant patients in many venues. We believe it important to emphasize that obstetric medicine is not a fence building state of mind.

Physicians and obstetricians in the United Kingdom created the MacDonald Club, named in honor of Angus MacDonald, to foster the practice of obstetric medicine and interdisciplinary communication. Following the example from the United Kingdom, physicians and obstetricians in North America established the Society of Obstetric Medicine twenty years ago. The International Society of Obstetric Medicine was created a decade later and draws membership from Societies of Maternal Fetal Medicine, Anesthesia, Pediatrics, Obstetrics, and Medicine from around the globe. We feel compelled to remind these groups that their objective is to preserve their multidisciplinary ambience and participation and not to create an entirely new specialty.

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