Hong Kong College of Obstetricians & Gynaecologists

Territory-wide Audit in Obstetrics & Gynaecology

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HKCOG Audit 2009

Hong Kong College of Obstetricians and Gynaecologists

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FOREWORD

The Hong Kong College of Obstetricians and Gynaecologists (HKCOG) is celebrating our 26th anniversary this year. In our continued efforts to facilitate transparency and accountability, we are proud to carry on our tradition in delivering independent, soundly based and quality audit reports to our stakeholders. The high regard in which the College is held is based on the commitment of our fellows to demonstrate determination in developing and improving systems to manage the quality of O&G service.

The Territory-wide Audit in Obstetrics and Gynaecology is the culmination of an extensive program led by Dr. PM Yuen's Audit Subcommittee and contribution of each individual doctor in providing data about everyday practice. I would like to take this opportunity to congratulate Dr. Yuen and his team involved for their remarkable achievement, and to express my sincere gratitude for their hard work.

In line with the audit reviews in 1999 and 2004, numerous items were studied in this survey, over the period from January to December 2009. In this very report, some items had been reviewed and accuracy of data was proudly verified by the Audit Subcommittee, adding heavily to the reliability of the team, our members and fellows, and the College. Information so obtained would guide the specialty on good practice as well as planning and development of O&G service in Hong Kong. Statistics collected from these audits provide important insight for our fellows to review disease patterns, overall trend and service quality of the Specialty. With solid and informative data as a reliable reference, the results of the audit encourage understanding among doctors and across institutions.

Our strength lies in our ability to anticipate significant issues and to respond quickly to society's needs when required. With turbulent workload fluctuations related to mainland obstetric demand, the audit results may even serve as a useful piece of information to evaluate our manpower strength in future. Only by constantly reviewing the audit program, key factors that affect service of O&G may be identified, measured and assessed.

I wish to thank each member in the Audit Subcommittee and each fellow in our specialty, again for the enthusiasm and diligence in completing The Territory-wide Audit in Obstetrics and Gynaecology. The report of this audit contains valuable information about O&G service and I commend the report to you.

Dr. LEUNG Kwok Ling Ares
Chairman, Quality Assurance Committee
President, Hong Kong College of Obstetricians and Gynaecologists

May 2014

AN OVERVIEW OF THE REPORT

Territory-wide Audit 2009

The current audit is the fourth audit exercise conducted by the Hong Kong College of Obstetricians & Gynaecologists since 1994. As in previous audits, there were some modification of the "Minimal Data Set" according to the change in practice and expansion of some clinically important area. In the obstetric side, Down's syndrome screening was included because of the introduction of biochemical test and later OSCAR into the common practice. Information on post-partum haemorrhage was expanded to look at the severity of the haemorrhage and need for transfusion. In the gynaecology side, new disease items were added to diseases of ovary and diseases of broad ligaments and pelvic peritoneum. Vaginal wall prolapse were classified as anterior and posterior compartment prolapse, replacing the traditional terms such as cystocele, enterocele and rectocele. Salpingo-oophorectomy or oophorectomy at time of abdominal hysterectomy was separated into 2 procedures as in laparoscopic approach. Different types of laparoscopic hysterectomy and robot-assisted procedure were included. As in 2004, the obstetric data of all public hospitals were extracted from the Clinical Management System of the Hospital Authority. The web-based database program developed by Prof. Daljit Sahota of the Department of Obstetrics and Gynaecology, Chinese University of Hong Kong and Dr. Yuen Pong Mo in 2004 were modified to capture the gynaecological data from the public hospitals and both the obstetric and gynaecological data from the private hospitals. These data were first recorded in the audit forms and the forms were returned to the College for centralized data entry through the internet.

Data processing

After pooling of all the data, those records with incomplete and obvious inconsistent data were identified and returned to individual hospital for clarification and verification, if possible. Duplicated records were eliminated if known. However, as the default value of various complications was set as “Nil” and the difficulties in cross-checking the occurrence of complications, especially those delayed complications, the completeness of the reporting of this information could not be verified. Similarly, information on fetal outcomes and neonatal complications relied very much on the effort of information tracing by the obstetricians and feedback from the paediatric colleagues, data accuracy is a great concern and might not reflect the real situation.

Obstetric report

The total number of deliveries in the year 2009 was increased. The increase was a result of the increase in non-Hong Kong residents, mainly from the Mainland China. In fact, the number of deliveries from Hong Kong residents was reduced. This must be taken into account when the data are interpreted. For example, the proportion of parturients at or above 35 year old was reduced, which seems to contradict with our clinical impression. The changes in the incidence of various complications may also be reduced as these might be under-reported or those with complications could not come to Hong Kong for delivery. The other reason for the differences was related to the change in practice. The change in diagnostic criteria of gestational diabetes,

management of breech presentation and the change in definition of post-maturity are a few more notable examples.

As mentioned just now, most of the parturients with breech presentation at term were delivered by caesarean section. The uptake of external cephalic version remained low. The management of threatened preterm labour was reported in 2004 and 2009. The use of antenatal steroid was increasing.

Some changes in the intrapartum management were also observed. There was an increase in social reason as the indication for induction. The number of augmentation of labour and epidural analgesia were reduced. The number of instrumental deliveries were reduced and the drop was more in forceps deliveries. As expected, the overall rate of caesarean sections was increased to 42.1% in 2009. Previous caesarean sections remained the most common indication, followed by social reason.

The incidence of post-partum haemorrhage increased to 4.2%, of which 18% were severe haemorrhage (blood loss > 1000 ml). There was one maternal death due to hepatic failure with associated with post-partum haemorrhage. The number of maternal death also decreased and so did the maternal mortality ratio.

The rates of stillbirth, congenital abnormality and birth trauma were reduced in 2009. Again, these changes might be a reflection of the change in composition of our clients.

Gynaecological report

The total number of hospital admissions dropped in 2009. Most of the drop was in the emergency and day admissions.

First trimester termination of pregnancy remained the most common ‘diagnosis’ but the proportion dropped substantially in 2009. On the other hand, the proportions of subfertility and endometrial polyp increased. Chronic pelvic inflammatory disease was diagnosed in around 400 admissions although there is no well accepted definition of the diagnosis. Although the total number was not high, there was a consistent increase in the group of genital displacement and urinary disorders over the years. Genuine stress incontinence accounted for half of the change. No change was observed in the number of admissions for threatened miscarriages. It will be interesting to see if a drop would be observed with the setting up of Early Pregnancy Assessment Clinics in various public hospitals.

The proportions of admissions for endoscopic operations, major abdominal operations for malignant conditions, assisted reproduction procedures increased in 2009 whilst the proportion of minor vaginal/vulval operations reduced. The drop in major abdominal operations for benign/pre-malignant conditions was probably related to the increasing use of minimal access approach. Robot-assisted procedures were first reported in the current report and he number was small. Vaginal approach remained less utilised in hysterectomy for uterus without prolapse. Increase in embryo transfer and USG guided oocyte retrieval accounted for most of the increase in assisted reproduction procedures. Corresponding to the drop in the ‘diagnosis’ of first trimester

termination of pregnancy, the number of suction termination of pregnancy dropped almost by 50%. Similarly, the number of evacuation of uterus after miscarriage also reduced substantially.

Complications associated with admissions remained low. It was higher in admissions for malignant conditions. Hospital stay was shortened over the years. As expected, the hospital stay after minimal access procedures was shorter compared to conventional surgery.

Participating Hospitals in Obstetric Audit

Participating hospitals	Number Reported		Number Audited	
	Maternities	Babies	Maternities	Babies
Canossa Hospital	1918	1959	1918	1959
Hong Kong Adventist Hospital	1095	1115	1095	1115
Hong Kong Baptist Hospital	12823	12960	12823	12960
Hong Kong Sanatorium & Hospital Ltd	2010	2059	2010	2059
Kwong Wah Hospital	5677	5775	5677	5775
Maltida International Hospital	1168	1190	1168	1190
Pamela Youde Nethersole Eastern Hospital	3582	3635	3582	3635
Precious Blood Hospital	335	338	335	338
Princess Margaret Hospital	4627	4699	4627	4699
Prince of Wales Hospital	6519	6640	6508	6622
Queen Elizabeth Hospital	5759	5886	5759	5886
Queen Mary Hospital	3822	3966	3805	3944
St Paul's Hospital	3204	3231	3204	3231
St Teresa's Hospital	7596	7662	7595	7660
Tsuen Wan Adventist Hospital	2431	2454	2429	2450
Tuen Mun Hospital	5690	5751	5690	5751
Union Hospital	6559	6633	6556	6625
United Christian Hospital	4951	5009	4951	5009
Total	79766	80962	79732	80908

Number reported refers to the total number of deliveries officially reported by individual hospital
Number audited refers to the total number of cases audited in individual hospital

Participating hospitals	% of hospital return		% of all audited cases	
	Maternities	Babies	Maternities	Babies
Canossa Hospital	100.00%	100.00%	2.4%	2.4%
Hong Kong Adventist Hospital	100.00%	100.00%	1.4%	1.4%
Hong Kong Baptist Hospital	100.00%	100.00%	16.1%	16.0%
Hong Kong Sanatorium & Hospital Ltd	100.00%	100.00%	2.5%	2.5%
Kwong Wah Hospital	100.00%	100.00%	7.1%	7.1%
Maltida International Hospital	100.00%	100.00%	1.5%	1.5%
Pamela Youde Nethersole Eastern Hospital	100.00%	100.00%	4.5%	4.5%
Precious Blood Hospital	100.00%	100.00%	0.4%	0.4%
Princess Margaret Hospital	100.00%	100.00%	5.8%	5.8%
Prince of Wales Hospital	99.83%	99.72%	8.2%	8.2%
Queen Elizabeth Hospital	100.00%	100.00%	7.2%	7.3%
Queen Mary Hospital	99.56%	99.44%	4.8%	4.9%
St Paul's Hospital	100.00%	100.00%	4.0%	4.0%
St Teresa's Hospital	99.98%	99.97%	9.5%	9.5%
Tsuen Wan Adventist Hospital	99.92%	99.84%	3.0%	3.0%
Tuen Mun Hospital	100.00%	100.00%	7.1%	7.1%
Union Hospital	100.00%	99.9%	8.2%	8.2%
United Christian Hospital	100.00%	100.00%	6.2%	6.2%
Total	99.96%	99.93%	100.0%	100.0%

% of hospital return refers to the percentage of cases returned for audit by individual hospital
% of all audited cases refers to the percentage of audited cases with respect to all audited cases

Participating Hospitals in Gynaecological Audit

Participating hospitals	Number of cases audited	% of all audited cases
Alice Ho Miu Ling Nethersole Hospital	5	0.07%
Canossa Hospital	885	1.26%
Caritas Medical Centre	110	0.16%
Evangel Hospital	580	0.83%
Hong Kong Adventist Hospital	81	0.12%
Hong Kong Baptist Hospital	4426	6.31%
Hong Kong Central Hospital	5408	7.70%
Hong Kong Sanatorium & Hospital	5245	7.47%
Kwong Wah Hospital	4563	6.50%
North District Hospital	792	1.13%
Our Lady of Maryknoll Hospital	205	0.29%
Pamela Youde Nethersole Eastern Hospital	3824	5.45%
Prince of Wales Hospital	7016	10.00%
Princess Margaret Hospital	4857	6.92%
Queen Elizabeth Hospital	5650	8.05%
Queen Mary Hospital	7921	11.29%
St Paul's Hospital	1686	2.40%
St Teresa's Hospital	1939	2.76%
Tseung Kwan O Hospital	1254	1.79%
Tsuen Wan Adventist Hospital	107	0.15%
Tuen Mun Hospital	5151	7.34%
Union Hospital	3556	5.7%
United Christian Hospital	4428	6.31%
Total	70190	

The Obstetric Report

2009

GENERAL OBSTETRIC STATISTICS

BACKGROUND INFORMATION OF THE RETURNED OBSTETRICAL DATA

	1999		2004		2009	
Records complete without error	45737	93.5%	46536	93.7%	76361	94.4%
Records with inconsistent data	1488	3.0%	1848	3.7%	3278	4.1%
Records with missing data	1699	3.5%	1492	3.0%	1567	1.9%
Missing data on date of delivery	*-*	*-*	*145*	*0.3%*	*0*	*0.0%*
Missing data on age	*320*	*18.8%*	*1129*	*2.3%*	*758*	*0.9%*
Missing data on gestation	*43*	*0.1%*	*131*	*0.3%*	*393*	*0.5%*
Missing data on birth weight	*100*	*5.9%*	*115*	*0.2%*	*610*	*0.8%*
Missing data on Apgar Score	*-*	*-*	*211*	*0.4%*	*398*	*0.5%*

TOTAL NO. OF MATERNITIES

The total number of maternities increased from 48,459 in 1999 to 49,110 in 2004, and further increased to 79,732 in 2009. The significant increase was due to the dramatic increase of parturients who were not Hong Kong residents, which increased from 9,709 in 2004 to 35,474 in 2009 and accounted for 44.5% of the total number of maternities. Although the number of maternities from Hong Kong residents increased from 39,401 in 2004 to 44,258 in 2009, it was still lower than the 48,459 in 1999.

The proportion of nulliparous was 54.8% in Hong Kong residents, which was similar to that in 2004 (54.3%). However, the proportion of nulliparous in non Hong Kong residents was 40.7% and it was lower than the 62.8% in 2004. The incidence of multiple pregnancy was 1.6% in Hong Kong residents and 1.3% in non Hong Kong residents. This was both higher than the corresponding figures of 1.1% and 0.9% in 2004. Overall, the incidence of triplets remained 0.02% but that of twins increased from 0.9% to 1.4%.

	Singleton Pregnancy		**Multiple Pregnancy**		**Total**
	Nulliparous	**Multiparous**	**Nulliparous**	**Multiparous**	
Resident	23754(62.5%)	19806(48.8%)	476(72.6%)	222(43.4%)	**44258**
Non-Resident	14254(37.5%)	20751(51.2%)	180(27.4%)	289(56.6%)	**35474**
Total	**38008**	**40557**	**656**	**511**	**79732**

NO. OF FETUSES IN EACH PREGNANCY

	1999		2004		2009	
Total no. of maternities	**48459**		**49110**		**79732**	
Singleton	*48015*	*99.0%*	*48573*	*98.9%*	*78565*	*98.5%*
Twin	*429*	*0.9%*	*528*	*1.1%*	*1152*	*1.4%*
Triplet	*15*	*0.03%*	*9*	*0.02%*	*15*	*0.02%*
Quadruplet/above	*0*	*0*	*0*	*0.0%*	*0*	*0.0%*
Total no. of babies	**48918**		**49656**		**80908**	
Live births	*48706*	*99.6%*	*49539*	*99.8%*	*80760*	*99.8%*
Stillbirths	*169*	*0.3%*	*117*	*0.2%*	*148*	*0.2%*
Unknown	*43*	*0.09%*	*0*	*0.0%*	*0*	*0.0%*

ANTENATAL COMPLICATIONS

	1999		2004		2009	
Diabetes mellitus (including IGT)	2945	6.1%	3108	6.3%	5228	6.6%
Anaemia	2745	5.7%	1956	4.0%	2279	2.9%
Thyroid diseases	643	1.3%	635	1.3%	886	1.1%
Cardiac diseases	442	0.9%	379	0.8%	470	0.6%
Respiratory diseases	307	0.6%	316	0.6%	460	0.6%
Surgical diseases	267	0.6%	218	0.4%	250	0.3%
Psychiatric diseases	177	0.4%	260	0.5%	493	0.6%
Immunological diseases	144	0.3%	69	0.1%	92	0.1%
Renal diseases	131	0.3%	118	0.2%	128	0.2%
Epilepsy	64	0.1%	69	0.1%	66	0.1%
Gastrointestinal /biliary tract diseases	41	0.08%	32	0.07%	38	0.05%
Liver diseases	29	0.06%	26	0.05%	55	0.1%

IGT= Impaired glucose tolerance

OBSTETRIC COMPLICATIONS

	1999		2004		2009	
Previous uterine scar	4434	9.2%	4373	8.9%	10088	12.7%
Preterm delivery (<37 weeks)	3046	6.3%	3296	6.7%	4873	6.1%
Breech presentation (parturients)	1929	4.0%	1807	3.7%	2538	3.2%
Post-term delivery (≥42 weeks)	1193	2.5%	673	1.4%	210	0.3%
Antepartum haemorrhage	1129	2.3%	984	2.0%	1170	1.5%
Pregnancy induced hypertension	946	2.0%	1169	2.4%	1535	1.9%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	32569	67.2%	31319	63.8%	42037	52.7%
Induced	8515	17.6%	9025	18.4%	13106	16.4%
No labour	7344	15.2%	8766	17.9%	24581	30.8%

PRESENTATION AND LIE AT DELIVERY

	1999		2004		2009	
Vertex	45938	93.91%	47362	95.38%	77807	96.2%
Breech	1966	4.02%	2081	4.19%	2862	3.5%
Brow presentation	11	0.02%	6	0.01%	5	0.01%
Face presentation	16	0.03%	18	0.04%	19	0.02%
Oblique lie	61	0.12%	29	0.06%	42	0.05%
Transverse lie	141	0.29%	109	0.22%	102	0.13%
Compound	15	0.03%	9	0.02%	9	0.01%
Others	36	0.07%	42	0.08%	34	0.04%
Unknown	734	1.50%	0	0.0%	28	0.03%

MODE OF DELIVERY (For Each Baby)

	1999		2004		2009	
Spontaneous vertex delivery	27943	57.2%	28898	58.2%	38418	47.5%
Vacuum extraction	6324	12.9%	4823	9.7%	7335	9.1%
Forceps delivery	867	1.8%	465	0.9%	373	0.5%
Vaginal breech delivery	232	0.5%	108	0.2%	161	0.2%
Lower segment CS before labour	7445	15.2%	8923	18.0%	24685	30.5%
Lower segment CS after labour	6021	12.3%	6378	12.8%	9661	11.9%
Classical Caesarean section	57	0.1%	60	0.1%	235	0.3%
Others/unknown	29	0.06%	1	0.0002%	40	0.05%

POSTPARTUM COMPLICATIONS

	1999		2004		2009	
Primary postpartum haemorrhage	1503	3.1%	1295	2.6%	3499	4.2%
Manual removal of placenta	1224	2.5%	1033	2.1%	1325	1.7%
Puerperal pyrexia	945	2.0%	294	0.6%	424	0.5%
Third degree laceration of perineum	39	0.08%	16	0.03%	67	0.08%
Hysterectomy	29	0.06%	21	0.04%	40	0.05%
Rupture of uterus	7	0.01%	5	0.01%	6	0.01%
Internal iliac artery ligation	-	-	3	0.01%	2	0.003%
Uterine artery embolisation	-	-	-	-	24	0.03%

NEONATAL COMPLICATIONS

	1999		2004		2009	
Apgar score at 1 minutes						
0-3	215	0.4%	250	0.50%	413	0.5%
4-6	1633	3.4%	1298	2.6%	1088	1.34%
Apgar score at 5 minutes						
0-3	46	0.1%	120	0.2%	304	0.4%
4-6	149	0.3%	123	0.3%	112	0.14%
Admission to neonatal ICU	6241	12.8%	8953	18.0%	7967	9.8%
Major congenital abnormalities	378	0.8%	241	0.5%	204	0.3%
Respiratory distress syndrome	86	0.2%	23	0.05%	63	0.08%
Intraventricular haemorrhage	36	0.07%	1	0.002%	11	0.01%
Necrotising enterocolitis	17	0.03%	5	0.01%	6	0.01%
Birth trauma	272	0.6%	194	0.4%	229	0.3%
Major infection	137	0.3%	22	0.04%	94	0.1%

MATERNAL DEATHS

	1999	2004	2009
Number	5	3	2
Total incidence (/100,000 live births)	10.3	6.1	2.5

MORTALITY RATES

	1999	2004	2009
Stillbirths (per 1000 total births)	169 (3.5/1000)	117 (2.4/1000)	148 (1.8/1000)
No anomalies	*161 (0.3%)*	*110 (0.2%)*	*141 (0.2%)*
Birth weight > 1 kg	*48 (0.1%)*	*74 (0.1%)*	*91 (0.1%)*
Neonatal Deaths (per 1000 live births)	72 (1.5/1000)	61 (1.2/1000)	77 (1.0/1000)
No anomalies	*63 (0.1%)*	*46 (0.09%)*	*65 (0.08%)*
Birth weight > 1 kg	*34 (0.07%)*	*31(0.06%)*	*44(0.05%)*
Perinatal Deaths (per 1000 total births)	225 (4.6/1000)	167 (3.3/1000)	214 (2.6/1000)
No anomalies	*210 (0.4%)*	*145 (0.3%)*	*195 (0.24%)*
Birth weight > 1 kg	*75 (0.2%)*	*101 (0.2%)*	*128 (0.16%)*

Missing data on fetal outcome is 43 (0.1%) in 1999

AGE AND PARITY OF PARTURIENTS

The proportion of parturients aged ≥ 35 decreased slightly from 28% in 1999 to 24.2% in 2004 and increased to 31.6% in 2009. The proportion of parturients aged ≥ 40 decreased slightly from 5.1% in 1999 to 4.5% in 2004 and increased to 5.9% in 2009. The incidence of elderly primigravidae increased from 9.1% in 2004 to 10.5% while that of grand multiparae (parity ≥ 4) decreased from 0.45% in 2004 to 0.33%.

PARITY OF THE PARTURIENTS

	1999		2004		2009	
Para 0	26101	53.9%	27500	56.0%	38664	48.5%
Para 1	16968	35.0%	17313	35.3%	34398	43.1%
Para 2	4167	8.6%	3433	7.0%	5601	7.0%
Para 3	870	1.8%	632	1.3%	801	1.0%
Para 4	242	0.5%	159	0.3%	196	0.2%
Para 5	52	0.1%	48	0.1%	52	0.1%
Para 6 and above	36	0.07%	25	0.05%	20	0.03%
Unknown	23	0.05%	0	0.0%	0	0.0%
Total	**48459**		**49110**		**79732**	

AGE OF THE PARTURIENTS

	1999		2004		2009	
< 20 years	316	0.7%	395	0.8%	377	0.5%
20-24 years	3904	8.1%	5358	10.9%	6530	8.2%
25-29 years	12677	26.2%	12564	25.6%	19321	24.2%
30-34 years	17694	36.5%	17759	36.2%	27531	34.5%
35-39 years	11101	22.9%	9672	19.7%	20529	25.7%
≥ 40 years	2450	5.1%	2233	4.5%	4696	5.9%
Unknown	317	0.7%	1129	2.30%	748	0.9%
Total	**48459**		**49110**		**79732**	

AGE VS PARITY OF THE PARTURIENTS

	Para 0	Para 1	Para 2	Para 3 & above
<20	362 (0.9%)	14 (0.04%)	1 (0.02%)	0 (0.0%)
20-24	5178 (13.5%)	1247 (3.7%)	98 (1.8%)	7 (0.7%)
25-29	11402 (29.8%)	7009 (20.6%)	793 (14.3%)	117 (11.0%)
30-34	13016 (34.0%)	12434 (36.5%)	1785 (32.2%)	296 (27.8%)
35-39	7010 (18.3%)	10966 (32.2%)	2130 (38.4%)	423 (39.8%)
40-44	1279 (3.3%)	2283 (6.7%)	695 (12.5%)	192 (18.1%)
≥ 45	62 (0.2%)	109 (0.2%)	48 (0.9%)	28 (2.6%)
Total	**38309**	**34062**	**5550**	**1063**

Missing data on maternal age in 748 cases (0.9%) in 2009

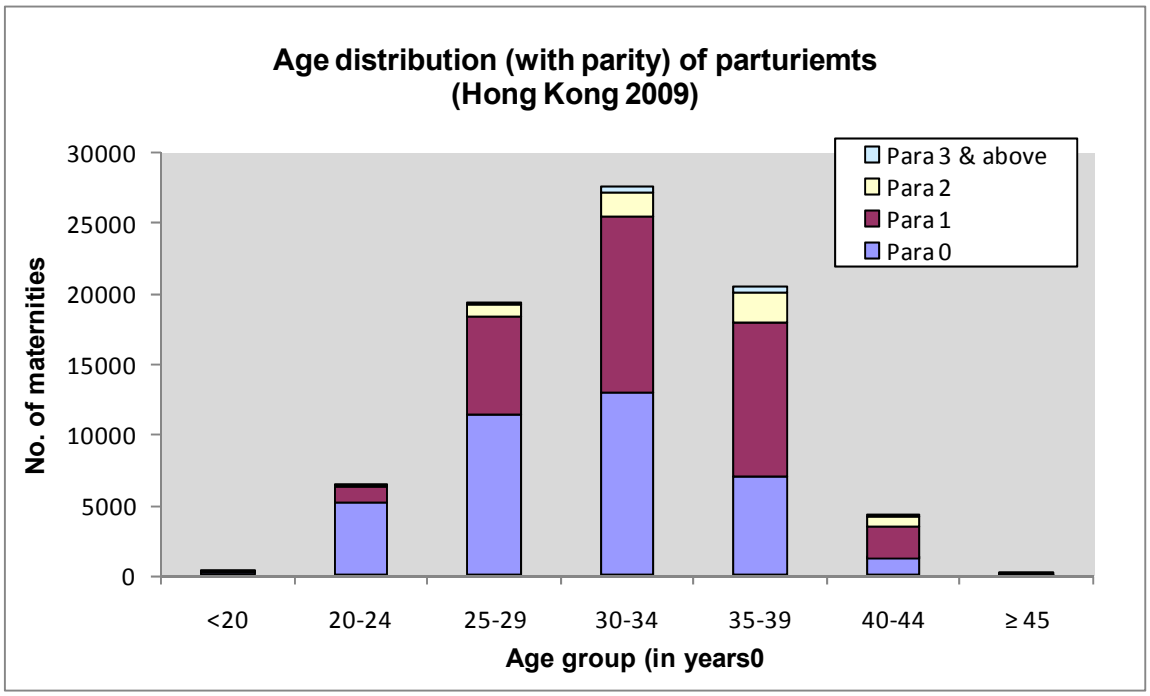

Figure O1 – Age distribution (with parity) of parturients

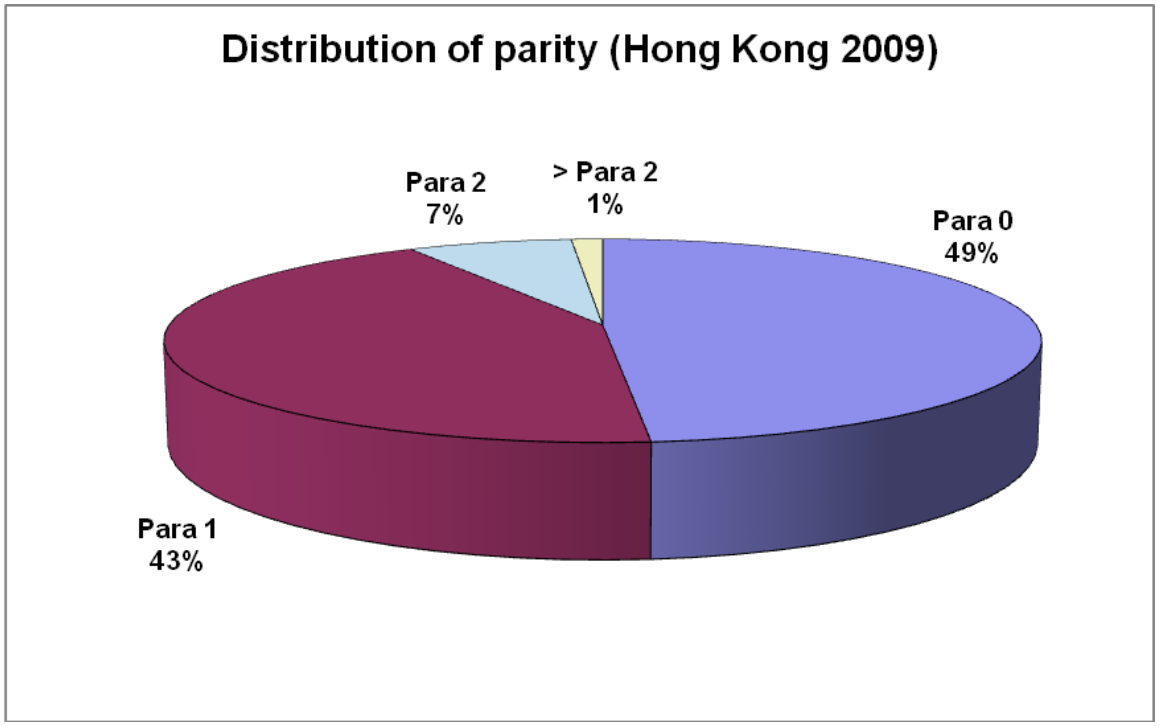

Figure O2 – Distribution of parity

COMMON ANTENATAL COMPLICATIONS

DIABETES MELLITUS

The overall incidence of diabetes mellitus (DM) increased from 6.1% in 1999 to 6.6% in 2009. The incidence of pre-existing diabetes remained roughly unchanged (0.13% in 2009) while that of gestational diabetes (including IGT) increased from 5.9% to 6.4%.

The incidence among singleton pregnancies increased from 6.0% to 6.5% while that among multiple pregnancies increased from 9.9% to 13.6%. The proportion of nulliparity remained roughly unchanged (43.4% - 47.3%). There was a shift from awaiting spontaneous onset of labour to allowing no labour while the rate of induction of labour remained at about 30%. Whilst there was no change in the rate of spontaneous vertex delivery, the rate of instrumental delivery decreased from 13.5% to 6.9% and vaginal breech delivery remained unchanged (0.2% - 0.3%). The rate of caesarean section before labour increased from 16.8% to 25.8% while that of caesarean section after labour remained unchanged.

The incidence of macrosomia reduced from 5.7% in 2004 to 4.4%. The rate of stillbirth and neonatal death among those with diabetes mellitus was 0.25% and 0.2% respectively. The perinatal mortality was 4.0 per 1000 births among those with diabetes mellitus compared with 2.6 for those without disease.

	1999		**2004**		**2009**	
Pre-existing diabetes mellitus	83	2.8%	70	2.3%	103	2.0%
Gestational diabetes mellitus	927	31.5%	754	24.3%	1315	25.2%
Impaired glucose tolerance	1935	65.7%	2284	73.5%	3810	72.9%
Total incidence	**2945**	**6.1%**	**3108**	**6.3%**	**5228**	**6.6%**

PREGNANCY

	1999		**2004**		**2009**	
Singleton	2901	98.5%	3049	98.1%	5069	97.0%
Multiple	44	1.5%	59	1.9%	159	3.0%

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Para 0	1277	43.4%	1471	47.3%	2439	44.9%
Para 1	1166	39.6%	1224	39.4%	2228	42.6%
Para 2	383	13.0%	318	10.2%	496	9.5%
Para 3 & above	119	4.0%	95	3.1%	155	3.0%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	1557	52.9%	1517	48.8%	2353	45.0%
Induced labour	908	30.8%	923	29.7%	1576	30.1%
No labour	479	16.3%	688	22.1%	1298	24.8%

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	1652	55.3%	1691	53.5%	2886	53.5%
Vacuum extraction	360	12.0%	258	8.1%	347	6.4%
Forceps delivery	44	1.5%	31	1.0%	29	0.5%
Vaginal breech delivery	10	0.3%	7	0.2%	14	0.3%
LSCS before labour	504	16.8%	698	22.0%	1389	25.8%
LSCS after labour	420	14.0%	476	15.0%	689	12.8%
Classical Caesarean section	4	0.1%	9	0.3%	36	0.7%

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	151	5.1%	99	3.2%	502	9.6%
Hysterectomy	0	0.0%	1	0.03%	5	0.1%
Preterm (<37 weeks)	34	1.2%	292	9.4%	504	9.6%
Singleton	-	-	*260*	*8.4%*	*417*	*8.0%*
Multiple	-	-	*32*	*1.0%*	*87*	*1.7%*
Maternal death	0	0.0%	1	0.03%	0	0.0%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	2984	99.6%	3159	99.7%	5367	99.6%
Stillbirths	6	0.2%	7	0.2%	13	0.2%
Neonatal deaths	3	0.1%	4	0.1%	10	0.2%
Low birth weight (<2500 gm)	-	-	276	8.7%	564	10.5%
Singleton	-	-	*201*	*6.3%*	*362*	*6.7%*
Multiple	-	-	*75*	*2.4%*	*202*	*3.7%*
Macrosomia (>4000 gm)	-	-	180	5.7%	236	4.4%
Apgar score <4 at 1 minute	-	-	22	0.7%	25	0.5%
Apgar score <4 at 5 minutes	-	-	9	0.3%	13	0.2%

FETAL OUTCOME IN PREGNANCIES COMPLICATED WITH DIABETES MELLITUS

	No disease		**Pre-existing DM**		**Gestational DM**		**Impaired GT**	
Alive	75316	99.73%	102	98.07%	1364	99.56%	3901	99.61%
Stillbirth	135	0.18%	1	0.96%	3	0.22%	9	0.23%
Antenatal	*112*	*0.15%*	*1*	*0.96%*	*3*	*0.22%*	*9*	*0.23%*
Intrapartum	*4*	*0.005%*	*0*	*0.00%*	*0*	*0.00%*	*0*	*0.00%*
Undetermined	*19*	*0.03%*	*0*	*0.00%*	*0*	*0.00%*	*0*	*0.00%*
Neonatal death	67	0.09%	1	0.96%	3	0.22%	6	0.15%
Early	*58*	*0.08%*	*1*	*0.96%*	*3*	*0.22%*	*4*	*0.10%*
Late	*9*	*0.01%*	*0*	*0.0%*	*0*	*0.00%*	*2*	*0.05%*
Total	**75518**		**104**		**1370**		**3916**	

HYPERTENSIVE DISORDER IN PREGNANCY

The overall incidence of hypertensive disorder in pregnancy remained unchanged and the proportion of mild and severe disease both dropped compared to 2004. However, the data should be interpreted with care because of the high percentage of unknown severity which was 36.5% in 2009, compared to 28.3% in 2004. The incidence of eclampsia remained low with 0.02% in 2009 compared to 0.02% in 1999 and 0.035% in 2004.

The rate of no labour increased from 32.3% to 42.9% with a concomitant rise in the rate of caesarean delivery before labour. On the contrary, the rate of instrumental delivery decreased from 18.5% to 8.2%, whereas the rate of spontaneous vertex delivery and caesarean section after labour remained about 30-35% and 15-18% respectively.

The rate of preterm delivery remained high (26.0%) and it was associated with both singleton and multiple pregnancy. The rate of post-partum haemorrhage was 9.5% which was higher than the general rate of 2.1% in 2009. The incidence of low birth weight also further increased to 30.8%. The rate of stillbirth was about 1% while that of neonatal death was 0.3% which was similar to that in 2004. The perinatal mortality rate was highest in parturients with severe form of hypertensive disorder (23.7 per 1,000 total births), which was almost 10 times higher than those without hypertension (2.4 per 1,000 total births). The magnitude of increase was similar to that in 2004. Parturients with mild form of hypertensive disorder (11.2 per 1,000 total births) also showed a significant increase in the perinatal mortality rate.

	1999		**2004**		**2009**	
Severity						
Mild	684	72.3%	562	45.0%	684	40.2%
Severe	262	27.7%	334	26.7%	395	23.2%
Unknown	0	0.0%	354	28.3%	621	36.5%
Category						
Eclampsia	10	1.1%	17	1.4%	16	0.9%
Pre-eclampsia	277	29.3%	466	37.3%	580	34.1%
Mild pre-eclampsia	*120*	*12.7%*	*141*	*11.3%*	*130*	*7.6%*
Severe pre-eclampsia	*157*	*16.6%*	*241*	*19.3%*	*287*	*16.9%*
Unknown severity	-	-	*84*	*6.7%*	*163*	*9.6%*
Gestational hypertension	392	41.1%	439	35.1%	553	31.5%
Mild gestational hypertension	*352*	*37.2%*	*260*	*20.8%*	*265*	*15.6%*
Severe gestational hypertension	*40*	*4.2%*	*34*	*2.7%*	*38*	*2.2%*
Unknown severity	-	-	*145*	*11.6%*	*250*	*14.7%*
Gestational proteinuria	22	2.3%	83	6.6%	146	8.6%
Chronic hypertension with no proteinuria	45	4.8%	47	3.8%	84	4.9%
Chronic hypertension with superimposed PET	36	3.8%	27	2.2%	59	3.5%
Unclassified	74	7.8%	90	7.2%	97	5.7%
No information	90	9.5%	81	6.5%	165	9.7
Total incidence	**946**	**2.0%**	**1250**	**2.5%**	**1700**	**2.1%**

PREGNANCY

	1999		2004		2009	
Singleton	917	96.9%	1197	95.8%	1603	94.3%
Multiple	29	3.1%	53	4.2%	97	5.7%

PARITY OF THE PATURIENTS

	1999		2004		2009	
Para 0	614	64.9%	812	65.0%	1017	59.8%
Para 1	223	23.6%	316	25.3%	541	31.8%
Para 2	87	9.2%	91	7.3%	112	6.6%
Para 3 & above	22	2.3%	31	2.5%	30	1.8%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	306	32.3%	410	32.8%	409	24.1%
Induced labour	334	35.4%	420	33.6%	562	33.1%
No labour	306	32.3%	420	33.6%	729	42.9%

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	295	30.2%	457	35.1%	555	30.8%
Vacuum extraction	147	15.1%	128	9.8%	130	7.2%
Forceps delivery	33	3.4%	17	1.3%	18	1.0%
Vaginal breech delivery	3	0.3%	8	0.6%	6	0.3%
LSCS before labour	322	33.0%	446	34.2%	786	43.7%
LSCS after labour	170	17.4%	239	18.3%	282	15.7%
Classical Caesarean section	6	0.6%	7	0.5%	21	1.2%

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	56	5.9%	59	4.7%	161	9.5%
Hysterectomy	0	0.0%	1	0.08%	4	0.2%
Preterm (<37 weeks)	22	2.3%	306	26.2%	442	26.0%
Singleton	-	-	*274*	*23.4%*	*386*	*22.7%*
Multiple	-	-	*32*	*2.7%*	*56*	*3.3%*
Maternal death	1	0.1%	0	0.0%	0	0.0%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	1674	99.5%	1288	98.8%	1776	98.7%
Stillbirths	5	0.3%	10	0.8%	18	1.0%
Neonatal deaths	5	0.3%	5	0.4%	6	0.3%
Low birth weight (<2500 gm)	-	-	384	29.5%	554	30.8%
Singleton	-	-	*320*	*24.6%*	*432*	*24.0%*
Multiple	-	-	*64*	*5.1 %*	*122*	*6.8%*
Macrosomia (>4000 gm)	-	-	51	3.9%	52	2.9%
Apgar score <4 at 1 minute	-	-	27	2.1%	24	1.3%
Apgar score <4 at 5 minutes	-	-	12	0.9%	14	0.8%

FETAL OUTCOME IN PREGNANCIES COMPLICATED WITH HYPERTENSION

			Hypertension					
	No disease		Mild		Severe		Unclassified	
Alive	78907	99.75%	707	98.74%	412	97.63%	657	99.24%
Stillbirth	130	0.16%	6	0.84%	8	1.90%	4	0.60%
Antenatal	*108*	*0.14%*	*5*	*0.70%*	*8*	*1.90%*	*4*	*0.60%*
Intrapartum	*4*	*0.01%*	*0*	*0.0%*	*0*	*0.0%*	*0*	*0.0%*
Undetermined	*18*	*0.02%*	*1*	*0.14%*	*0*	*0.0%*	*0*	*0.0%*
Neonatal death	71	0.09%	3	0.42%	2	0.47%	1	0.15%
Early	*62*	*0.08%*	*2*	*0.28%*	*2*	*0.47%*	*0*	*0.0%*
Late	*9*	*0.01%*	*1*	*0.14%*	*0*	*0.0%*	*1*	*0.15%*
Total	79108		716		422		662	

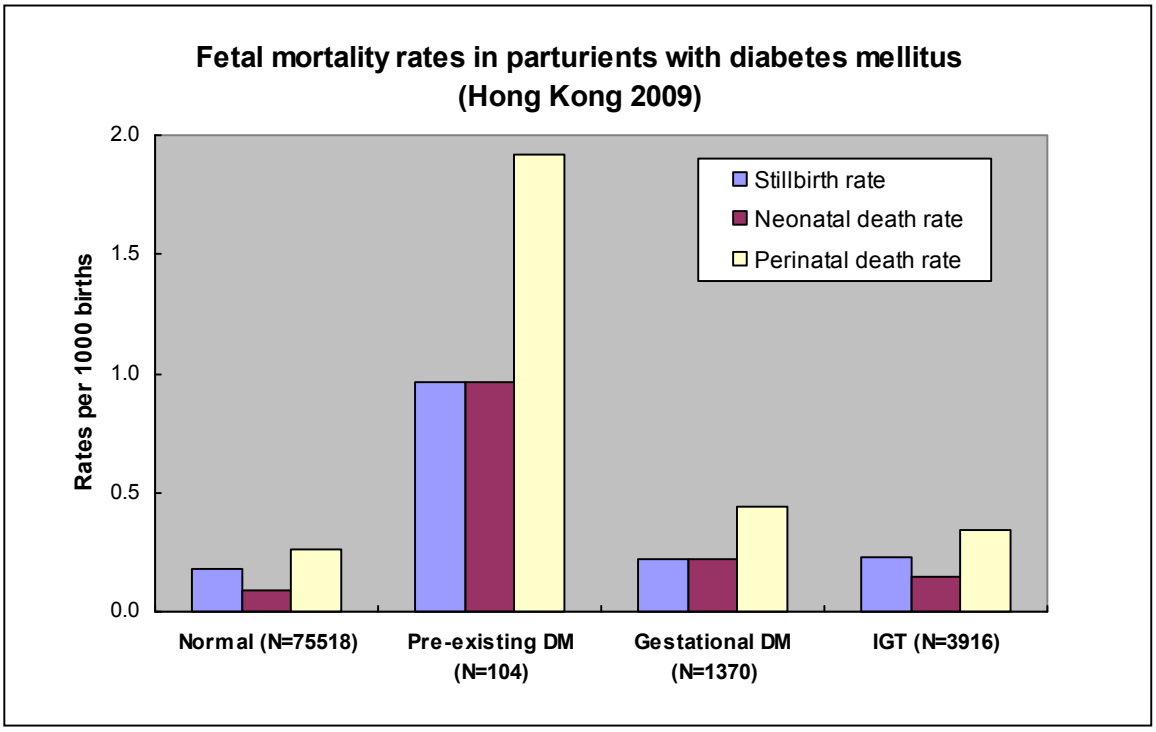

Figure O3 – Fetal mortality rates in parturients with diabetes mellitus

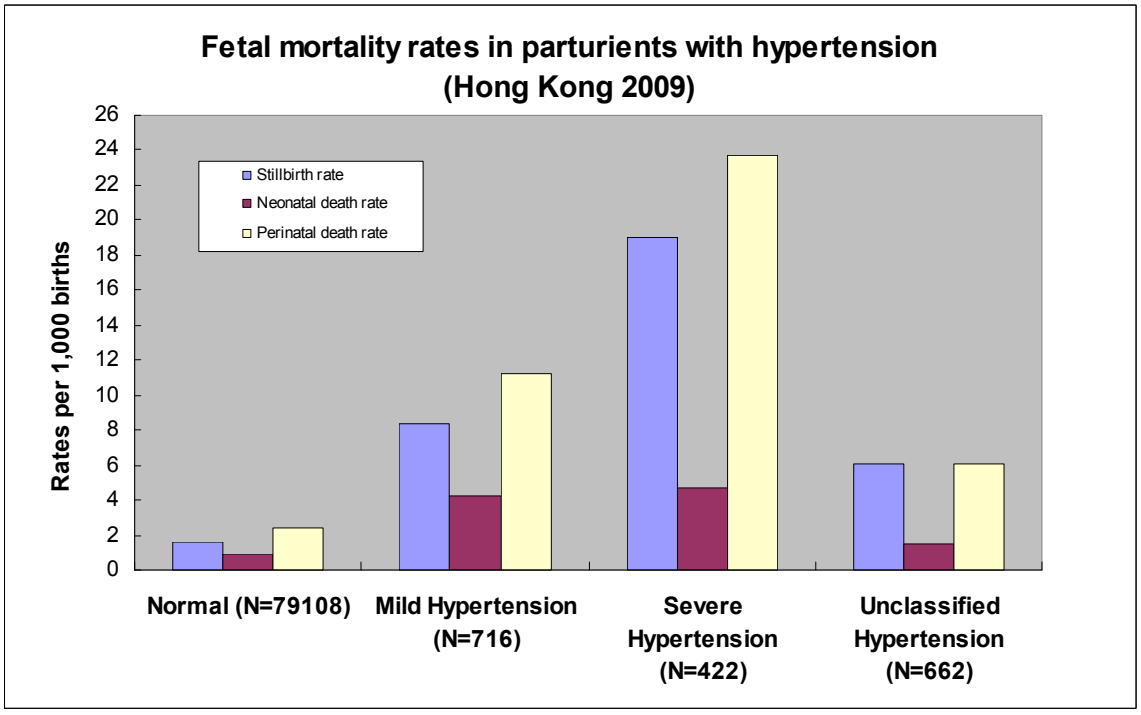

Figure O4 – Fetal mortality rates in parturients with hypertension

CARDIAC DISEASES

The overall incidence of cardiac diseases decreased from 0.9% to 0.6%. The pattern of cardiac diseases changed over time with an increase in the proportion of congenital heart disease and arrhythmia, whereas the proportion of rheumatic heart disease and mitral valvular prolapse dropped from 11.8% to 4.7% and 21.0% to 9.8% respectively.

There was a change in the labour management over the past 10 years. Similar to other medical diseases complicating pregnancy, there was a shift from awaiting spontaneous onset of labour to allowing no labour. Whilst there was no significant change in the rate of spontaneous vertex delivery, the rate of instrumental delivery decreased from 16% to 9.6%. The rate of caesarean section before labour increased from 14.6% to 22.6% while that of caesarean section after labour decreased from 13.8% to 8.7%.

The incidence of preterm delivery is higher than the general population with the rate of 8-10% in the past 10 years, which was consistent with the incidence of low birth weight. Fetal and neonatal mortality rate in 2009 is increased which warrant further auditing.

	1999		**2004**		**2009**	
Rheumatic heart disease	52	11.8%	17	4.5%	22	4.7%
Congenital heart disease	67	15.2%	66	17.4%	111	23.6%
Mitral valvular prolapse	93	21.0%	62	16.4%	46	9.8%
Arrhythmia	29	6.6%	22	5.8%	62	13.2%
Others	201	45.5%	212	55.9%	229	48.7%
Total incidence	**442**	**0.9%**	**379**	**0.8%**	**470**	**0.6%**

PREGNANCY

	1999		**2004**		**2009**	
Singleton	434	98.2%	376	99.2%	461	98.1%
Multiple	8	1.8%	3	0.8%	9	1.9%

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Para 0	211	47.7%	185	48.8%	248	52.8%
Para 1	167	37.8%	158	41.7%	185	39.4%
Para 2	43	9.7%	28	7.4%	23	4.9%
Para 3 & above	21	4.8%	8	2.1%	14	3.0%

MODE OF ONSET OF LABOUR

	1999		**2004**		**2009**	
Spontaneous	288	65.2%	217	57.3%	257	54.7%
Induced labour	92	20.8%	86	22.7%	110	23.4%
No labour	62	14.0%	76	20.1%	103	21.9%

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	248	54.9%	216	56.5%	282	58.9%
Vacuum extraction	59	13.1%	31	8.1%	44	9.2%
Forceps delivery	13	2.9%	2	0.5%	2	0.4%
Vaginal breech delivery	3	0.7%	0	0%	4	0.8%
LSCS before labour	66	14.6%	77	20.2%	106	22.6%
LSCS after labour	63	13.8%	56	14.7%	41	8.7%
Classical Caesarean section	0	0.0%	1	0.3%	0	0.0%

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	14	3.2%	7	1.8%	33	7.0%
Hysterectomy	0	0.0%	1	0.3%	0	0.0%
Preterm (<37 weeks)	42	9.5%	39	10.3%	38	8.1%
Singleton	-	-	*37*	*9.8%*	*32*	*6.8%*
Multiple	-	-	*2*	*0.5%*	*6*	*1.3%*
Maternal death	1	0.2%	0	0.0%	0	0.0%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	449	99.3%	382	100%	472	98.5%
Stillbirths	3	0.7%	0	0%	5	1.0%
Neonatal deaths	0	0.0%	0	0%	2	0.4%
Low birth weight (<2500 gm)	40	8.8%	31	8.1%	50	10.4%
Singleton	*28*	*6.2%*	*26*	*6.8%*	*37*	*7.7%*
Multiple	*12*	*2.7%*	*5*	*1.3%*	*13*	*2.7%*
Macrosomia (>4000 gm)	12	2.7%	16	4.2%	22	4.6%
Apgar score <4 at 1 minute	2	0.4%	2	0.5%	3	0.6%
Apgar score <4 at 5 minutes	0	0%	0	0%	2	0.4%

ANTEPARTUM HAEMORRHAGE

The incidence of antepartum haemorrhage (APH) decreased from 2.3% to 1.5% from 1999 to 2009. However, the overall low incidence could be due to under reporting, in particular for those not having regular antenatal care in Hong Kong. Although the proportion of APH due to placenta praevia increased, the exact incidence of 0.6% remained unchanged when compared with 0.7% and 0.6% in 1999 and 2004.

The rate of spontaneous labour and induction of labour decreased from 38.8% to 28.7% and 26.4% to 23.4% respectively. The rate of no labour increased with the rate of caesarean section before labour from 34.5% to 47.2%.

The incidences of preterm delivery and low birth rate were similar to that in 2004. The rate of post-partum haemorrhage increased to 23.2%, whereas the hysterectomy rate remained unchanged. The rate of stillbirth remained 0.7% while the neonatal death decreased from 0.7% to 0.3%. APH of unknown origin was associated with a 3-fold increase in the perinatal mortality rate (8.3 per 1,000 total births) compared with those without APH, and the rate reported in 1999 was 7.2 per 1,000 total births. The perinatal mortality rate in those with placenta praevia (6.6 per 1,000 total births) was 2.5 times higher than those without APH and the rate reported in 1999 was 3.1 per 1,000 total births.

	1999		**2004**		**2009**	
APH of unknown origin	682	60.4%	577	58.6%	603	51.5%
Placenta praevia	323	28.6%	290	29.5%	455	38.9%
Placenta abruptio	86	7.6%	72	7.3%	73	6.2%
Other causes	38	3.4%	45	4.6%	39	3.3%
Total incidence	**1129**	**2.3%**	**984**	**2.0%**	**1170**	**1.5%**

PREGNANCY

	1999		**2004**		**2009**	
Singleton	1113	98.6%	951	96.6%	1139	97.4%
Multiple	16	1.4%	33	3.4%	31	2.6%

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Para 0	588	52.1%	547	55.6%	640	54.7%
Para 1	398	35.3%	347	35.3%	435	37.2%
Para 2	105	9.3%	70	7.1%	68	5.8%
Para 3 & above	38	3.3%	20	2.0%	27	2.3%

MODE OF ONSET OF LABOUR

	1999		**2004**		**2009**	
Spontaneous	438	38.8%	309	31.4%	336	28.7%
Induced labour	298	26.4%	286	29.1%	274	23.4%
No labour	393	34.8%	389	39.5%	560	47.9%

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	449	39.2%	384	37.7%	375	31.3%
Vacuum extraction	79	6.9%	67	6.6%	57	4.8%
Forceps delivery	13	1.1%	6	0.6%	6	0.5%
Vaginal breech delivery	10	0.9%	5	0.5%	10	0.8%
LSCS before labour	395	34.5%	399	39.2%	547	45.6%
LSCS after labour	193	16.8%	147	14.4%	171	14.3%
Classical Caesarean section	7	0.6%	11	1.1%	28*	2.3%

** 19 were performed before labour*

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	54	4.8%	49	5.0%	272	23.2%
Hysterectomy	11	1.0%	9	0.9%	14	1.2%
Preterm (<37 weeks)	72	6.4%	343	34.9%	420	35.9%
Singleton	-	-	*313*	*31.8%*	*396*	*33.8%*
Multiple	-	-	*30*	*3.0%*	*24*	*2.1%*
Maternal death	1	0.1%	0	0.0%	0	0.0%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	1090	98.4%	1003	98.4%	1189	99.1%
Stillbirths	9	0.8%	8	0.8%	8	0.7%
Neonatal deaths	8	0.7%	8	0.8%	3	0.3%
Low birth weight (<2500 gm)	-	-	295	28.9%	331	27.6%
Singleton	-	-	*236*	*23.2%*	*282*	*23.5%*
Multiple	-	-	*59*	*5.8%*	*49*	*4.1%*
Macrosomia (>4000 gm)	-	-	16	1.6%	19	1.6%
Apgar score <4 at 1 minute	-	-	26	2.6%	18	1.5%
Apgar score <4 at 5 minutes	-	-	11	1.1%	8	0.7%

Missing data on fetal outcome in 39 (3.4%) cases in 1999

FETAL OUTCOME IN PREGNANCY COMPLICATED WITH APH

	No disease		APH of unknown origin		Placenta praevia		Other causes	
Alive	78370	99.8	598	99.2	452	99.3%	109	97.3%
Stillbirth	126	0.16%	3	0.50%	3	0.7%	2	1.8%
Antenatal	*107*	*0.14%*	*2*	*0.33%*	*3*	*0.75*	*2*	*1.8%*
Intrapartum	*4*	*0.01%*	*0*	*0.0%*	*0*	*0.0%*	*0*	*0.0%*
Undetermined	*15*	*0.02%*	*1*	*0.17%*	*0*	*0.0%*	*0*	*0.0%*
Neonatal death	66	0.08%	2	*0.33%*	0	*0.0%*	1	0.9%
Early	*59*	*0.11%*	*2*	*0.33%*	*0*	*0.0%*	*1*	*0.9%*
Late	*7*	*0.01%*	*0*	*0.0%*	*0*	*0.0%*	*0*	*0.0%*
Total	78562		603		455		112	

BREECH PRESENTATION AT BIRTH

All babies with breech presentation at delivery were included in the analysis. For maternal information, only those singleton pregnancies or multiple pregnancies with first baby in breech presentation were included.

The incidence of breech presentation at delivery varied from 3.5% in 1999 to 4.2% in 2009, of which about 82% were singleton pregnancy. The rate of preterm delivery remained similar at about 19 to 20% and that of low birth weight increased from 20.5% to 23.1% which probably related to the increase proportion of twin pregnancies. Both were much higher than that of the general population. The vaginal delivery rate further dropped dramatically from 11.8% in 1999 to 4.9% in 2004 and 3.9% in 2009 and caesarean section before labour increased from 21.2% in 1999 to 69.2% in 2004 and 76.2% in 2009. This is likely related to the change of practise after the "Term Breech Trial" published in 2000. About 1.6% of the babies required a classical caesarean section. The stillbirth rate reduced from 2.2% to 1.0% over the 10 years period and the neonatal mortality rate dropped from 1.1% to 0.7%.

The incidence of very low Apgar score (< 4) among those vaginal births was 25.8% and 20.6% at 1 and 5 minutes, both were lower than that in 2004 but much higher when compared with previous years. This is probably also related to the change of practice as mentioned above.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	1966	4.0%	2081	4.2%	2862	3.5%
Singleton	1721	87.5%	1805	86.7%	2339	81.7%
Multiple	245	12.5%	276	13.3%	523	18.3%
First baby, multiple	-	-	*92*	*33.3%*	*199*	*38.0%*
Subsequent baby, multiple	-	-	*184*	*66.7%*	*324*	*62.0%*

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Para 0	1193	60.6%	1211	63.9%	1455	57.3%
Para 1	595	30.3%	543	28.6%	908	35.8%
Para 2	130	6.6%	112	5.9%	147	5.8%
Para 3 & above	48	2.5%	30	1.6%	28	1.1%

Data in 1999 referred to all babies

MODE OF ONSET OF LABOUR

	1999		**2004**		**2009**	
Spontaneous	580	29.5%	519	27.4%	521	20.5%
Induced labour	67	3.4%	28	1.5%	37	1.5%
No labour	1319	67.1%	1350	71.2%	1980	78.0%

Data in 1999 referred to all babies

MODE OF DELIVERY

	1999		2004		2009	
Vaginal delivery	234	11.8%	102	4.9%	99	3.9%
LSCS before labour	416	21.2%	1441	69.2%	1934	76.2%
LSCS after labour	1299	66.1%	519	24.9%	464	19.3%
Classical Caesarean section	17	0.9%	19	0.9%	40	1.6%

Missing data in one case on mode of delivery in 2009

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	21	1.1%	22	1.2%	339	11.8%
Hysterectomy	4	0.2%	8	0.4%	6	0.2%
Internal artery ligation	-	-	2	0.1%	0	0.0%
Uterine artery embolisation	-	-	-	-	4	0.2%
Preterm (<37 weeks)	393	20.0%	393	20.7%	478	18.9%
Singleton	*292*	*72.3%*	*347*	*88.3%*	*381*	*79.7%*
Multiple	*101*	*27.7%*	*46*	*11.7%*	*97*	*20.3%*
Maternal death	1	0.05%	2	0.1%	1	0.03%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	1902	96.7%	2032	97.6%	2811	98.2%
Stillbirths	43	2.2%	31	1.5%	30	1.0%
Antepartum	*30*	*69.8%*	*25*	*80.7%*	*26*	*86.7%*
Intrapartum	*5*	*11.6%*	*1*	*3.2%*	*0*	*0%*
Undetermined	*8*	*18.6%*	*5*	*16.1%*	*4*	*13.3%*
Neonatal deaths	21	1.1%	18	0.9%	21	0.7%
Early	*18*	*85.7%*	*14*	*77.8%*	*18*	*85.7%*
Late	*3*	*14.3%*	*4*	*22.2%*	*3*	*14.3%*
Low birth weight (<2500 gm)	404	20.5%	476	22.9%	661	23.1%
Singleton	*291*	*72%*	*304*	*63.9%*	*343*	*51.9%*
Multiple	*113*	*28%*	*172*	*36.1%*	*318*	*48.1%*
Macrosomia (>4000 gm)	27	1.4%	38	1.8%	35	1.2%
Apgar score <4 at 1 minute	47	2.4%	65	3.1%	45	1.6%
Apgar score <4 at 5 minutes	15	0.8%	38	1.8%	25	0.9%
Birth trauma	5	0.3%	8	0.4%	3	0.1%

LIVEBORN SINGLETONS IN BREECH PRESENTATION WITH LOW APGAR SCORES

Apgar Score	1999		2004		2009	
	Vaginal	**Caesarean**	**Vaginal**	**Caesarean**	**Vaginal**	**Caesarean**
At 1 minute						
0 – 3	15(6.4%)	20(1.2%)	26 (37.7%)	29 (1.7%)	25(25.8%)	11(0.5%)
4 – 6	46(19.7%)	170(9.8%)	17 (24.6%)	138 (8.0%)	18(18.6%)	128(5.7%)
At 5 minutes						
0 – 3	9(3.8%)	1(0.06%)	23 (33.3%)	9 (0.5%)	20(20.6%)	3(0.1%)
4 – 6	9(3.8%)	12(0.7%)	2 (2.9%)	10 (0.6%)	5(5.2%)	6(0.3%)
Total	**234**	**1732**	**69**	**1727**	**97**	**2241**

Missing data in one case on mode of delivery in 2009

EXTERNAL CEPAHLIC VERSION

External cephalic version (ECV) was attempted in 194 pregnancies (7.8%), compared with 9.8% and 11.6% in 1999 and 2004 respectively. The procedure was successful in 61.9%, slightly higher than previous years. For those with successful ECV, vaginal delivery was achieved in 80.9% similar to that in 2004. For those with failed ECV, the Caesarean section rate remained about 96%. The use of ECV reduced the Caesarean section rate from 92.8% to 48.5%.

	1999		2004		2009	
No ECV	1715	89.0%	1430	88.4%	2308	92.2%
ECV	187	9.8%	188	11.6%	194	7.8%
Successful ECV	*101*	*54.0%*	104	*55.3%*	*120*	*61.9%*
Failed ECV	*86*	*46.0%*	*84*	*44.7%*	*74*	*38.1%*
Total incidence	**1926**	**3.9%**	**1618**	**3.3%**	**2502**	**3.1%**

Missing data on ECV in 24 (1.2%) in 1999

No ECV

	1999		2004		2009	
Spontaneous	35	2.0%	13	0.9%	54	2.3%
Instrumental	15	0.9%	2	0.1%	9	0.4%
Vaginal breech	201	11.7%	57	4.0%	104	4.5%
LSCS	1445	84.2%	1339	93.6%	2097	90.9%
Classical CS	15	0.9%	18	1.3%	43	1.9%
Unknown	4	0.2%	1	0.1%	1	0.04%
Total	**1715**		**1430**		**2308**	

SUCCESSFUL ECV

	1999		2004		2009	
Spontaneous	63	62.4%	71	68.3%	86	71.7%
Instrumental	12	11.9%	14	13.5%	11	9.2%
Vaginal breech	0	0.0%	0	0.0%	0	0.0%
LSCS	26	25.7%	19	18.3%	23	19.2%
Classical CS	0	0.0%	0	0.0%	0	0.0%
Unknown	0	0.0%	0	0.0%	0	0.0%
Total	**101**		**104**		**120**	

FAILED ECV

	1999		2004		2009	
Spontaneous	1	1.7%	0	0.0%	2	2.7%
Instrumental	0	0.0%	0	0.0%	0	0.0%
Vaginal breech	3	3.5%	2	2.4%	0	0.0%
LSCS	81	94.1%	82	97.6%	70	94.6%
Classical CS	1	1.7%	0	0.0%	1	1.4%
Unknown	0	0.0%	0	0.0%	1	1.4%
Total	**86**		**84**		**74**	

PARTURIENTS WITH PREVIOUS UTERINE SCAR

The prevalence of parturients having previous uterine scar increased from about 9% in previous years to 12.7%. The rate of caesarean section before labour increased from 59.3% to 76.0%. The vaginal delivery rate for those who had been in labour reduced from 59.4% to 52.9%. Uterine rupture rate was 0.05% which was similar to that in 2004. Postpartum haemorrhage rate increased from 2.8% to 7.6%. The rate of hysterectomy was 0.2%, comparable with 0.1-0.4% in previous years.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	4434	9.2%	4373	8.9%	10088	12.7%
Singleton	4400	99.2%	4331	99.0%	9952	98.7%
Multiple	34	0.8%	42	1.0%	136	1.3%

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Para 0	179	4.0%	122	2.8%	191	1.9%
Para 1	3470	78.3%	3534	80.8%	8568	84.9%
Para 2	647	14.6%	606	13.9%	1163	11.5%
Para 3 & above	138	3.1%	111	2.5%	166	1.6%

MODE OF ONSET OF LABOUR

	1999		**2004**		**2009**	
Spontaneous	1520	34.3%	1249	28.6%	2064	20.5%
Induced labour	248	5.6%	167	3.8%	224	2.2%
No labour	2666	60.1%	2957	67.6%	7798	77.3%

Missing data on mode of onset of labour in 2 cases (0.02%) in 2009

MODE OF DELIVERY FOR EACH BABY

	1999		**2004**		**2009**	
NSD	750	16.8%	625	14.1%	976	9.7%
Vacuum extraction	268	6.0%	113	2.6%	205	2.0%
Forceps	35	0.8%	12	0.3%	18	0.2%
Vaginal breech	6	0.1%	8	0.2%	10	0.1%
LSCS before labour	2654	59.3%	2939	66.5%	7667	76.0%
LSCS after labour	731	16.4%	696	15.8%	1151	11.4%
Classical Caesarean section	25	0.6%	24	0.5%	54	0.5%

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	125	2.8%	77	1.8%	764	7.6%
Hysterectomy	16	0.4%	6	0.1%	21	0.2%
Internal artery ligation	-	-	1	0.02%	0	0.0%
Uterine artery embolisation	-	-	-	-	10	0.1%
Rupture of uterus	7	0.2%	2	0.05%	5	0.05%
Preterm (<37weeks)	271	6.1%	280	6.4%	638	6.3%
Singleton	*257*	*5.8%*	*263*	*6.0%*	*585*	*5.8%*
Multiple	*14*	*0.3%*	*17*	*0.4%*	*53*	*0.5%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	4445	99.4%	4407	99.8%	10205	99.8%
Stillbirths	16	0.4%	6	0.1%	16	0.2%
Neonatal deaths	7	0.2%	4	0.2%	4	0.04%
Low birth weight (<2500 gm)	242	5.4%	265	6.0%	562	5.5%
Singleton	*209*	*86.4%*	*220*	*83.0%*	*444*	*79.0%*
Multiple	*33*	*13.6%*	*45*	*17.0%*	*118*	*21.0%*
Macrosomia (>4000 gm)	192	4.3%	170	3.8%	291	2.8%
Apgar score <4 at 1 minute	21	0.5%	18	0.4%	21	0.2%
Apgar score <4 at 5 minutes	4	0.1%	6	0.1%	12	0.1%

DOWN'S SYNDROME SCREENING

The data on Down's syndrome screening was captured in 2009. The available screening methods during the audit period were either first trimester combined nuchal translucency and biochemical screening, or second trimester biochemical screening. Invasive diagnostic tests (amniocentesis or chorionic villus sampling) and second trimester biochemical screening were offered for parturients with advance maternal age in the public hospital, whereas first trimester screenings were self-financed tests.

Down's syndrome screening was reported in 15.8% of the parturients, with 9.9%, 5.2% and 0.7% using first trimester test, second trimester test or combination of both respectively in 2009. The proportion of parturients with screening was higher in Hong Kong residents than non-Hong Kong residents (17.4% vs 14.1%), and those with advance maternal age ≥ 35 years (20.5% vs 13.4%).

The number of parturients reported to have undergone Down's syndrome screening was lower than expected. Therefore, the number of tests performed by the two main pre-natal diagnostic centres, Tsang Yuk Hospital/Queen Mary Hospital/University of Hong Kong and Prince of Wales Hospital/Chinese University of Hong Kong, were obtained which included virtually all the tests done in the public side and part of those in the private side. The number of tests performed in the private laboratories could not be retrieved. The total number of first trimester tests and integrated first and second trimester test performed by the two laboratories were 17,668 and 3,614 respectively. which showed a significantly under-reporting of these screening tests. However, the number of second trimester tests performed by the two laboratories were 1,115 which was much less than that reported. Nevertheless, with the implementation of universal Down's syndrome screening and the advancement in non-invasive prenatal test, the trend in Down's syndrome screening warrants further review in the future audit.

INCIDENCE

	2009	
No screening	67174	84.2%
First trimester screening	7855	9.9%
Second trimester screening	4170	5.2%
Both/Combined screening	533	0.7%

RESIDENTIAL STATUS

	2009	
Hong Kong Residents	44258	
Screened	*7551*	*17.10%*
Not screened	*36707*	*82.90%*
Non Hong Kong Residents	35474	
Screened	*5007*	*14.10%*
Not screened	*30467*	*85.90%*

MATERNAL AGE

	No screening	First trimester	Second trimester	Both
<20	348(0.5%)	17(0.2%)	12(0.3%)	0(0.0%)
20-24	5903(8.9%)	277(3.6%)	346(8.4%)	4(0.8%)
25-29	16995(25.5%)	1250(16.2%)	1061(25.9%)	15(2.8%)
30-34	23333(35.0%)	3003(38.9%)	1137(27.7%)	58(10.9%)
35-39	16407(24.6%)	2602(33.7%)	1174(28.6%)	346(65.0%)
≥ 40	3651(5.5%)	568(7.4%)	368(9.0%)	109(20.5%)
Total	**66637**	**7717**	**4098**	**532**

Missing data on maternal age in 748 cases (0.9%) in 2009

PRETERM LABOUR

The data on preterm labour was captured in 1999 but it was not specified whether it ended up with preterm delivery or not. In 2004, the data was specified as threatened preterm labour which did not proceed to delivery, either spontaneously or after tocolytic therapy. *The data on preterm labour included those preterm labours which were arrested either spontaneously or with tocolytic therapy and those which proceeded to delivery irrespective of whether tocolytic therapy was used or not. Those preterm deliveries without labour were excluded.* The data therefore included those with threatened and/or actual preterm labour.

Preterm labour occurred in 4.0% of all deliveries, compared with 4.7% and 5.1% in 1999 and 2004 respectively. The risk of preterm labour was much higher in multiple pregnancy, although the incidence dropped from 50.2% in 1999, 26.3% in 2004 to 20.6% in 2009. The incidence of threatened preterm labour occurred in 14.6%, of which 25.7% (n=120) delivered at ≤ 32 weeks and 62.7% (n=293) delivered at 33-36 weeks.

Data on the use of steroid and tocolytic agents was captured since 1999. However, the effectiveness of tocolytic therapy was not recorded. Overall, tocolytic therapy was used in 4.5% (4.3% and 5.8% in 1999 and 2004) of all preterm labours, 57.3% of them had a history of threatened preterm labour. Steroid was used in 8.9% in all preterm labours, of which 40.6% received tocolytic. The corresponding data in 2004 were 11.2% and 42%, whereas the figures were likely to be inaccurate in 1999 as the data was missing in over 80% of cases.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	2472	4.7%	2527	5.1%	3189	4.0%
Singleton	*2249*	*91.0%*	*2386*	*94.4%*	*2949*	*92.5%*
Multiple	*223*	*9.0%*	*141*	*5.6%*	*240*	*7.5%*

HISTORY OF THREATENED PRETERM LABOUR

	1999		**2004**		**2009**	
TOTAL INCIDENCE	-	-	442	17.5%	467	14.6%
Singleton	-	-	*401*	*90.7%*	*425*	*91.0%*
Multiple	-	-	*41*	*9.3%*	*42*	*9.0%*

ONSET OF LABOUR

	1999		**2004**		**2009**	
Spontaneous	1949	78.8%	1928	76.9%	2259	80.2%
Induced labour	520	21.1%	523	21.7%	*630*	*19.8%*

Missing data on onset of labour in 3 cases (0.1%) in 1999

USE OF TOCOLYTIC

	1999		2004		2009	
Not used	2365	95.7%	2380	94.2%	3046	95.5%
With history of TPL	-	-	*357*	*15.0%*	*232*	*7.6%*
Without history of TPL	-	-	*2023*	*85.0%*	*2814*	*92.4%*
Used	107	4.3%	147	5.8%	*143*	*4.5%*
With history of TPL	-	-	*85*	*57.8%*	*82*	*57.3%*
Without history of TPL	-	-	*62*	*42.2%*	*61*	*42.7%*

TPL: threatened preterm labour

USE OF STEROID

	1999		2004		2009	
Not used	392	15.9%	2244	88.8%	2906	91.1%
With tocolytic	*15*	*68.2%*	*28*	*0.2%*	*28*	*1.0%*
Without tocolytic	*7*	*31.8%*	*2216*	*99.8%*	*2878*	*99.0%*
Used	22	0.9%	283	11.2%	*283*	*8.9%*
With tocolytic	*15*	*68.2%*	*119*	*42.0%*	*115*	*40.6%*
Without tocolytic	*7*	*31.8%*	*163*	*58.0%*	*168*	*59.4%*

Missing data on use of steroid in 2058 cases (83.2%) in 1999

USE OF STEROID IN THOSE WITH GESTATION AT DELIVERY ≤ 34 WEEKS

	1999		2004		2009	
Not used	-	-	836	76.2%	414	67.2%
With tocolytic	-	-	*27*	*3.2%*	*23*	*5.6%*
Without tocolytic	-	-	*809*	*96.8%*	*391*	*94.4%*
Used	-	-	261	23.8%	*262*	*32.8%*
With tocolytic	-	-	*115*	*44.1%*	*86*	*42.6%*
Without tocolytic	-	-	*146*	*55.9%*	*116*	*57.4%*

GESTATION AT DELIVERY FOR THOSE HAVING TOCOLYTIC TREATMENT

	1999		2004		2009	
< 26 weeks	17	15.9%	12	8.1%	16	6.9%
26 - 28 weeks	20	18.7%	22	14.9%	*18*	*7.8%*
29 - 32 weeks	32	29.9%	57	38.5%	*83*	*35.8%*
33 - 36 weeks	34	31.8%	38	25.7%	*71*	*30.6%*
37 - 41 weeks	4	3.7%	10	12.8%	*43*	*18.5%*
≥ 42 weeks	0	0.0%	0	0.0%	*0*	*0.0%*

Missing data on gestation at delivery in 1 case (0.4%) in 2009

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	2323	93.8%	2563	96.0%	3063	96.0%
Stillbirths	110	4.4%	73	2.7%	*91*	*2.9%*
Neonatal deaths	38	1.5%	34	1.3%	*35*	*1.1%*

FETAL OUTCOME IN THOSE LIVE BIRTHS DELIVERED AT GESTATION ≤ 34 WEEKS

	2004		2009	
No use of steroid or tocolytic	811	71.5%	325	9.6%
Use of steroid only	167	14.7%	111	0.4%
Use of tocolytic only	26	2.3%	23	4.2%
Use of both steroid and tocolytic	128	11.3%	86	15.8%
Total	**1135**	**100.0%**	**545**	**100.0%**

THOSE ALIVE AT 28 DAYS

	2004		2009	
No use of steroid or tocolytic	790	97.4%	304	93.5%
Use of steroid only	160	95.8%	108	97.3%
Use of tocolytic only	28	96.6%	21	91.3%
Use of both steroid and tocolytic	125	97.7%	80	93.0%
Total	**1103**	**97.2%**	**513**	**94.1%**

Percentage refers to that of the total population in that group

THOSE WITH NEONATAL DEATHS

	2004		2009	
No use of steroid or tocolytic	21	2.6%	21	6.5%
Use of steroid only	7	4.2%	3	2.7%
Use of tocolytic only	1	3.4%	2	8.7%
Use of both steroid and tocolytic	3	2.3%	6	7.0%
Total	**32**	**2.8%**	**32**	**5.9%**

Percentage refers to that of the total population in that group

THREATENED PRETERM LABOUR

Of all the reported threatened preterm labour, tocolytic therapy was used in only 27.4% and steroid was used in 34.3%. Almost 90% delivered < 37 weeks. Despite the use of tocolytics, 42.1% of pregnancies with threatened preterm labour delivered before 33 weeks. There was however no difference in the survival rate at 28 days.

	2004			2009		
	Use of Tocolytic		Total	Use of Tocolytic		Total
	No	Yes		No	Yes	
Singleton	326 (91.3%)	75 (88.2%)	401 (90.7%)	311 (91.7%)	114 (89.1%)	425 (91.0%)
Multiple	31 (8.7%)	10 (11.8%)	41 (9.3%)	28 (8.3%)	14 (10.9%)	42 (9.0%)
Total	**357 (0.7%)**	**85 (0.2%)**	**442 (0.9%)**	**339 (0.4%)**	**128 (0.2%)**	**467 (0.6%)**

ONSET OF LABOUR

	2004			2009		
	Use of Tocolytic		Total	Use of Tocolytic		Total
	No	Yes		No	Yes	
Spontaneous	264 (73.9%)	63 (74.1%)	327 (74.0%)	218 (64.3%)	87 (68.0%)	305 (65.3%)
Induction	37 (10.4%)	2 (2.4%)	39 (8.8%)	31 (9.1%)	8 (6.2%)	39 (8.4%)
No Labour	56 (15.7%)	20 (23.5%)	76 (17.2%)	90 (26.5%)	33 (25.8%)	123 (26.3%)

USE OF STEROID

	2004			2009		
	Use of Tocolytic		Total	Use of Tocolytic		Total
	No	Yes		No	Yes	
Not used	305 (85.4%)	15 (17.6%)	320 (72.4%)	279 (82.3%)	28 (21.9%)	307 (65.7%)
Used	52 (14.6%)	70 (82.4%)	122 (27.6%)	60 (17.7%)	100 (78.1%)	160 (34.3%

GESTATION AT DELIVERY

	2004			2009		
	Use of Tocolytic		Total	Use of Tocolytic		Total
	No	Yes		No	Yes	
< 26 wks	11 (3.1%)	7 (8.3%)	18 (4.1%)	10 (3.0%)	9 (7.0%)	19 (4.1%)
26 - 28 wks	17 (4.8%)	12 (14.3%)	29 (6.6%)	9 (2.7%)	5 (3.9%)	14 (3.0%)
29 - 32 wks	41 (11.5%)	29 (34.5%)	70 (15.9%)	47 (13.9%)	40 (31.2%)	87 (18.7%)
33 - 36 wks	253 (71.1%)	19 (22.6%)	272 (61.8%)	246 (73.0%)	47 (36.7%)	293 (63.0%)
37 - 41 wks	32 (9.0%)	17 (20.2%)	49 (11.1%)	25 (7.4%)	27 (21.1%)	52 (11.2%)
≥ 42 wks	2 (0.6%)	0 (0.0%)	2 (0.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)

Missing data on gestation at delivery in 2 in 2004 and 2009

FETAL OUTCOME

	2004			2009		
	Use of Tocolytic		Total	Use of Tocolytic		Total
	No	Yes		No	Yes	
Alive at 28d	381 (97.9%)	93 (97.9%)	474 (97.9%)	330 (97.3%)	126 (98.4%)	456 (97.6%)
Stillbirths	2 (0.5%)	1 (1.1%)	3 (0.6%)	2 (0.6%)	0 (0.0%)	2 (0.4%)
NND	6 (1.5%)	1 (1.1%)	7 (1.4%)	7 (2.1%)	2 (1.6%)	9 (1.9%)

NND: Neonatal deaths

FETAL OUTCOME IN THOSE LIVE BIRTHS DELIVERED AT GESTATION ≤ 34 WEEKS

	2004		2009	
No use of steroid or tocolytic	114	(49.8%)	69	(42.9%)
Use of steroid only	46	(20.0%)	28	(17.4%)
Use of tocolytic only	7	(3.1%)	10	(6.2%)
Use of both steroid and tocolytic	62	(27.1%)	54	(33.5%)
Total	**229**	**100.0%**	**161**	**100.0%**

THOSE ALIVE AT 28 DAYS

	2004		2009	
No use of steroid or tocolytic	112	98.2%	64	92.8%
Use of steroid only	43	93.5%	27	96.4%
Use of tocolytic only	7	100.0%	9	90.0%
Use of both steroid and tocolytic	61	98.4%	53	98.1%
Total	**223**	**97.4%**	**153**	**95.0%**

Percentage refers to that of the total population in that group

THOSE WITH NEONATAL DEATHS

	2004		2009	
No use of steroid or tocolytic	2	1.8%	5	7.2%
Use of steroid only	3	6.5%	1	3.6%
Use of tocolytic only	0	0.0%	1	10.0%
Use of both steroid and tocolytic	1	1.6%	1	1.9%
Total	**6**	**2.6%**	**8**	**5.0%**

Percentage refers to that of the total population in that group

PRE-TERM DELIVERY

The incidence of preterm delivery (<37 completed weeks) remained at around 6%. For singleton pregnancy, the incidence decreased to 5.5% in 2009, compared with 5.9% in 1999 and 6.2% in 2004. The incidences of preterm delivery for twin pregnancy remained roughly the same with the figures being 45.2%, 50.2% and 48.3% in 1999, 2004 and 2009 respectively. The incidences of preterm delivery for triplet pregnancy apparently decreased from 93.3% in 1999, 88.9% in 2004 to 86.7% in 2009.

The proportion of preterm delivery occurring at gestation < 33 weeks was 22.8% in 1999, 18.6% in 2004 and 14.5% (709/4873) in 2009. The proportion of very low birth weight (< 1500 gm) also decreased from 15.1% in 1999, 12.0% in 2004 to 9.7% in 2009. Consistent with the decreasing incidence of preterm delivery, the incidence of respiratory distress syndrome decreased from 2.0% in 1999 to 0.5% and 0.8% in 2004 and 2009. The stillbirth and neonatal mortality rates decreased from 3.5% to 2.2% and 2.0% and from 1.5% to 1.3% and 0.9% in 1999 to 2004

	1999		**2004**		**2009**	
TOTAL INCIDENCE	3046	6.3%	3292	6.7%	4873	6.0%
Singleton	*2838*	*93.2%*	*3019*	*91.7%*	*4304*	*88.3%*
Twin	*194*	*6.4%*	*265*	*8.0%*	*556*	*11.4%*
Triplet or above	*14*	*0.5%*	*8*	*0.2%*	*13*	*0.3%*

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Para 0	1687	55.4%	1885	57.3%	2372	48.7%
Para 1	966	31.7%	1061	32.2%	2015	41.4%
Para 2	290	9.5%	251	7.6%	372	7.6%
Para 3 & above	103	3.4%	95	2.9%	114	2.3%

MATERNAL AGE

	1999		**2004**		**2009**	
< 20 years	51	1.7%	58	1.8%	33	0.7%
20 - 24 years	284	9.3%	299	9.1%	349	7.2%
25 - 29 years	656	21.5%	711	21.6%	912	18.7%
30 - 34 years	985	32.3%	1124	34.1%	1589	32.6%
35 - 39 years	801	26.3%	793	24.1%	1489	30.6%
≥ 40 years	254	8.3%	245	7.5%	465	9.6%
Missing data	15	0.5%	62	1.9%	36	0.7%

ASSOCIATED ANTENATAL COMPLICATIONS

	1999		2004		2009	
Antepartum haemorrhage	363	11.1%	343	10.4%	420	8.6%
Placenta praevia	*136*	*37.5%*	*120*	*35.0%*	*168*	*40.0%*
Placenta abruptio	*45*	*12.4%*	*34*	*9.9%*	*40*	*9.3%*
APH of unknown origin	*170*	*46.8%*	*176*	*51.3%*	*204*	*48.6%*
Other causes	*12*	*3.3%*	*13*	*3.8%*	*8*	*1.9%*
Diabetes mellitus (including IGT)	254	7.8%	292	9.9%	504	10.3%
Hypertension	211	6.5%	306	9.3%	442	9.1%
Mild	*97*	*31.8%*	*92*	*30.1%*	*113*	*25.6%*
Severe	*134*	*68.2%*	*162*	*52.9%*	*206*	*46.6%*
Unclassified	*0*	*0.0%*	*52*	*17.0%*	*123*	*27.8%*
Anaemia	197	6.0%	135	4.1%	167	3.4%
Cardiac diseases	46	1.4%	39	1.2%	38	0.8%
Surgical diseases	23	0.7%	23	0.7%	25	0.5%
Other medical diseases	187	5.7%	163	5.0%	214	4.4%

PRESENTATION AND LIE AT DELIVERY

	1999		2004		2009	
Vertex	2638	80.7%	3002	84.0%	4720	86.6%
Breech	440	13.5%	505	14.1%	654	12.0%
Brow	0	0.0%	0	0.01%	0	0.0%
Face	0	0.0%	3	0.08%	2	0.04%
Oblique lie	9	0.3%	4	0.1%	4	0.1%
Transverse lie	53	1.6%	41	1.1%	31	0.6%
Compound	5	0.2%	3	0.08%	1	0.02%
Others	15	0.5%	16	0.4%	12	0.2%

Missing data on presentation in 108 (3.3%) in 1999

ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	1918	58.7%	1893	57.5%	2559	52.5%
Induced labour	513	15.7%	519	15.8%	630	12.9%
No labour	834	25.5%	880	26.7%	1681	34.5%

Missing data on mode of onset of labour in 3 (0.1%) in 1999 and 3 (0.1%) in 2009

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	1590	48.8%	1697	47.5%	2161	39.6%
Vacuum extraction	191	5.8%	172	4.8%	190	3.5%
Forceps delivery	70	2.1%	45	1.3%	33	0.6%
Vaginal breech delivery	109	3.3%	66	1.8%	84	1.5%
LSCS before labour	1214	37.1%	1009	28.2%	1918	35.2%
LSCS after labour	476	12.6%	556	15.6%	980	17.8%
Classical Caesarean section	26	0.8%	28	0.8%	53	1.0%
Others/Unknown	68	2.1%	0	0.0%	33	0.6%

BIRTH WEIGHT AT DELIVERY

	1999		2004		2009	
< 500 gm	57	1.7%	17	0.5%	31	0.6%
500 - 999 gm	179	5.5%	164	4.6%	188	3.4%
1000 - 1499 gm	257	7.9%	245	6.9%	310	5.7%
1500 - 1999 gm	449	13.7%	505	14.1%	715	13.1%
2000 - 2499 gm	926	28.3%	1037	29.0%	1576	28.9%
2500 - 2999gm	976	30.0%	1132	31.7%	1810	33.2%
3000 - 3499 gm	347	10.6%	402	11.2%	665	12.2%
3500 - 3999 gm	60	1.8%	56	1.6%	123	2.3%
≥ 4000 gm and above	14	0.4%	11	0.3%	19	0.3%
Unknown	3	0.1%	5	0.1%	15	0.3%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	3102	94.9%	3450	96.5%	5288	97.0%
Stillbirths	115	3.5%	79	2.2%	110	2.0%
Neonatal deaths	50	1.5%	45	1.3%	54	0.9%
Unknown outcome	1	0.03%	0	0.0%	0	0%

OTHER NEONATAL COMPLICATIONS

	1999		2004		2009	
Low Apgar score at birth						
Apgar score 0-3 at 1 minute	252	7.7%	136	3.8%	142	2.6%
Apgar score 4-6 at 1 minute	425	13.0%	404	11.3%	389	7.1%
Apgar score 0-3 at 5 minutes	172	5.3%	80	2.2%	93	1.7%
Apgar score 4-6 at 5 minutes	68	2.1%	46	1.3%	54	1.0%
Admission to neonatal ICU	1321	40.4%	1729	48.4%	1956	36.0%
Respiratory distress syndrome	68	2.1%	17	0.5%	46	0.8%
Major congenital abnormalities	65	2.0%	31	0.9%	39	0.7%
Major infection	42	1.3%	3	0.08%	7	0.1%
Intraventricular haemorrhage	32	1.0%	0	0.0%	10	0.2%
Necrotising enterocolitis	14	0.4%	3	0.08%	5	0.1%
Birth trauma	13	0.4%	8	0.2%	10	0.2%

POST-TERM DELIVERY

The incidence of post-term delivery (≥ 42 completed weeks) decreased from 2.5% in 1999, 1.4% in 2004 to 0.26% in 2009. The significant drop was related to the widespread practice of performing dating ultrasound scan and the practice of induction of labour by 41 weeks instead of 42 weeks. Induction of labour was performed in 53.2% in 1999, 34.5% in 2004 and 40.5% in 2009, and the rate of caesarean delivery was 27.4% in 2009. The incidence of birthweight ≥ 4000 gm decreased from 10% to 7.6%. Although the incidence of low Apgar score and other major neonatal complications remained low, the admission to neonatal ICU rate remained higher (22.3% in 2009) than in general population.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	1193	2.5%	673	1.4%	210	0.26%
Singleton	1191	99.8%	672	99.9%	209	99.5%
Twin	1	0.1%	1	0.1%	1	0.5%
Triplet or above	1	0.1%	0	0.0%	0	0.0%

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Para 0	661	55.4%	406	60.3%	108	51.4%
Para 1	387	32.4%	225	33.4%	80	38.1%
Para 2	108	9.1%	29	4.3%	13	6.2%
Para 3 & above	37	3.1%	13	1.9%	9	4.3%

MATERNAL AGE

	1999		**2004**		**2009**	
< 20 years	14	1.2%	5	0.7%	1	0.5%
20 - 24 years	150	12.6%	146	21.7%	27	12.9%
25 - 29 years	411	34.5%	248	36.8%	64	30.5%
30 - 34 years	375	31.4%	163	24.2%	68	32.4%
35 - 39 years	197	16.5%	95	14.1%	39	18.6%
≥ 40 years	42	3.5%	15	2.2%	11	5.3%
Missing data	4	0.3%	1	0.1%	0	0.0%

ASSOCIATED ANTENATAL COMPLICATIONS

	1999		2004		2009	
Antepartum haemorrhage	7	0.6%	2	0.3%	0	0.0%
Placenta praevia	*3*	*42.9%*	*0*	*0.0%*	*0*	*0.0%*
Placenta abruptio	*0*	*0.0%*	*0*	*0.0%*	*0*	*0.0%*
APH of unknown origin	*4*	*57.1%*	*2*	0.3%	*0*	*0.0%*
Other causes	*0*	*0.0%*	*0*	*0.0%*	*0*	*0.0%*
Diabetes mellitus (including IGT)	35	2.9%	14	2.1%	7	3.3%
Hypertension	10	0.8%	11	1.6%	4	1.9%
Mild	*4*	*40.0%*	*5*	*45.5%*	*3*	*75.0%*
Severe	*6*	*60.0%*	*2*	*18.2%*	*0*	*0.0%*
Unclassified	0	0.0%	4	36.4%	*1*	*25.0%*
Anaemia	96	8.0%	25	3.7%	6	2.9%
Cardiac diseases	-	-	3	0.4%	*0*	*0.0%*
Surgical diseases	-	-	0	0.0%	*0*	*0.0%*
Other medical diseases	-	-	14	2.1%	3	1.4%

PRESENTATION AND LIE AT DELIVERY

	1999		2004		2009	
Vertex	1146	95.8%	663	98.4%	208	98.6%
Breech	24	2.0%	11	1.6%	3	1.4%
Brow	1	0.1%	0	0.0%	0	0.0%
Face	1	0.1%	0	0.0%	0	0.0%
Oblique lie	1	0.1%	0	0.0%	0	0.0%
Transverse lie	0	0.0%	0	0.0%	0	0.0%
Compound	0	0.0%	0	0.0%	0	0.0%
Others	0	0.0%	0	0.0%	0	0.0%

Missing data on presentation and lie in 23 (1.9%) in 1999

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	493	41.3%	402	59.7%	105	50.5%
Induced labour	635	53.2%	232	34.5%	85	40.5%
No labour	64	5.4%	39	5.8%	19	9.0%

Missing data on onset of labour in 1 (0.1%) in 1999

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	701	58.6%	430	63.8%	132	62.6%
Vacuum extraction	166	13.9%	61	9.1%	19	6.0%
Forceps delivery	18	1.5%	7	1.0%	1	0.5%
Vaginal breech delivery	2	0.2%	1	0.1%	0	0.0%
LSCS before labour			39	5.8%	18	8.5%
LSCS after labour	309	25.8%	135	20.0%	37	17.5%
Classical Caesarean section			1	0.1%	3	1.4%
Others/Unknown	0	0.0%	0	0.0%	1	0.5%

Caesarean section data in 1999 included both lower segment and classical Caesarean section

BIRTH WEIGHT AT DELIVERY

	1999		2004		2009	
< 500 gm	0	0.0%	1	0.1%	0	0.0%
500 - 999 gm	0	0.0%	1	0.1%	0	0.0%
1000 - 1499 gm	0	0.0%	0	0.0%	0	0.0%
1500 - 1999 gm	5	0.4%	1	0.1%	0	0.0%
2000 - 2499 gm	23	1.9%	15	2.2%	4	1.9%
2500 - 2999gm	165	13.8%	108	16.0%	32	15.2%
3000 - 3499 gm	487	40.7%	302	44.8%	101	47.9%
3500 - 3999 gm	392	32.8%	182	27.0%	56	26.5%
≥ 4000 gm	124	10.4%	64	9.5%	16	7.6%

Missing data on birth weight in 2 (0.9%) in 2009

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	1192	99.7%	672	99.7%	211	100%
Stillbirths	1	0.1%	1	0.1%	0	0.0%
Neonatal deaths	3	0.3%	1	0.1%	0	0.0%
Unknown outcome	0	0.0%	0	0.0%	0	0.0%

OTHER NEONATAL COMPLICATIONS

	1999		2004		2009	
Low Apgar score at birth						
Apgar score <7 at 1 minute	84	7.0%	30	4.5%	9	4.3%
Apgar score <7 at 5 minutes	6	0.5%	5	0.7%	2	1.0%
Admission to neonatal ICU	200	16.7%	161	23.9%	47	22.3%
Major congenital abnormalities	16	1.3%	1	0.1%	0	0.0%
Major infection	-	-	1	0.1%	0	0.0%
Respiratory distress syndrome	0	0.0%	0	0.0%	0	0.0%
Birth trauma	6	0.5%	4	0.5%	3	1.4%

INDUCTION OF LABOUR

The overall rate of induction of labour remained similar between 16-18% in 1999-2009. Over 99% of the inductions were carried out in singleton pregnancy. Prelabour rupture of membranes remained the most common indication, accounting for about 28.5%.

Prolonged pregnancy was the second most common indication for induction. However, the data was not strictly comparable as there was a change in the terminology for this indication in the previous audits. In 1999, the term 'postterm/postmaturity' was used which should mainly imply a gestation ≥ 42 weeks. In 2004 and 2009, the term 'prolonged pregnancy' with a clear specification of gestation ≥ 41weeks was used. According to the data on post-term delivery, the term actually included those with gestation ≥ 42 weeks in only 32.2% (635/1972) in 1999, 10.7% (232/2160) in 2004 and 3.1% (85/2702) in 2009. Moreover, there was no indication for induction documented in 1596 cases (12.2% of all induction cases) in 2009.

For those undergoing induction of labour, 75-78% delivered vaginally. Post-partum haemorrhage rate 6.1%. The rate of uterine rupture and hysterectomy remained very low.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	8515	17.6%	9025	18.4%	13106	16.4%
Singleton	*8442*	*99.1%*	*8976*	*99.5%*	*13038*	*99.5%*
Multiple	*73*	*0.9%*	*49*	*0.5%*	*68*	*0.5%*

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Para 0	5480	64.4%	5903	65.4%	7882	60.1%
Para 1	2284	26.8%	2379	26.4%	4178	31.9%
Para 2	582	6.8%	586	6.5%	841	6.4%
Para 3 & above	169	2.0%	157	1.7%	205	1.6%

INDICATIONS (each pregnancy might have more than 1 indication)

	1999		2004		2009	
Prelabour rupture of membranes	2471	29.0%	2796	31.0%	3735	28.5%
Prolonged pregnancy (≥ 41 weeks) *	1972	23.2%	2160	23.9%	2702	20.6%
Diabetes mellitus (including IGT)	563	6.6%	426	4.7%	719	5.5%
Suboptimal cardiotocography	557	6.5%	662	7.3%	602	4.6%
Antepartum haemorrhage	516	6.1%	377	4.2%	354	2.7%
Hypertension	445	5.2%	323	3.6%	443	3.4%
Social reasons	293	3.4%	230	2.5%	1596	12.2%
Suspected IUGR/IUGR	284	3.3%	241	2.7%	360	2.7%
Intra-uterine death	88	1.0%	53	0.6%	79	0.6%
Bad obstetric history	52	0.6%	51	0.6%	41	0.3%
Multiple pregnancy	37	0.4%	36	0.4%	44	0.3%
Maternal disease	31	0.4%	38	0.4%	39	0.3%
Fetal anomaly	20	0.2%	20	0.2%	10	0.1%
Others	1362	16.0%	1613	17.6%	2749	21.0%

Missing data on indication in 381 (4.5%) in 1999
**"Postterm/postmaturity" was used in 1999*

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	4688	54.6%	5441	60.0%	8335	63.6%
Vacuum extraction	1517	17.7%	1220	13.4%	1786	13.6%
Forceps delivery	215	2.5%	122	1.3%	112	0.9%
Vaginal breech delivery	42	0.5%	22	0.2%	16	0.1%
LSCS	2123	24.7%	2268	25.0%	2794	21.3%
Classical Caesarean section	1	0.01%	2	0.02%	60	0.5%
Others/Unknown	2	0.02%	0	0.0%	3	0.02%

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	345	4.1%	349	3.9%	803	6.1%
Puerperal pyrexia	-	-	78	0.9%	168	1.3%
Hysterectomy	7	0.08%	3	0.03%	6	0.05%
Uterine rupture	0	0.0%	2	0.02%	0	0.0%
Maternal death	1	0.01%	1	0.01%	0	0.0%
Preterm labour (<37 weeks)	471	5.5%	519	5.7%	630	4.8%
Singleton	*453*	*96.2%*	*508*	*97.9%*	*612*	*97.1%*
Multiple	*18*	*3.8%*	*11*	*2.1%*	*18*	*2.9%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	8468	98.6%	8999	99.2%	13083	99.3%
Stillbirths	100	1.2%	63	0.7%	86	0.65%
Neonatal deaths	15	0.2%	13	0.1%	4	0.03%
Unknown outcome	4	<0.05%	0	0.0%	0	0.0%
Low birth weights (< 2500 gm)	572	6.7%	558	6.1%	812	6.2%
Singleton	*513*	*89.7%*	*521*	*93.4%*	*752*	*92.6%*
Multiple	*59*	*10.3%*	*37*	*6.6%*	*60*	*7.4%*
Macrosomia (> 4000 gm)	435	5.1%	481	5.3%	476	3.6%
Apgar score < 4 at 1 minute	48	0.6%	74	0.8%	92	0.7%
Apgar score < 4 at 5 minutes	10	0.1%	54	0.6%	65	0.5%

AUGMENTATION OF LABOUR

There was a reduction in the rate of augmentation of labour from 32.2% in 1999, 22.7% in 2004 to 19.6% in 2009. Vaginal delivery rate following augmentation of labour remained 87-89%. Post-partum haemorrhage rate reduced from 3.7% to 2.7%. The rate of uterine rupture and hysterectomy remained very low.

	1999		2004		2009	
TOTAL INCIDENCE	15610	32.2%	11157	22.7%	15618	19.6%
Singleton	15547	99.6%	11128	99.7%	15584	99.8%
Multiple	63	0.4%	29	0.3%	34	0.2%

No information on augmentation of labour in 32 (0.1%) in 1999

PARITY OF THE PATURIENTS

	1999		2004		2009	
Para 0	8974	57.5%	6805	61.0%	8205	52.5%
Para 1	5011	32.1%	3425	30.7%	6008	38.5%
Para 2	1274	8.2%	732	6.6%	1158	7.4%
Para 3 & above	351	2.2%	195	1.7%	247	1.6%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	14597	93.5%	10199	91.4%	13446	86.1%
Induced labour	1011	6.5%	938	8.4%	2074	13.3%

Missing data on mode of onset of labour in 2 (<0.05%) in 1999 and 20 were reported to have no labour in 2004
Missing data on mode of onset of labour in 1 (0.01%) and 97 (0.6%) were reported to have no labour in 2009

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	10627	67.9%	7777	69.5%	10690	68.4%
Vacuum extraction	2858	18.2%	1908	17.1%	3169	20.3%
Forceps delivery	335	2.1%	119	1.1%	107	0.7%
Vaginal breech delivery	45	0.3%	14	0.1%	7	0.04%
LSCS before labour	1809	11.5%	12	0.1%	59	3.6%
LSCS after labour			1356	12.1%	1574	96.4%
Others/Unknown	0	0.0%	0	0.0%	12	0.1%

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	573	3.7%	302	2.7%	424	2.7%
Puerperal pyrexia	-	-	50	0.4%	77	0.5%
Hysterectomy	0	0.0%	2	0.02%	6	0.04%
Uterine rupture	1	0.006%	1	0.009%	0	0.0%
Maternal death	2	0.01%	0	0.0%	1	0.01%
Preterm labour (<37 weeks)	510	3.3%	427	3.8%	514	3.3%
Singleton	*485*	*95.1%*	*415*	*97.2%*	*491*	*95.5%*
Multiple	*25*	*4.9%*	*12*	*2.8%*	*23*	*4.5%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	15643	99.8%	11165	99.8%	15636	99.9%
Stillbirths	24	0.2%	17	0.2%	10	0.1%
Neonatal deaths	6	0.04%	4	0.04%	6	0.04%
Low birth weights (< 2500 gm)	533	3.4%	372	3.3%	491	3.1%
Singleton	*472*	*88.6%*	*348*	*93.5%*	*444*	*90.4%*
Multiple	*61*	*11.4%*	*24*	*6.5%*	*47*	*9.6%*
Macrosomia (> 4000 gm)	529	3.4%	409	3.7%	398	2.5%
Apgar score < 4 at 1 minute	32	0.2%	24	0.2%	19	0.1%
Apgar score < 4 at 5 minutes	4	0.03%	10	0.1%	6	0.04%

Missing data on fetal outcome in 1 (<0.05%) in 1999

EPIDURAL ANALGESIA & ANAESTHESIA

Epidural analgesia/anaesthesia rate during labour or delivery decreased from 11.5% in 1999 and 8.4% in 2004 to 5.0% in 2009. Spontaneous vaginal delivery rate increased from 38.7% to 43.4% while instrumental delivery rate decreased from 29.9% to 25.8%. The incidences of hypertension in the group were 4.8% in 1999, 7.5% in 2004 and 5.2% in 2009, the proportion of parturients with hypertension receiving treatment were decreased from 28.1% to 24.6% and 13.5% respectively. The epidural rate for caesarean section after labour decreased from 29-30% to 25.2%, while that for caesarean section before labour increased from 1.6% to 4.6%. Post-partum haemorrhage rate dropped from 4.6% to 6.9%.

	1999		2004		2009	
TOTAL INCIDENCE	5561	11.5%	4111	8.4%	3962	5.0%
Singleton	*5491*	*98.7%*	*4055*	*98.6%*	*3922*	*99.0%*
Multiple	*70*	*1.3%*	*56*	*1.4%*	*40*	*1.0%*

PARITY OF THE PATURIENTS

	1999		2004		2009	
Para 0	4483	80.6%	3318	80.7%	2883	72.8%
Para 1	901	16.2%	654	15.9%	858	21.7%
Para 2	138	2.5%	112	2.7%	187	4.7%
Para 3 & above	39	0.7%	27	0.7%	34	0.9%

ANTENATAL COMPLICATIONS

	1999		2004		2009	
Diabetes mellitus (including IGT)	522	9.4%	391	9.5%	351	8.9%
Hypertension	266	4.8%	307	7.5%	287	7.2%
Anaemia	349	6.3%	177	4.3%	139	3.5%
Antepartum haemorrhage	144	2.6%	116	2.8%	60	1.5%
Cardiac diseases	84	1.5%	44	1.1%	45	1.1%
Other medical/surgical complications	321	5.8%	761	18.5%	202	5.1%
Previous Caesarean section	-	-	140	3.4%	214	5.4%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	2794	50.3%	1909	46.4%	1905	48.1%
Induced labour	2679	48.2%	2131	51.8%	1867	47.1%
No labour	86	1.5%	71	1.7%	190	4.8%

Missing data on mode of onset of labour in 2 (<0.05%) in 1999

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	2177	38.7%	1738	41.7%	1738	43.4%
Vacuum extraction	1396	24.8%	958	23.0%	913	22.8%
Forceps delivery	289	5.1%	131	3.1%	120	3.0%
Vaginal breech delivery	29	0.5%	15	0.4%	10	0.2%
LSCS before labour	88	1.6%	72	1.7%	183	4.6%
LSCS after labour	1649	29.3%	1254	30.1%	1009	25.2%
Classical Caesarean section	-	-	0	0.0%	29	0.7%

LSCS data in 1999 included both lower segment and classical caesarean section

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	257	4.6%	162	3.9%	272	6.9%
Uterine rupture	2	0.04%	2	0.05%	1	0.03%
Maternal death	-	-	0	0.0%	0	0.0%
Preterm labour (<37 weeks)	245	4.4%	230	5.6%	175	4.4%
Singleton	*221*	*90.2%*	*207*	*90.0%*	*156*	*89.1%*
Multiple	*24*	*9.8%*	*23*	*10.0%*	*19*	*10.9%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	5603	99.6%	4147	99.5%	3994	99.8%
Stillbirths	23	0.4%	15	0.4%	6	0.1%
Neonatal deaths	2	0.04%	6	0.1%	2	0.05%
Low birth weights (<2500 gm)	281	5.1%	251	6.0%	211	5.3%
Singleton	*215*	*76.5%*	*193*	*76.9%*	*167*	*79.1%*
Multiple	*66*	*23.5%*	*58*	*23.1%*	*44*	*20.9%*
Macrosomia (>4000 gm)	268	4.8%	198	4.8%	145	3.6%
Apgar score < 4 at 1 minute	35	0.6%	26	0.6%	12	0.3%
Apgar score < 4 at 5 minutes	3	0.1%	13	0.3%	4	0.1%

DURATION OF LABOUR

The mean duration of labour in 2009 was 4.8 hours (SD3.6) compared to 5.7 hours and 5.6 hours in 1999 and 2004. The proportion of labour lasting longer than 12 hours decreased from 5.5% in 2004 to 3.4% in 2009, while the caesarean section rate in this group remained similar with the rate of 23-24%

The mean duration of labour was similar in those undergoing induction (4.7 ± 3.9 hrs) and those with spontaneous labour (4.8 ± 3.4 hrs). Nulliparous women (5.9 ± 4.0 hrs) had a longer duration of labour than multiparous women (3.5 ± 2.5). Parturients having epidural analgesia also had a longer duration of labour (7.8 ± 5.4 hrs).

DISTRIBUTION OF DURATION OF LABOUR BY MODE OF LABOUR ONSET (in hours)

Hours	**Spontaneous labour**		**Induced labour**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**
Missing	5211	12.4	606	4.6	5817	10.5
0	997	2.4	1392	10.6	2389	4.3
1	2968	7.1	1082	8.3	4050	7.3
2	5746	13.7	1659	12.7	7405	13.4
3	5843	13.4	1500	11.4	7343	13.3
4	6125	14.6	1559	11.9	7684	13.9
5	3504	8.3	1053	8.0	4557	8.3
6	3454	8.2	979	7.5	4433	8.0
7	1888	4.5	682	5.2	2570	4.7
8	1998	4.8	669	5.1	2667	4.8
9	1024	2.4	429	3.3	1453	2.6
10	903	2.1	414	3.2	1317	2.4
11	603	1.4	279	2.1	882	1.6
12	483	1.1	240	1.8	723	1.3
13-24	1255	3.0	553	4.2	1808	3.3
> 24	35	0.08	10	0.08	45	0.08
Total	**42037**		**13106**		**55143**	

Missing data on labour duration in 5817 (10.5%) cases.

DISTRIBUTION OF DURATION OF LABOUR BY PARITY (in hours)

Hours	Para 0		Para 1		Para2+		Total	
Missing	3038	10.7%	2426	11.1%	353	7.2%	5817	10.5%
0	1729	6.1%	536	2.5%	124	2.5%	2389	4.3%
1	701	2.5%	2572	11.8%	777	15.8%	4050	7.3%
2	2064	7.3%	4200	19.2%	1141	23.1%	7405	13.4%
3	2752	9.7%	3714	17.0%	877	17.8%	7343	13.3%
4	3601	12.7%	3367	15.4%	716	14.5%	7684	13.9%
5	2594	9.1%	1617	7.4%	346	7.0%	4557	8.3%
6	2811	9.9%	1368	6.3%	254	5.1%	4433	8.0%
7	1838	6.5%	622	2.8%	110	2.2%	2570	4.7%
8	1988	7.0%	583	2.7%	96	1.9%	2667	4.8%
9	1176	4.1%	235	1.1%	42	0.9%	1453	2.6%
10	1084	3.8%	199	0.9%	34	0.7%	1317	2.4%
11	740	2.6%	121	0.6%	21	0.4%	882	1.6%
12	618	2.2%	86	0.4%	19	0.4%	723	1.3%
13-24	1610	5.7%	177	0.8%	21	0.4%	1808	3.3%
> 24	35	0.1%	8	0.04%	2	0.04%	45	0.1%
Total	**28379**		**21831**		**4933**		**55143**	

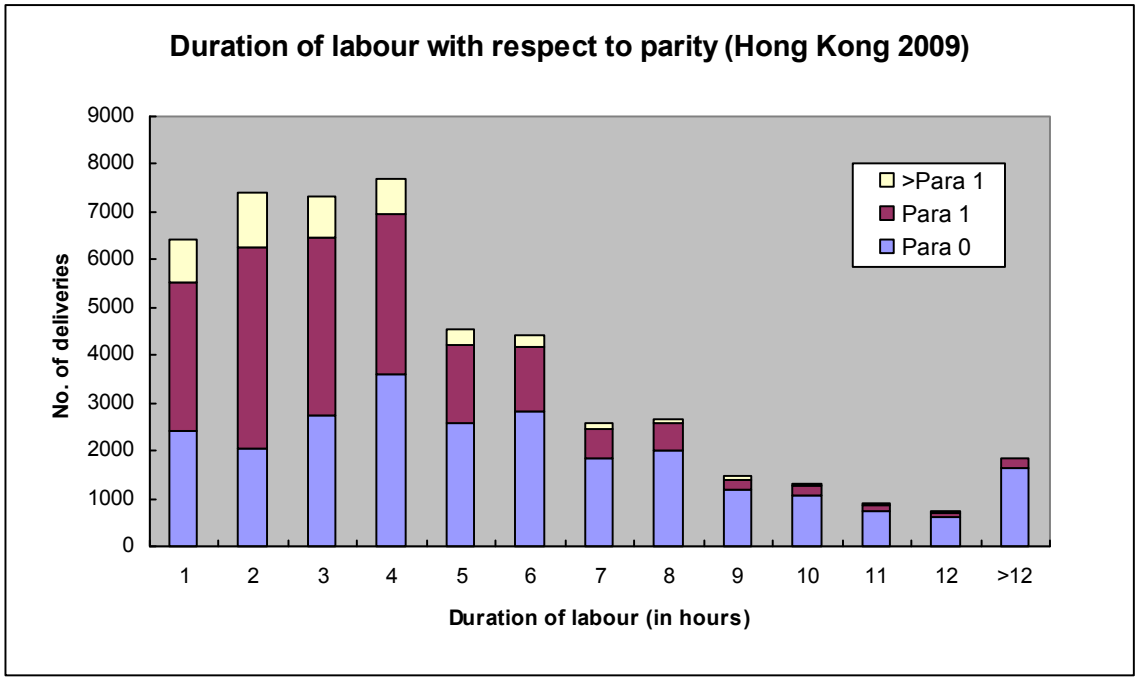

Figure O5 – Duration of labour with respect to parity

MEAN DURATION OF LABOUR (in hours)

	1999		2004		2009	
	N	Mean±SD	N	Mean±SD	N	Mean±SD
All parturients*	38229	5.7±3.9	36712	5.6±3.8	49326	4.8±3.6
Effect of onset of labour						
Spontaneous	30636	5.6±3.6	28869	5.5±3.8	36826	4.8±3.4
Induced	7563	6.1±4.1	7843	5.8±4.0	12500	4.7±3.9
Effect of parity						
Para 0	20451	7.1±4.1	20473	6.8±4.1	25341	5.9±4.0
Para 1	16982	3.3±3.1	12811	4.0±2.8	19405	3.6±2.5
Para 2 & above	5378	3.2±2.7	3428	3.6±2.5	4580	3.3±2.3
With epidura1 analgesia	4991	9.5±4.7	3420	9.2±5.0	3511	7.8±5.4

**Those parturients with no information on duration of labour were excluded*

PATURIENTS WITH DURATION OF LABOUR OVER 12 HOURS

	1999		2004		2009	
Incidence						
of all pregnancies	2280	4.7%	2018	4.1%	1853	2.3%
actually in labour	2280	6.0%	2018	5.5%	1853	3.4%
Parity						
Nulliparous	2021	88.6%	1809	89.6%	1645	88.8%
Multiparous	259	11.4%	209	10.4%	208	11.2%
Mode of onset of labour						
Spontaneous labour	1719	75.4%	1529	75.8%	1290	69.6%
Induced labour	561	24.6%	489	24.2%	563	30.4%
Mode of delivery (for the first baby)						
Spontaneous vertex delivery	900	39.6%	954	47.3%	840	45.3%
Vacuum extraction	710	31.1%	532	26.4%	526	28.4%
Forceps delivery	98	4.3%	62	3.1%	49	2.6%
Vaginal breech delivery	12	0.5%	2	0.1%	4	0.2%
Caesarean section	557	24.4%	468	23.2%	434	23.4%
Others/unknown	3	0.1%	0	0.0%	0	0.0%

SPONTANEOUS VERTEX DELIVERY

Spontaneous vertex delivery decreased from 57% and 58% of all deliveries in 1999 and 2004 to 47.5% in 2009. The proportion of spontaneous vertex delivery from nulliparous women ranged from 44% - 49%. The number of episiotomy performed was decreased to 66%, of whom 55.2% were nulliparous women. The stillbirth rate and neonatal mortality rate were comparable to the overall figures.

	1999		**2004**		**2009**	
TOTAL INCIDENCE (births)	27943	57.1%	28898	58.3%	38418	47.5%
Singleton	*27766*	*99.4%*	*28743*	*99.5%*	*38916*	*99.4%*
Multiple	*177*	*0.6%*	*155*	*0.5%*	*222*	*0.6%*

BIRTH ORDER FOR THOSE BABIES FROM MULTIPLE PREGNANCY

	1999		**2004**		**2009**	
Twins	-	-	100		141	
First baby	-	-	*94*	*94.0%*	*128*	*90.8%*
Second baby	-	-	*56*	*56.0%*	*92*	*65.2%*
Triplets	-	-	2		1	
First baby	-	-	*2*	*100%*	*1*	*100%*
Second baby	-	-	*2*	*100%*	*0*	*0%*
Third baby	-	-	*1*	*50%*	*1*	*100%*

PARITY OF THE PATURIENTS (FOR EACH BABY)

	1999		**2004**		**2009**	
Para 0	12543	45.0%	14260	49.3%	16923	44.0%
Para 1	11250	40.4%	11431	39.6%	17223	44.8%
Para 2	3141	11.3%	2525	8.7%	3494	9.1%
Para 3 & above	941	3.3%	683	2.4%	778	2.0%

MODE OF ONSET OF LABOUR (FOR EACH BABY)

	1999		**2004**		**2009**	
Spontaneous	23139	82.8%	23361	80.8%	29551	76.9%
Induced labour	4672	16.7%	5441	18.8%	8360	21.8%
Inconsistent or missing information	132	0.5%	96	0.4%	508	1.3%

MATERNAL COMPLICATIONS (FOR EACH BABY)

	1999		2004		2009	
Postpartum haemorrhage	1077	3.9%	957	3.3%	801	2.1%
Third degree tear	18	0.1%	11	0.04%	35	0.1%
MROP	-	-	404	1.4%	435	1.1%
Puerperal pyrexia	-	-	104	0.4%	124	0.3%
Hysterectomy	-	-	3	0.01%	4	0.01%
Rupture of uterus	-	-	0	0.0%	0	0.0%
Maternal death	-	-	1	0.003%	0	0.0%
Preterm labour (<37wk)	1501	5.4%	1697	5.9%	2161	5.7%
Singleton	*1453*	*5.2%*	*1629*	*96.0%*	*2046*	*94.7%*
Multiple	*48*	*0.2%*	*68*	*4.0%*	*115*	*5.3%*
Episiotomy	-	-	23412	81.0%	25413	66.1%
Nulliparous	-	-	*13288*	*56.8%*	*14023*	*55.2%*
Multiparous	-	-	*10124*	*43.2%*	*11390*	*44.8%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	27802	99.5%	28800	99.7%	38281	99.6%
Stillbirths	101	0.4%	74	0.3%	100	0.3%
Neonatal deaths	32	0.1%	24	0.08%	37	0.1%
Low birth weights (<2500 gm)	1506	5.4%	1454	5.0%	1969	5.1%
Singleton	*1397*	*92.8%*	*1369*	*94.2%*	*1836*	*93.2%*
Multiple	*109*	*7.2%*	*85*	*5.8%*	*133*	*6.8%*
Macrosomia (>4000 gm)	769	2.8%	840	2.9%	861	2.2%
Apgar score < 4 at 1 minute	47	0.2%	89	0.3%	96	0.2%
Apgar score < 4 at 5 minutes	18	0.1%	63	0.2%	83	0.2%
Birth trauma	95	0.3%	110	0.4%	125	0.3%

Missing data on fetal outcome in 8 (0.03%) in 1999

VACUUM EXTRACTION

Of all the deliveries, the rate of vacuum extraction decreased from 12.9% to 9.1%. About 70-78% of the babies were from nulliparous women. Prolonged second stage remained the most common indication, accounting for about 25.5%. The rates of fetal distress and maternal distress as an indication were both approximately 24%. Episiotomy was performed in 81.4% but the rate of third degree tear increased from 0.2% in 1999 and 0.1% in 2004 to 0.4% in 2009.

	1999		**2004**		**2009**	
TOTAL INCIDENCE (births)	6324	12.9%	4823	9.7%	7335	9.1%
Singleton	*6271*	*99.2%*	*4795*	*99.4%*	*7310*	*99.7%*
Multiple	*53*	*0.8%*	*28*	*0.6%*	*25*	*0.3%*

BIRTH ORDER FOR THOSE BABIES FROM MULTIPLE PREGNANCY

	1999		**2004**		**2009**	
Twins	-		20		19	
First baby	-	-	*13*	*65%*	*14*	*56.0%*
Second baby	-	-	*15*	*75%*	*11*	*44.0%*

PARITY OF THE PATURIENTS (FOR EACH BABY)

	1999		**2004**		**2009**	
Para 0	4796	75.9%	3773	78.2%	5126	69.9%
Para 1	1310	20.7%	902	18.7%	1941	26.5%
Para 2	181	2.9%	117	2.4%	228	3.1%
Para 3 & above	37	0.5%	31	0.6%	40	0.5%

MODE OF ONSET OF LABOUR (FOR EACH BABY)

	1999		**2004**		**2009**	
Spontaneous	4803	75.9%	3596	74.6%	5500	75.0%
Induced labour	1517	24.0%	1220	25.3%	1794	24.5%
Inconsistent or missing information	4	0.1%	7	0.1%	41	0.5%

INDICATIONS FOR VACUUM EXTRACTION (Each baby might have more than 1 indication)

	1999		**2004**		**2009**	
Prolonged second stage	2652	41.9%	1642	34.0%	1869	25.5%
Fetal distress	1420	22.5%	1332	27.6%	1725	23.5%
Maternal distress	1182	18.7%	847	17.6%	1744	23.8%
Maternal disease	150	2.4%	86	1.8%	110	1.5%
Previous uterine scar	73	1.2%	36	0.7%	39	0.5%
Obstetric complications	28	0.4%	11	0.2%	18	0.2%
Cord prolapse	-	-	2	0.0%	2	0.03%
Others	936	14.9%	784	16.3%	1803	24.6%

Missing data on indications for vacuum extraction in 248 (3.9%) in 1999, 298 (6.2%) in 2004 and 426 (5.8%) in 2009.

MATERNAL COMPLICATIONS (FOR EACH BABY)

	1999		2004		2009	
Postpartum haemorrhage	296	4.7%	223	4.6%	190	2.6%
Third degree tear	13	0.2%	3	0.1%	29	0.4%
MROP	-	-	71	1.5%	73	1.0%
Puerperal pyrexia	98	1.5%	32	0.7%	28	0.4%
Hysterectomy	4	0.1%	0	0.0%	1	0.01%
Rupture of uterus	3	0.05%	1	0.02%	0	0.0%
Maternal death	2	0.03%	0	0.0%	0	0.0%
Preterm labour (<37 weeks)	188	3.0%	172	3.6%	190	2.6%
Singleton	*176*	*93.6%*	*164*	*95.3%*	*182*	*95.8%*
Multiple	*12*	*6.4%*	*8*	*4.7%*	*8*	*4.2%*
Episiotomy	-	-	4272	88.6%	5973	81.4%
Nulliparous	-	-	*3388*	*79.3%*	*4414*	*73.9%*
Multiparous	-	-	*884*	*20.7%*	*1559*	*26.1%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	6315	99.9%	4820	99.9%	7333	99.97%
Stillbirths	6	0.1%	1	0.02%	1	0.01%
Neonatal deaths	3	0.05%	2	0.04%	1	0.01%
Low birth weights (<2500 gm)	173	2.7%	122	2.5%	193	2.6%
Singleton	*154*	*89.0%*	*114*	*93.4%*	*183*	*94.8%*
Multiple	*19*	*11.0%*	*8*	*6.6%*	*10*	*5.2%*
Macrosomia (>4000 gm)	198	3.1%	123	2.6%	173	2.4%
Apgar score < 4 at 1 minute	31	0.5%	24	0.5%	19	0.3%
Apgar score < 4 at 5 minutes	2	0.03%	4	0.1%	3	0.04%
Birth trauma	129	2.0%	58	1.2%	64	0.9%

FORCEPS DELIVERIES

For instrumental delivery, forceps was still performed far less common than vacuum extraction. The overall rate further dropped from 1.8% to 0.5% and about 77% were nulliparous. Similar to vacuum extraction, the commonest indications were prolonged second stage and fetal distress. Post-partum haemorrhage and third degree laceration of the perineum were more common (4.3% and 1.1%) than in vacuum extraction (2.6% and 0.4%).

	1999		2004		2009	
TOTAL INCIDENCE (births)	867	1.8%	465	0.9%	373	0.5%
Singleton	*847*	*97.7%*	*447*	*96.1%*	*357*	*95.7%*
Multiple	*20*	*2.3%*	*18*	*3.9%*	*16*	*4.3%*

BIRTH ORDER FOR THOSE BABIES FROM MULTIPLE PREGNANCY

	1999		2004		2009	
Twins			13		14	
First baby	-	-	*9*	69.2%	*10*	62.5%
Second baby	-	-	*9*	69.2%	*6*	37.5%

PARITY OF THE PATURIENTS (FOR EACH BABY)

	1999		2004		2009	
Para 0	689	79.5%	384	82.6%	286	76.7%
Para 1	145	16.7%	71	15.3%	78	20.9%
Para 2	27	3.1%	8	1.7%	8	2.1%
Para 3 & above	6	0.7%	2	0.4%	1	0.3%

MODE OF ONSET OF LABOUR (FOR EACH BABY)

	1999		2004		2009	
Spontaneous	652	75.2%	341	73.4%	256	68.6%
Induced labour	215	24.8%	122	26.2%	115	30.8%
No information	0	0.0%	2	0.4%	2	0.5%

INDICATIONS FOR FORCEPS DELIVERY (For each baby) (may be more than 1)

	1999		2004		2009	
Prolonged second stage	387	44.4%	172	37.0%	145	38.9%
Fetal distress	280	32.1%	171	36.8%	117	31.4%
Maternal distress	70	8.1%	39	8.4%	12	3.2%
Maternal disease	17	2.0%	8	1.7%	6	1.6%
Obstetric complications	8	0.9%	2	0.4%	2	0.5%
Previous uterine scar	1	0.1%	1	0.2%	4	1.1%
Cord prolapse	1	0.1%	2	0.4%	1	0.3%
Others	73	8.3%	41	8.8%	84	22.5%

Missing data on indications for forceps delivery in 78 (9.0%) in 1999 and 22 (5.9%) in 2009

MATERNAL COMPLICATIONS (FOR EACH BABY)

	1999		2004		2009	
Postpartum haemorrhage	46	5.3%	24	5.2%	16	4.3%
Third degree tear	7	0.8%	2	0.4%	4	1.1%
MROP	-	-	5	1.1%	5	1.3%
Puerperal pyrexia	19	2.2%	4	0.9%	3	0.8%
Hysterectomy	0	0.0%	0	0.0%	0	0.0%
Rupture of uterus	1	0.1%	0	0.0%	0	0.0%
Maternal death	-	-	0	0.0%	0	0.0%
Preterm labour (<37 weeks)	70	8.1%	45	9.7%	33	8.8%
Singleton	*59*	*84.3%*	*34*	*75.6%*	*21*	*63.6%*
Multiple	*11*	*15.7%*	*11*	*24.4%*	*12*	*36.4%*
Episiotomy	-	-	419	90.1%	346	92.8%
Nulliparous	-	-	*352*	*84.0%*	*265*	*76.6%*
Multiparous	-	-	*67*	*16.0%*	*81*	*23.4%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	864	99.7%	462	99.4%	372	99.7%
Stillbirths	3	0.3%	3	0.6%	0	0.0%
Neonatal deaths	0	0.0%	0	0.0%	1	0.3%
Low birth weights (<2500 gm)	53	6.1%	37	8.0%	33	8.8%
Singleton	*40*	*75.5%*	*22*	*59.5%*	*23*	*69.7%*
Multiple	*13*	*24.5%*	*15*	*40.5%*	*10*	*30.3%*
Macrosomia (>4000 gm)	26	3.0%	14	3.0%	14	3.8%
Apgar score < 4 at 1 minute	4	0.5%	3	0.6%	2	0.5%
Apgar score < 4 at 5 minutes	0	0.0%	3	0.6%	1	0.3%
Birth trauma	22	2.5%	9	1.9%	5	1.3%

VAGINAL BREECH DELIVERY

The overall incidence of vaginal breech delivery dropped from 0.5% to 0.2%. The proportion of babies in multiple pregnancy ranged from 20.3% to 26.9% and about 95% were aftercoming babies. Nulliparity rate increased from 45.1% in 1999 to 70.4% in 2004, and dropped back to 47.8% in 2009. The rate of preterm delivery was 52.5%, which was compatible with the low birth weight (< 2500 gm) rate of 53.4% of all vaginal breech deliveries. The stillbirth rate was 14.9%, while neonatal mortality remained at around 6-7% which was higher than other modes of vaginal delivery. External cephalic version was not attempted in 64.6%, compared with 86.7% in 1999 and 78.7% in 2004.

	1999		2004		2009	
TOTAL INCIDENCE (BIRTHS)	232	0.5%	108	0.2%	161	0.2%
Singleton	185	79.7%	79	73.1%	123	76.4%
Multiple	47	20.3%	29	26.9%	38	23.6%
First baby in twin	*-*	*-*	*2*	*1.9%*	*2*	*1.2%*
Aftercoming baby	*-*	*-*	*27*	*25.0%*	*36*	*22.4%*

PARITY OF THE PARTURIENTS (For each baby)

	1999		2004		2009	
Para 0	112	48.2%	50	70.4%	77	47.8%
Para 1	86	37.1%	40	20.4%	66	41.0%
Para 2	22	9.5%	9	8.3%	13	8.1%
Para 3 & above	12	5.2%	9	8.3%	5	3.1%

EXTERNAL CEPHALIC VERSION

	1999		2004		2009	
ECV not attempted	201	86.7%	85	78.7%	104	64.6%
ECV successful	0	0.0%	0	0.0%	0	0.0%
ECV failed	3	1.3%	2	1.9%	0	0.0%
Missing/Irrelevant	28	12.0%	21	19.4%	57	35.4%

MODE OF ONSET OF LABOUR (each baby)

	1999		2004		2009	
Spontaneous onset	184	79.3%	76	70.4%	97	60.2%
Induced labour	42	18.1%	22	20.4%	28	17.4%
No labour	6	2.6%	10	9.3%	36	22.4%

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	12	5.2%	6	5.6%	4	2.5%
Third degree tear	0	0.0%	0	0.0%	0	0.0%
Puerperal pyrexia	4	1.7%	2	1.9%	1	0.6%
Preterm labour (<37 weeks)	81	34.9%	66	61.1%	84	52.5%
Singleton	*63*	*77.8%*	*47*	*71.2%*	*62*	*73.8%*
Multiple	*18*	*22.2%*	*19*	*28.8%*	*22*	*26.2%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	178	76.7%	75	69.4%	125	77.6%
Stillbirths	37	15.9%	26	24.1%	24	14.9%
Antepartum	-	-	*21*	*80.8%*	*20*	*83.3%*
Intrapartum	-	-	*1*	*3.8%*	*0*	*0.0%*
Undetermined	-	-	*4*	*15.4%*	*4*	*16.7%*
Neonatal deaths	17	7.4%	7	6.5%	12	7.4%
Low birth weight (<2500 gm)	113	48.7%	68	63.0%	86	53.4%
Singleton	*81*	*71.7%*	*48*	*70.6%*	*59*	*68.6%*
Multiple	*32*	*28.3%*	*20*	*29.4%*	*27*	*31.4%*
Macrosomia (>4000 gm)	0	0.0%	0	0.0%	3	1.9%
Apgar score < 4 at 1 minute	21	10.8%	30	27.8%	27	16.8%
Apgar score < 4 at 5 minutes	12	6.2%	26	24.1%	20	12.4%
Birth trauma	1	0.4%	0	0.0%	0	0.0%

CAESAREAN SECTION

The overall Caesarean section rate increased from 27.1% to 42.1%, over 80% were elective sections. An increase in classical Caesarean sections from 0.1% in previous years to 0.3% was also noted in 2009.

Previous uterine scar remained the most common indication for Caesarean section while social reasons previously being the fifth most common indication in 2004 became the second in 2009. Cephalo-pelvic disproportion, malpresentation/abnormal lie and failed induction were the other three commonest indications for Caesarean section.

The overall rate of Caesarean section for social reasons increased dramatically from 6.8% to 18.9%. The rate of social reasons as the sole indication increased from 5.2% (n=681) in 1999 to 8.2% (n=1230) in 2004 and 17.6% (n=5891) in 2009. Compared with 2004, more parturients were aged ≥35 (24.3% in 2004 and 27.7% in 2009), less parturients were nulliparous (86.8% in 2004 and 68.4% in 2009), and similar proportion of them were section before labour (85-86%). There was a significant increase in the proportion of non-Hong Kong residents from a quarter to 66% in the group of Caesarean section for social reason.

Caesarean section was associated with 0.1% hysterectomy rate and 0.01-0.03% maternal death ratio. Neonatal death rate was 0.1-0.2% while birth trauma occurred in 0.1-0.2%.

CAESAREAN SECTIONS (pregnancies)

	1999		2004		2009	
TOTAL PREGNANCIES	13149	27.1%	14938	30.4%	33557	42.1%
Singleton	12872	97.9%	14508	97.1%	32541	97.0%
Multiple	277	2.1%	430	2.9%	1016	3.0%
Twins	-	-	*422*	*98.1%*	*1002*	*98.6%*
Both babies	-	-	410	97.2%	997	99.5%
Second baby only	-	-	12	2.8%	5	0.5%
Triplets	-	-	*8*	*1.9%*	*14*	*1.4%*
All babies	-	-	7	87.5%	14	100%
Third baby only	-	-	1	12.5%	0	0.0%

CAESAREAN SECTIONS (births)

	1999		2004		2009	
TOTAL BIRTHS	13466	27.5%	15361	30.9%	34581	42.7%
Singleton	12872	95.6%	14509	94.5%	32541	94.1%
Multiple	594	4.4%	852	5.5%	2040	5.9%

PARITY OF THE PARTURIENTS

	1999		2004		2009	
Para 0	7972	60.6%	9099	60.9%	16302	48.6%
Para 1	4178	31.8%	4906	32.8%	15132	45.1%
Para 2	796	6.1%	789	5.3%	1869	5.6%
Para 3 & above	203	1.5%	144	1.0%	249	0.7%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	3825	29.1%	4023	26.9%	6731	20.1%
Induced labour	2096	15.9%	2256	15.1%	2854	8.5%
No labour	7227	55.0%	8659	58.0%	23969	71.4%

Missing data on mode of onset of labour in 1 (<0.05%) in 1999

INDICATIONS FOR CAESAREAN SECTIONS (There might be more than 1 indication)

	1999		2004		2009	
Previous uterine scar	3334	25.4%	3824	25.6%	11361	33.9%
Cephalopelvic disproportion	2233	17.0%	1937	13.0%	3137	9.3%
Malpresentation / abnormal lie	1730	13.2%	1847	12.4%	2672	8.0%
Fetal distress	1526	11.6%	1393	9.3%	1486	4.4%
No progress of labour	1167	8.9%	1023	6.8%	1156	3.4%
Social reasons	898	6.8%	1385	9.3%	6345	18.9%
Failed induction	720	5.5%	908	6.1%	1999	6.0%
Antepartum haemorrhage/PP	581	4.4%	726	4.9%	1229	3.7%
Contracted pelvis / unfavourable pelvis	573	4.4%	225	1.5%	313	0.9%
Suspected big baby	374	2.8%	241	1.6%	603	1.8%
Hypertension	373	2.8%	328	2.2%	640	1.9%
Elderly / infertility	352	2.7%	302	2.0%	464	1.4%
Intrauterine growth retardation	251	1.9%	257	1.7%	430	1.3%
Multiple pregnancy	243	1.8%	391	2.6%	975	2.9%
Diabetes mellitus (including IGT)	205	1.6%	126	0.8%	228	0.7%
Failed instrumental delivery	132	1.0%	81	0.5%	75	0.2%
Bad obstetric history	99	0.8%	63	0.4%	113	0.3%
Genital tumour / anomaly	69	0.5%	53	0.4%	88	0.3%
Maternal diseases	68	0.5%	66	0.4%	121	0.4%
Cord prolapse / cord presentation	37	0.3%	52	0.3%	66	0.2%
Others	1613	12.3%	2399	16.1%	4251	12.7%

Missing data on indication in 153 (1.2%) in 1999 and 1020 (2.9%) in 2009.

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	83	0.6%	94	0.6%	2331	6.9%
Uterine rupture	3	0.02%	4	0.03%	6	0.02%
Hysterectomy	16	0.1%	18	0.1%	30	0.1%
Internal iliac artery ligation	-	-	3	0.02%	2	0.006%
Uterine artery embolisation	-	-	-	-	15	0.04%
Maternal death	4	0.03%	2	0.01%	2	0.006%
Puerperal pyrexia	552	4.2%	157	1.1%	269	0.8%
Preterm labour (<37 weeks)	1063	8.1%	1369	9.2%	2449	7.3%
Singleton	*928*	*87.3%*	*1144*	*83.6%*	*1962*	*80.1%*
Multiple	*122*	*13.7%*	*225*	*16.4%*	*487*	*19.9%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	13423	99.7%	15320	99.7%	34532	99.9%
Stillbirths	21	0.2%	13	0.1%	23	0.1%
Neonatal deaths	17	0.1%	28	0.2%	26	0.1%
Low birth weight (<2500 gm)	1225	9.1%	1582	10.3%	2801	8.1%
Singleton	*881*	*71.9%*	*1060*	*67.0%*	*1669*	*59.6%*
Multiple	*344*	*28.1%*	*522*	*33.0%*	*1132*	*40.4%*
Macrosomia (>4000 gm)	743	5.5%	707	4.6%	1029	3.0%
Apgar score < 4 at 1 minute	105	0.8%	104	0.7%	97	0.3%
Apgar score < 4 at 5 minutes	11	0.1%	24	0.2%	29	0.1%
Birth trauma	24	0.2%	17	0.1%	35	0.1%

Missing data on fetal outcome in 5 (<0.05%) in 1999

SECOND STAGE CAESAREAN SECTION

Among the 34,581 Caesarean deliveries, 268 (0.8%) were performed at the second stage of labour which accounted for 0.77% (249/32541) and 0.93% (19/2040) of Caesarean section in singleton and multiple pregnancy respectively. Cephalo-pelvic disproportion (39.7%) and failed instrumental delivery (21.4%) were the commonest indications for second stage Caesarean section. Besides maternal complications, the rates of fetal complications including low Apgar scores and birth trauma were higher in second stage Caesarean section.

INDICATIONS FOR CAESAREAN SECTIONS (There might be more than 1 indication)

	Non-second stage CS		Second Stage CS	
Previous uterine scar	11315	34.0%	23	8.8%
Cephalopelvic disproportion	2929	8.8%	104	39.7%
Malpresentation / abnormal lie	2642	7.9%	30	11.5%
Fetal distress	1457	4.4%	29	11.1%
No progress of labour	1133	3.4%	23	8.8%
Social reasons	6344	19.1%	1	0.4%
Failed induction	1998	6.0%	1	0.4%
Antepartum haemorrhage/PP	1228	3.7%	1	0.4%
Contracted pelvis / unfavourable pelvis	312	0.9%	1	0.4%
Suspected big baby	603	1.8%	0	0.0%
Hypertension	640	1.9%	0	0.0%
Elderly / infertility	464	1.4%	0	0.0%
Intrauterine growth retardation	430	1.3%	0	0.0%
Multiple pregnancy	959	2.9%	16	6.1%
Diabetes mellitus (including IGT)	226	0.7%	2	0.8%
Failed instrumental delivery	19	0.06%	56	21.4%
Bad obstetric history	113	0.3%	0	0.0%
Genital tumour / anomaly	87	0.3%	1	0.4%
Maternal diseases	120	0.4%	1	0.4%
Cord prolapse / cord presentation	66	0.2%	0	0.0%
Others	4199	12.6%	52	19.8%

MATERNAL COMPLICATIONS

	Non-second stage CS		Second Stage CS	
Postpartum haemorrhage	2282	6.7%	49	18.3%
Uterine rupture	6	0.02%	0	0.0%
Hysterectomy	26	0.1%	4	1.5%
Internal iliac artery ligation	2	0.006%	0	0.0%
Uterine artery embolisation	14	0.04%	1	0.4%
Maternal death	2	0.006%	0	0.0%
Puerperal pyrexia	264	0.8%	5	1.9%
Preterm labour (<37 weeks)	2423	7.3%	26	9.7%
Singleton	*1946*	*80.1%*	*16*	*61.5%*
Multiple	*477*	*19.9%*	*10*	*38.5%*

FETAL OUTCOME

	Non-second stage CS		Second Stage CS	
Alive at 28 days	34264	99.9%	268	100%
Stillbirths	23	0.1%	0	0.0%
Neonatal deaths	26	0.1%	0	0.0%
Low birth weight (<2500 gm)	2779	8.1%	22	8.2%
Singleton	*1658*	*59.6%*	11	50.0%
Multiple	*1121*	*40.4%*	11	50.0%
Macrosomia (>4000 gm)	1016	3.0%	13	4.9%
Apgar score < 4 at 1 minute	91	0.3%	6	2.2%
Apgar score < 4 at 5 minutes	28	0.1%	1	0.4%
Birth trauma	29	0.1%	6	2.2%

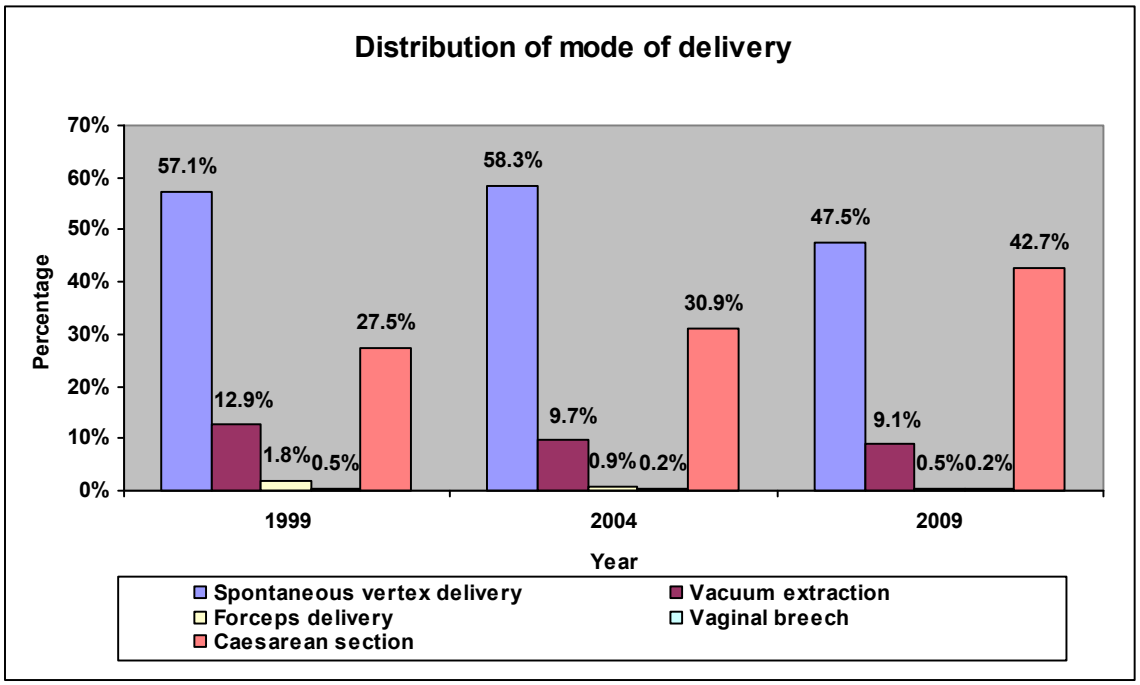

Figure O6 – Distribution of mode of delivery

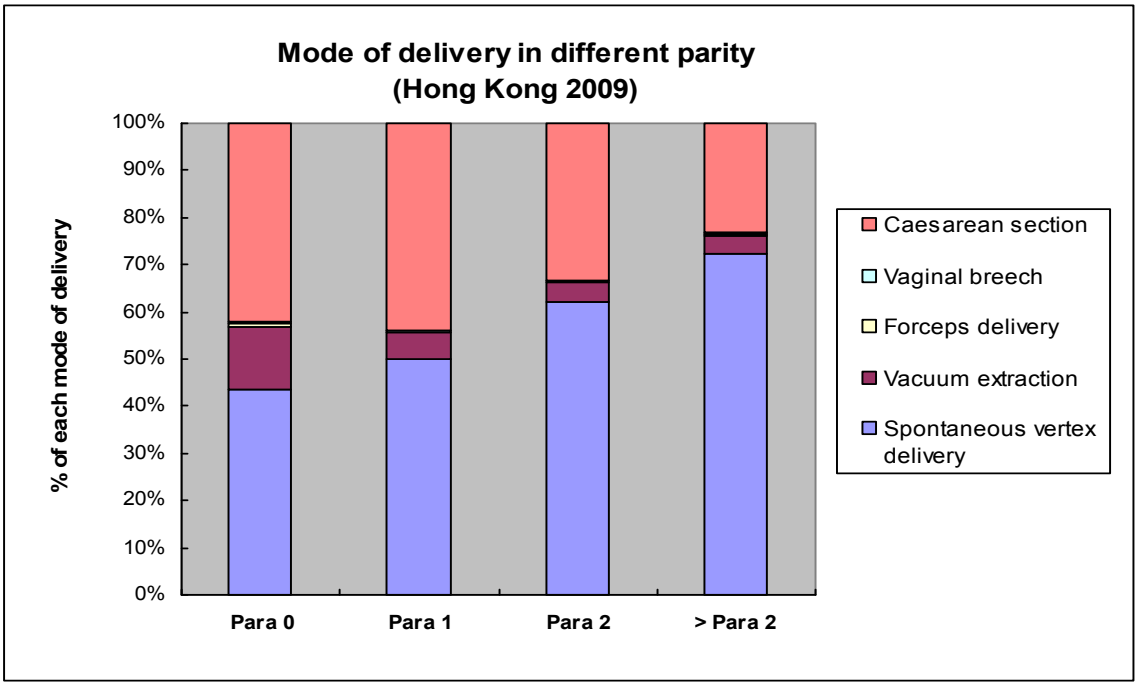

Figure O7 – Mode of delivery in different parity

POSTPARTUM HAEMORRHAGE

In previous audits, the occurrence of postpartum haemorrhage (PPH) was set as null by default and the incidence of PPH was calculated when cause(s) of PPH was reported. In 2009, the amount of postpartum haemorrhage was categorized and the incidence was calculated using the amount of blood loss > 500 ml as defined since the first audit in 1994. The incidence of PPH in 2009 was 4.2%, which was higher than previous audits, and severe PPH (blood loss > 1000 ml) occurred in 0.38%. Among those with PPH, the causes of PPH were reported in 1378 (41.2%) cases only, suggesting that there was a significant under-reporting in the previous audit. The overall transfusion rate in those with PPH was 7.9%. For those with mild PPH, the transfusion rate was 4.0% while that for severe PPH was 25.7%.

Uterine atony remained the most common cause and the incidence 58.5%. The incidence of perineal tear decreased from 14% to 9.2%. Hysterectomy rate was ranged from 0.8% to 1.1% in 1999-2009. There was no case of internal iliac ligation being reported. A total of 24 cases of uterine artery embolisation were performed and 23 of them were performed in cases with postpartum haemorrhage. Data of the latter procedure was first collected in the current audit. There was one maternal death attributed to hepatic failure with severe postpartum haemorrhage reported in 2009.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	1510	3.1%	1295	2.6%	3349	4.2%
Mild PPH (500 -1000 ml)	-	-	-	-	*2746*	*82.0%*
Severe PPH (> 1000 ml)	-	-	-	-	*603*	*18.0%*
Transfusion	-	-	-	-	*264*	*7.9%*
Mild PPH	-	-	-	-	*109*	*41.3%*
Severe PPH	-	-	-	-	*155*	*58.7%*

PREGNANCY

	1999		**2004**		**2009**	
Singleton	1487	98.5%	1274	98.4%	3137	93.7%
Multiple	23	1.5%	21	1.6%	212	6.3%
After vaginal delivery	1427	94.5%	1201	92.7%	1011	30.2%

Missing data on postpartum haemorrhage in 32 (0.1%)in 1999

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Para 0	737	48.8%	719	55.5%	1663	49.7%
Para 1	618	40.9%	477	36.8%	1389	41.5%
Para 2	125	8.3%	80	6.2%	236	7.0%
Para 3 & above	30	2.0%	19	1.5%	61	1.8%

CAUSES OF PPH (there might be more than 1 cause for each case)

	1999		2004		2009	
Uterine atony	1025	67.9%	945	73.0%	807	58.5%
Perineal tear	211	14.0%	145	11.2%	127	9.2%
Retained products of gestation	84	5.6%	91	7.0%	93	6.7%
Vaginal tear	77	5.1%	39	3.0%	44	3.2%
Cervical tear	44	2.9%	33	2.5%	45	3.2%
Genital haematoma	34	2.3%	25	1.9%	28	2.0%
Disseminated intravascular coagulopathy	10	0.7%	12	0.9%	17	1.2%
Rupture of uterus	4	0.3%	1	0.1%	5	0.4%
Acute inversion of uterus	3	0.2%	3	0.2%	0	0.0%
Others	151	10.0%	102	7.9%	213	15.4%

Causes of PPH was recorded in 1378 cases only (41.2%)in 2009

ASSOCIATED ANTENATAL COMPLICATIONS

	1999		2004		2009	
Previous uterine scar	125	8.3%	77	5.9%	764	22.8%
Hypertension	56	3.7%	59	4.6%	161	4.8%
Antepartum haemorrhage	54	3.6%	47	3.6%	272	8.1%
Multiple pregnancy	23	1.5%	21	1.6%	212	6.3%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	1116	73.9%	892	68.9%	1133	33.8%
Induced labour	345	22.9%	349	26.9%	803	24.0%
No labour	49	3.2%	54	4.2%	1411	42.1%

AUGMENTATION OF LABOUR

	1999		2004		2009	
Augmented labour	576	38.1%	302	23.3%	1133	33.8%

DURATION OF LABOUR

	1999		2004		2009	
< 2 hours	133	8.8%	57	4.7%	1711	51.1%
2 - 3 hours	368	24.4%	298	24.6%	383	11.4%
4 - 5 hours	363	24.0%	314	25.9%	315	9.4%
6 - 7 hours	212	14.0%	189	15.6%	206	6.2%
8 - 9 hours	163	10.8%	145	12.0%	173	5.2%
10 - 11 hours	105	7.0%	83	6.9%	125	3.7%
12 - 13 hours	72	4.8%	60	5.0%	89	2.7%
> 13 hours	94	6.2%	65	5.4%	113	3.4%

Missing data on duration of labour in 234 cases in 2009

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	1083	70.6%	957	72.7%	801	23.9%
Vacuum extraction	306	19.9%	223	16.9%	190	5.7%
Forceps delivery	46	3.0%	24	1.8%	16	0.5%
Vaginal breech delivery	12	0.8%	6	0.5%	4	0.1%
LSCS before labour	52	3.4%	63	4.8%	906	27.1%
LSCS after labour	35	2.3%	42	3.2%	1364	40.7%
Classical Caesarean section	-	-	1	0.1%	61	1.8%

Missing data on mode of delivery in 1 case in 1999 and 7 in 2009

OTHER MATERNAL POST-PARTUM COMPLICATIONS

	1999		2004		2009	
Hysterectomy	16	1.1%	11	0.8%	35	1.0%
Internal iliac artery ligation	-	-	3	0.2%	2	0.1%
Uterine artery embolisation	-	-	-	-	23	0.7%
Manual removal of placenta	-	-	106	8.2%	142	4.2%
Maternal death	1	0.1%	1	0.1%	1	0.03%

PUERPERAL PYREXIA

The incidence of puerperal pyrexia decreased from 2.0% to 0.5%. It was associated with Caesarean section in 63.4%; about 23% of which were Caesarean sections after labour. Duration of labour was 12 hours or more in 8%. The exact causes of puerperal pyrexia were not explored in the audit and the possible associated conditions listed might not necessarily be the cause of the fever.

	1999		2004		2009	
TOTAL INCIDENCE	945	2.0%	294	0.6%	424	0.5%
Singleton	*920*	*97.4%*	*281*	*95.5%*	*402*	*94.8%*
Multiple	*25*	*2.6%*	*13*	*4.4%*	*22*	*5.2%*

PARITY OF THE PATURIENTS

	1999		2004		2009	
Para 0	581	61.5%	202	68.7%	282	66.5%
Para 1	279	29.5%	70	23.8%	113	26.7%
Para 2	65	6.9%	17	5.8%	28	6.6%
Para 3 & above	20	2.1%	5	1.7%	1	0.2%

ASSOCIATED CONDITIONS OF POSTPARTUM PYREXIA (may have more than 1 cause)

	1999		2004		2009	
Manual removal of placenta	80	8.5%	15	5.1%	10	2.4%
Wound infection	48	5.1%	19	6.5%	16	3.8%
Urinary tract infection	27	2.9%	14	4.8%	17	4.0%
Genital tract infection	11	1.2%	4	1.4%	8	1.9%
Breast problems	5	0.5%	2	0.7%	1	0.2%
Hysterectomy	5	0.5%	0	0.0%	0	0.0%
Third degree tear	1	0.1%	0	0.0%	2	0.5%

DURATION OF LABOUR

	1999		2004		2009	
< 2 hours	311	33.0%	7	2.4%	199	46.9%
2 - 3 hours	117	12.4%	25	8.5%	35	8.3%
4 - 5 hours	119	12.6%	34	11.6%	43	10.2%
6 - 7 hours	124	13.0%	26	8.8%	30	7.1%
8 - 9 hours	84	8.9%	27	9.2%	35	8.3%
10 - 11 hours	74	7.8%	30	10.2%	31	7.3%
12 - 13 hours	44	4.7%	18	6.1%	11	2.6%
> 13 hours	72	7.6%	16	5.4%	23	5.4%

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	296	30.5%	102	33.1%	124	29.2%
Vacuum extraction	98	10.1%	32	10.4%	27	6.4%
Forceps delivery	19	2.0%	4	1.3%	3	0.7%
Vaginal breech delivery	4	0.4%	2	0.6%	1	0.2%
LSCS before labour	195	20.1%	63	20.5%	164	38.7%
LSCS after labour	357	36.8%	105	34.1%	99	23.3%
Classical Caesarean section	-	-	0	0.0%	6	1.4%

OTHER MATERNAL COMPLICATIONS

	1999		2004		2009	
Hysterectomy	5	0.5%	0	0.0%	0	0.0%
Internal iliac artery ligation	-	-	0	0.0%	0	0.0%
Uterine artery embolisation	-	-	-	-	0	0.0%
Maternal death	-	-	0	0.0%	0	0.0%

PERINEAL LACERATION

The incidence of third degree laceration of the perineum was 0.08% in 2009, similar to that in 1999 but increased compared with 0.03% in 2004. Half of the cases occurred following spontaneous vaginal delivery. The risk of third degree tear after spontaneous vaginal delivery was similar with the incidence of 0.07% in 1999 and 0.09% in 2009. However, there was increase in the risk of third degree tear after vacuum extraction increased from 0.2% in 1999 and 0.06% in 2004 to 0.4% in 2009, and that after forceps delivery increased from 0.8% in 1999 and 0.4% on 2004 to 1.1% in 2009.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	39	0.1%	16	0.03%	67	0.08%
Singleton	*39*	*100.0%*	*16*	*100.0%*	*66*	*98.5%*
Multiple	*0*	*0.0%*	*0*	*0.0%*	*1*	*1.5%*

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Nulliparous	30	76.9%	6	37.5%	49	73.1%
Multiparous	9	23.1%	10	62.5%	18	26.9%

DURATION OF LABOUR

	1999		**2004**		**2009**	
< 2 hours	0	0.0%	2	12.5%	3	4.5%
2 - 3 hours	10	25.6%	4	25.0%	12	17.9%
4 - 5 hours	8	20.5%	2	12.5%	13	19.4%
6 - 7 hours	7	17.9%	3	18.8%	12	17.9%
8 - 9 hours	3	7.7%	4	25.0%	10	15.0%
10 - 11 hours	5	12.8%	1	6.3%	6	9.0%
12 - 13 hours	1	2.6%	0	0.0%	4	6.0%
> 13 hours	2	5.1%	0	0.0%	4	6.0%

MODE OF DELIVERY FOR EACH BABY

	1999		**2004**		**2009**	
Spontaneous vertex delivery	19	48.8%	11	68.8%	34	50.7%
Vacuum extraction	13	33.3%	3	18.8%	29	43.3%
Forceps delivery	7	17.9%	2	12.5%	4	6.0%

OTHER ASSOCIATED CONDITIONS

	1999		**2004**		**2009**	
Postpartum haemorrhage	4	10.3%	1	6.3%	8	11.9%
Rupture of uterus	1	2.6%	0	0.0%	0	0.0%
Hysterectomy	1	2.6%	0	0.0%	0	0.0%
Macrosomia	-	-	3	18.8%	2	3.0%

UTERINE RUPTURE

The incidence of uterine rupture remained at 0.01% and majority was associated with previous uterine scar. It was associated with postpartum haemorrhage in 66.7% of cases and none of the cases required a hysterectomy. There was no maternal or perinatal death. In contrast to 2004 with all 5 cases of uterine rupture after labour, half of the cases had spontaneous rupture before labour in 2009.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	7	0.01%	5	0.01%	6	0.01%
Nulliparous	*0*	*0.0%*	*3*	*60.0%*	*1*	*16.7%*
Multiparous	*7*	*100.0%*	*2*	*40.0%*	*5*	*83.3%*

ASSOCIATED CONDITIONS

	1999		**2004**		**2009**	
Previous uterine scar	7	100.0%	2	40.0%	5	83.3%
Postpartum haemorrhage	*4*	57.1%	1	20.0%	4	66.7%
Hysterectomy	3	42.9%	0	0.0%	0	0.0%

MODE OF ONSET OF LABOUR

	1999		**2004**		**2009**	
Spontaneous	6	85.7%	3	60.0%	3	50.0%
Induced labour	0	0.0%	2	40.0%	0	0.0%
No labour	1	14.3%	0	0.0%	3	50.0%

AUGMENTATION OF LABOUR

	1999		**2004**		**2009**	
Augmented labour	1	14.9%	1	20.0%	0	0.0%

MODE OF DELIVERY

	1999		**2004**		**2009**	
Vacuum extraction	3	42.9%	1	20.0%	0	0.0%
Forceps delivery	1	14.2%	0	0.0%	0	0.0%
Caesarean section	3	42.9%	4	80.0%	6	100%
Others/Unknown	0	0.0%	0	0.0%	0	0.0%

FETAL OUTCOME

	1999		**2004**		**2009**	
Alive at 28 days	7	100.0%	5	100.0%	6	100%
Stillbirth	0	0.0%	0	0.0%	0	0.0%
Neonatal death	0	0.0%	0	0.0%	0	0.0%

HYSTERECTOMY

The incidence of hysterectomy after delivery was similar at 0.04% to 0.06%. The risk of hysterectomy in the presence of placenta praevia or previous uterine scar was similar to previous audits with the rate of 2.6% and 0.2% respectively. The proportion of hysterectomy preceded by a Caesarean section occurred in three-quarter of the cases. There was one maternal death in this group in 2004, but none in the previous audits and 2009.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	29	0.06%	21	0.04%	40	0.05%
Nulliparous	*6*	*20.7%*	*4*	*19.0%*	*5*	*12.5%*
Multiparous	*23*	*79.3%*	*17*	*81.0%*	*35*	*87.5%*

ASSOCIATED CONDITIONS

	1999		**2004**		**2009**	
Postpartum haemorrhage	16	55.2%	11	52.4%	35	87.5%
Antepartum haemorrhage	11	37.9%	9	42.9%	14	35.0%
Placenta praevia	*7*	*63.6%*	*9*	*100%*	*12*	*85.7%*
Unknown origin	*3*	*27.3%*	*0*	*0.0%*	*2*	*14.3%*
Placental abruptio	*1*	*9.1%*	*0*	*0.0%*	*0*	*0.0%*
Previous uterine scar	16	55.2%	6	28.6%	21	52.5%
Internal iliac artery ligation	-	-	2	9.5%	1	2.5%
Uterine artery embolisation	-	-	-	-	8	20.0%

MODE OF ONSET OF LABOUR

	1999		**2004**		**2009**	
Spontaneous	9	85.7%	7	33.3%	10	25.0%
Induced labour	7	0.0%	3	14.3%	6	15.0%
No labour	13	14.3%	11	52.4%	24	60.0%

AUGMENTATION OF LABOUR

	1999		**2004**		**2009**	
Augmented labour	5	17.2%	2	9.5%	6	15.0%

MODE OF DELIVERY

	1999		**2004**		**2009**	
Vaginal delivery	*11*	37.9%	3	14.3%	5	12.5%
Spontaneous	*7*	*24.1%*	*3*	*12.5%*	*4*	*10.0%*
Vacuum extraction	*4*	*13.8%*	*0*	*0.0%*	*1*	*2.5%*
Forceps delivery	*0*	*0.0%*	*0*	*0.0%*	*0*	*0.0%*
Caesarean delivery	18	62.1%	18	85.7%	30	75.0%
LSCS before labour	*-*	*-*	*8*	*38.1%*	*10*	*25.0%*
LSCS after labour	*-*	*-*	*7*	*33.3%*	*13*	*32.5%*
Classical Caesarean section	*-*	*-*	*3*	*14.3%*	*7*	*17.5%*
Others	-	-	-	-	5	12.5%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	29	100.0%	23	95.8%	42	100%
Stillbirth	0	0.0%	1	4.2%	0	0.0%
Neonatal death	0	0.0%	0	0.0%	0	0.0%

INFORMATION ABOUT BABY

DISTRIBUTION OF GESTATIONAL AGE AT DELIVERY AND THE RESPECTIVE MEAN BIRTH WEIGHTS

The mean birth weight for all babies in 2009 was 3149 (SD 471) gm and that of all term babies (≥ 37 weeks) was 3156 (SD 453) gm, both were similar to the previous audits. The mean birth weight for all singleton term babies was 3173 (SD 448) gm. The mean birth weight increased with gestation except beyond 41 weeks and the magnitude of increase was largest between 32 and 37 weeks.

	1999			**2004**			**2009**		
Gestation in weeks	No.	% of total deliveries	Mean birth weight (gm)	No.	% of total deliveries	Mean birth weight (gm)	No.	% of total deliveries	Mean birth weight (gm)
> 42	256	0.5%	3264	244	0.5%	3280	46	0.06%	3267
42	939	1.9%	3455	430	0.9%	3434	165	0.2%	3409
41	202	10.6%	3452	4800	9.7%	3455	5031	6.2%	3449
40	11025	22.5%	3363	10468	21.2%	3362	14007	17.3%	3357
39	13142	26.9%	3249	13053	26.3%	3245	20063	24.8%	3243
38	10897	22.3%	3129	11942	24.1%	3124	25347	31.3%	3138
37	4018	8.2%	2947	4972	10.0%	2938	10386	12.8%	2967
36	1319	2.7%	2700	1526	3.1%	2723	2606	3.2%	2718
35	605	1.2%	2497	696	1.4%	2464	1076	1.3%	2481
34	363	0.7%	2497	415	0.8%	2262	646	0.8%	2251
33	212	0.4%	2064	238	0.5%	2046	314	0.4%	1984
32	139	0.3%	1840	177	0.4%	1867	223	0.3%	1773
31	97	0.2%	1684	111	0.2%	1632	143	0.2%	1669
30	83	0.2%	1613	98	0.2%	1562	117	0.1%	1495
29	69	0.1%	1450	63	0.1%	1308	82	0.1%	1390
28	48	0.1%	1323	64	0.1%	1234	50	0.1%	1348
27	44	0.1%	1130	50	0.1%	1091	59	0.1%	962
26	27	0.1%	1017	47	0.1%	941	28	0.03%	776
< 26	156	0.3%	1118	84	0.2%	1001	108	0.1%	682

Missing data on gestation in 277 (0.6%) in 1999, 178 (0.4%) in 2004 and 393 (0.5%)in 2009.

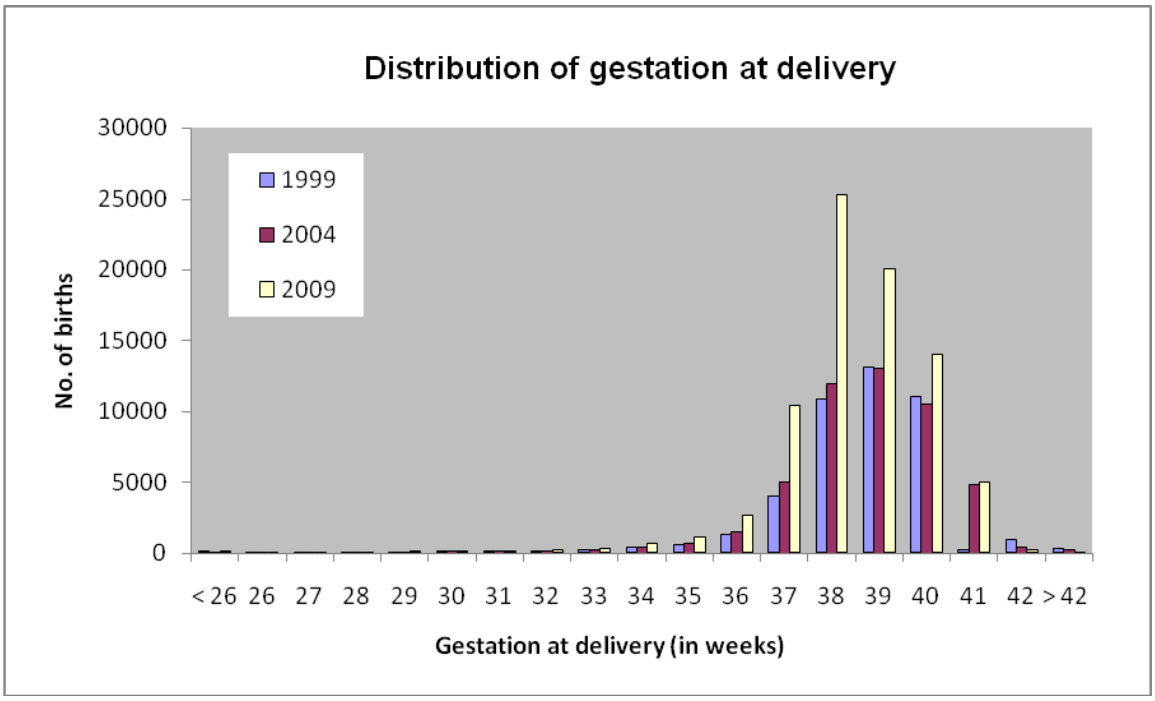

Figure O8 – Distribution of gestation at delivery

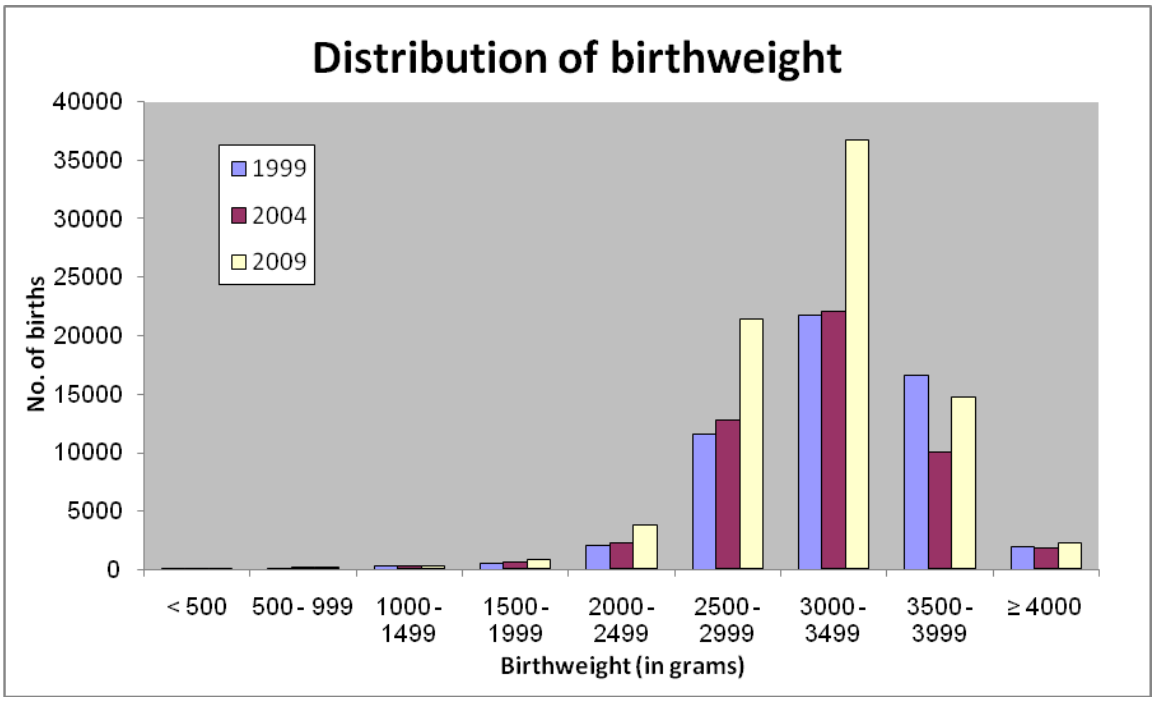

Figure O9 – Distribution of birth weight at delivery

FETAL OUTCOME WITH RESPECT TO GESTATION

As in previous audits, more than 99% of those babies born ≥ 33 weeks survived for at least 28 days. For those born < 26 weeks, about 57% survived for at least 28 days and the neonatal death rate was 22.8% in 1999, 23.8% in 2004 and 25% in 2009.

Gestation	Alive at 28 days		Stillbirth		Neonatal death		Total
in weeks	No.	%	No.	%	No.	%	
≥ 42	211	100.0%	0	0.0%	0	0.0%	211
37 - 41	74773	99.9%	38	0.05%	23	0.03%	74834
33 - 36	4595	99.0%	36	0.8%	11	0.2%	4642
29 - 32	525	92.9%	32	5.7%	8	1.4%	565
26 - 28	106	77.4%	23	16.8%	8	5.8%	137
< 26	62	57.4%	19	17.6%	27	25.0%	108

Missing data on gestation in 411 (0.5%)

SURVIVAL RATES WITH RESPECT TO BIRTH WEIGHTS

For those live births with birth weight < 1 kg, the survival rate increased from 76.2% in 1999 to 79.2% in 2004 and 80.2% in 2009 irrespective of any major congenital anomalies. For those live births with birth weight ≥ 1 kg, the survival rate was 99.9%.

Birth weights	Born alive			Born alive without major anomalies		
	Total	Survived at 28 days		Total	Survived at 28 days	
< 500 gm	28	22	78.6%	27	21	77.8%
500 - 999 gm	139	112	80.6%	137	111	81.0%
1000 - 1499 gm	296	286	96.6%	292	285	97.6%
1500 - 1999 gm	803	800	99.6%	799	797	99.7%
2000 - 2499 gm	3733	3725	99.8%	3711	3706	99.9%
2500 - 2999 gm	21430	21419	99.9%	21372	21364	100.0%
3000 - 3499 gm	36737	36729	100.0%	36668	36661	100.0%
3500 - 3999 gm	14723	14721	100.0%	14693	14691	100.0%
≥ 4000 gm	2262	2260	99.9%	2255	2253	99.9%
Total	**80151**	**80074**	**99.9%**	**79954**	**79889**	**99.9%**

Missing data on birth weight in 610 (0.75%)

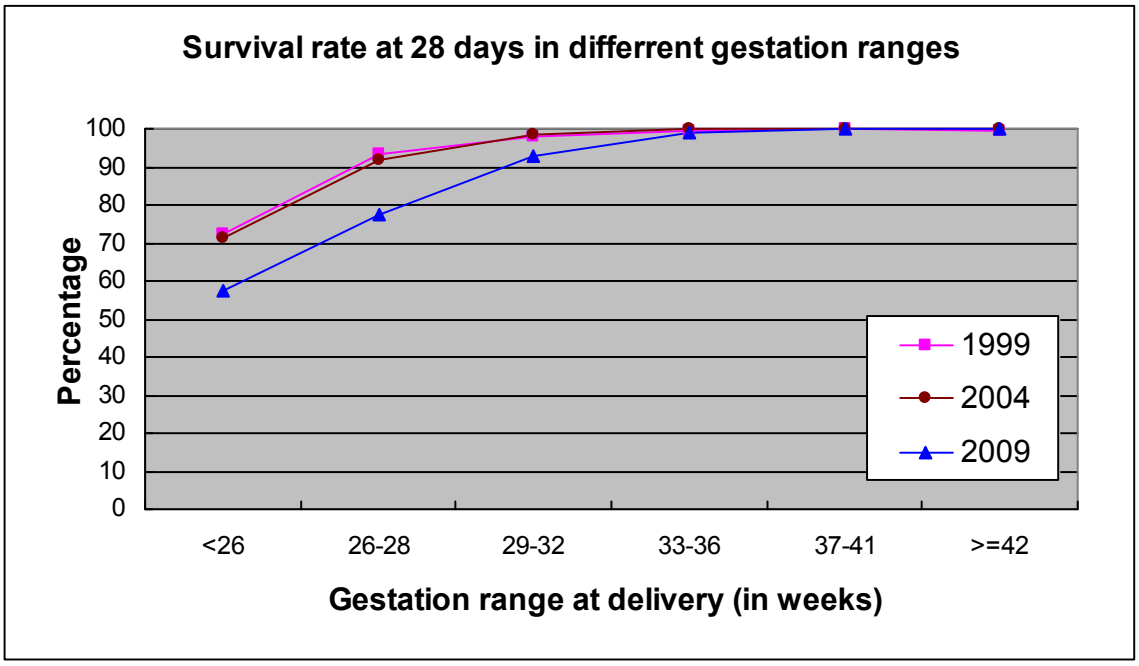

Figure O10 – Survival rate at 28 days of all live births in different gestation ranges

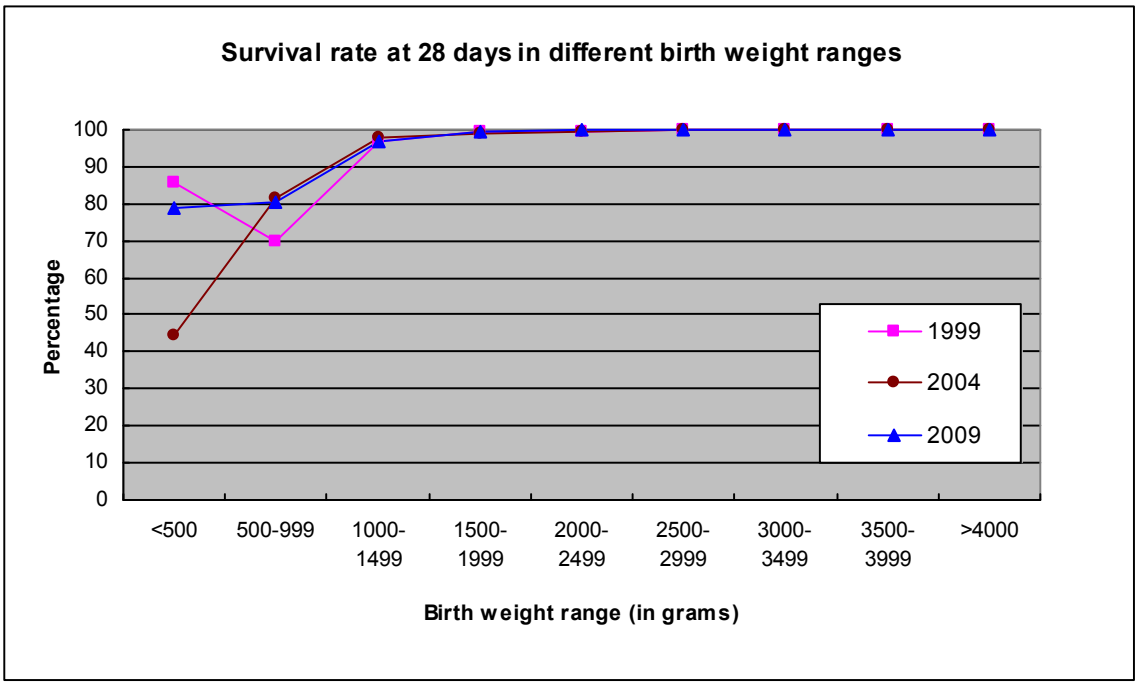

Figure O11 – Survival rate at 28 days of all live births in different birth weight ranges

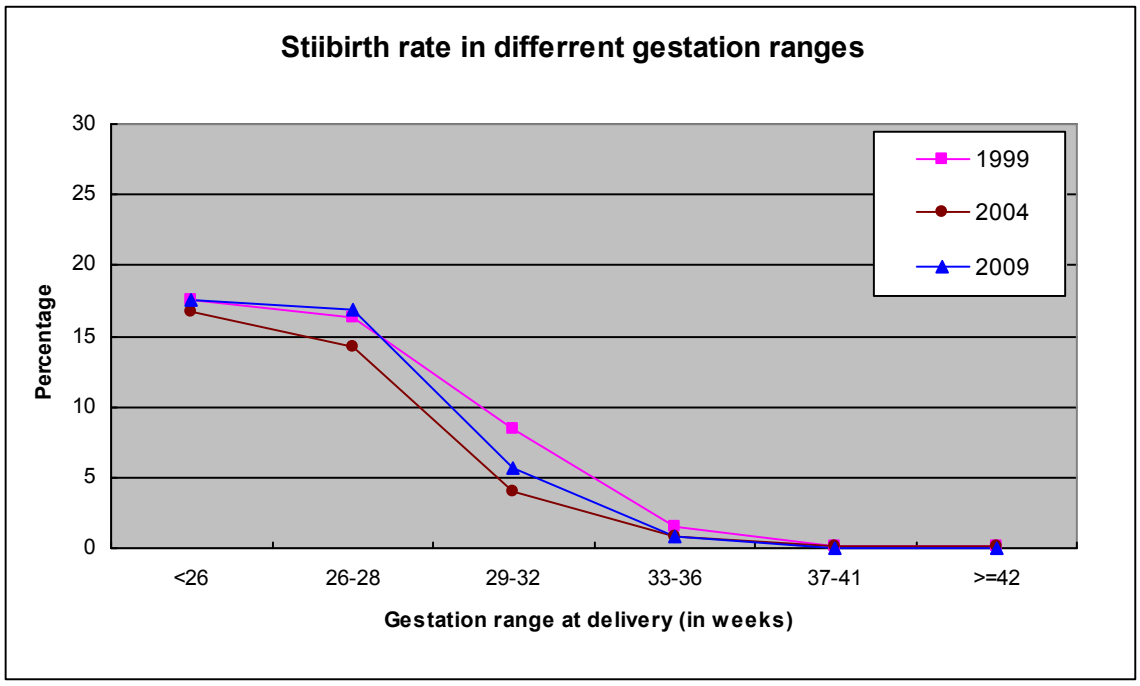

Figure O12 – Stillbirth rate of all births in different gestation ranges

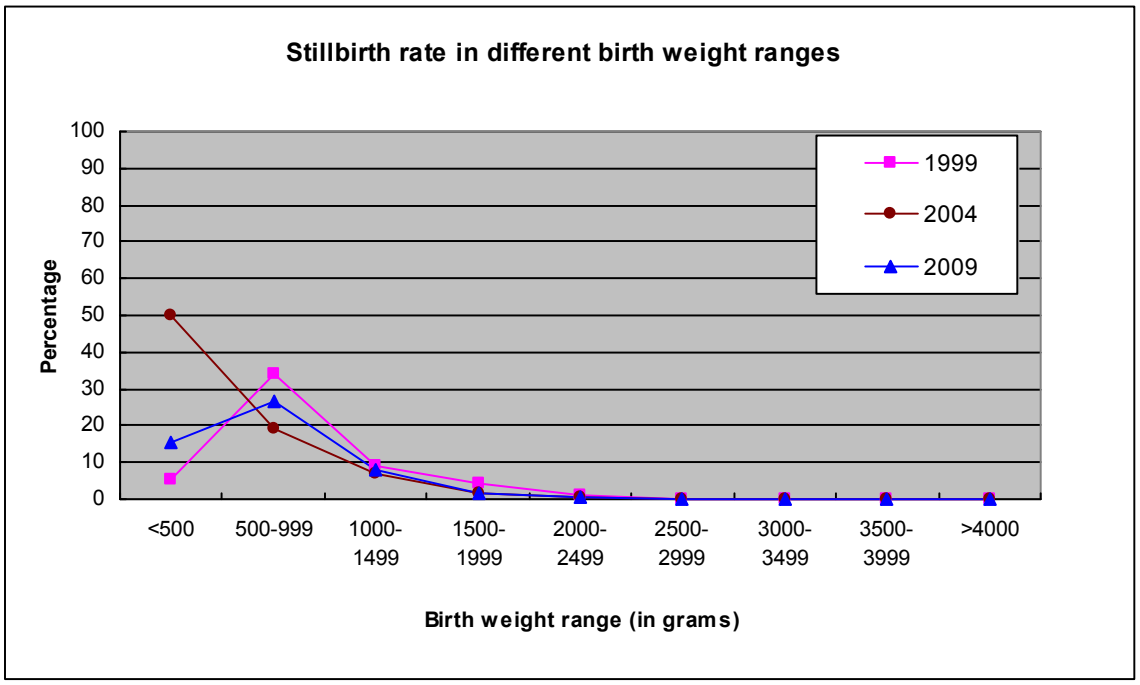

Figure O13 – Stillbirth rate of all births in different birth weight ranges

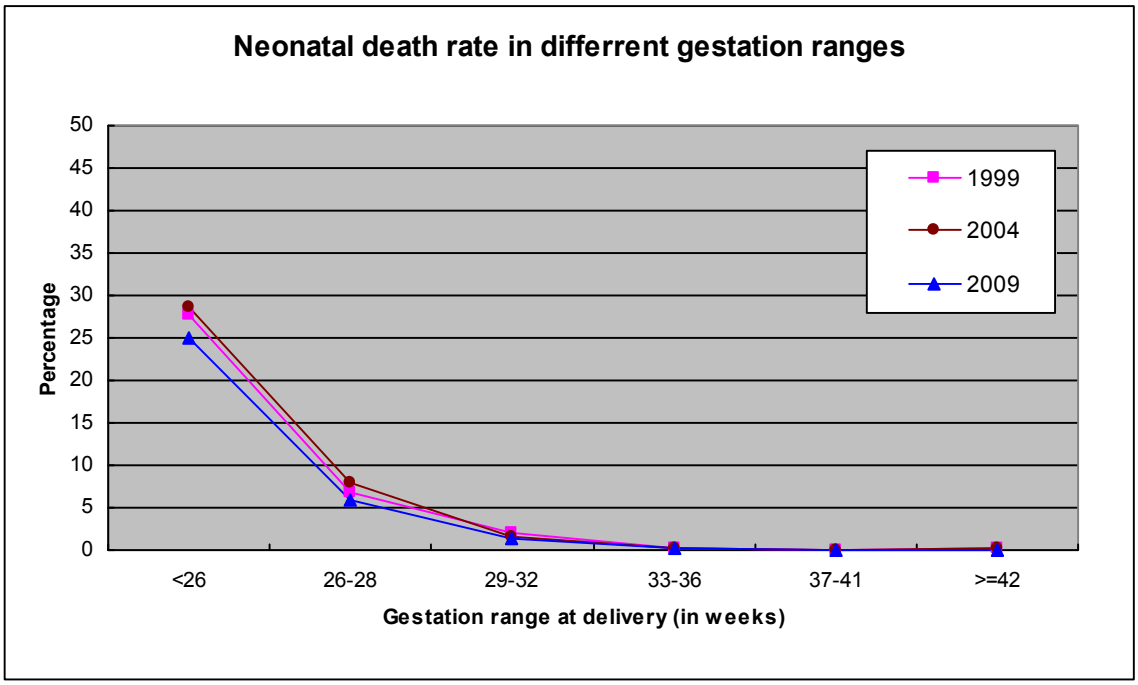

Figure O14 – Neonatal death rate of all live births in different gestation ranges

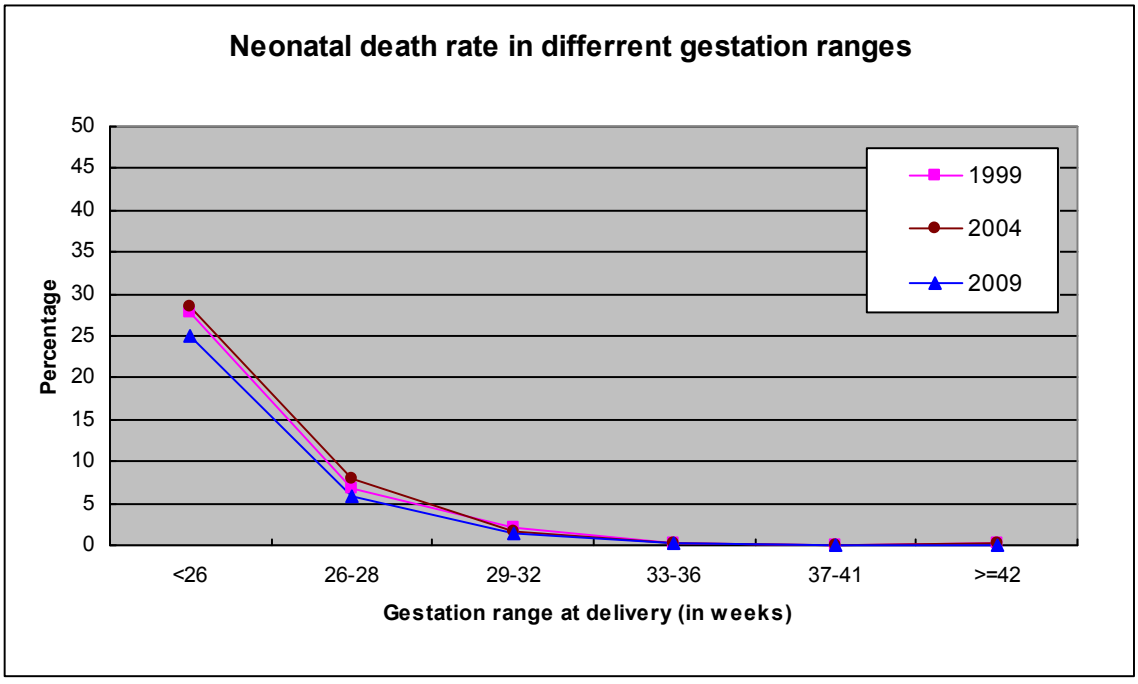

Figure O15 – Neonatal death rate of all live births in different birth weight ranges

INFANTS BORN WITH CONGENITAL ANOMALIES

Congenital anomaly was reported only if it was of major significance and apparent at or soon after birth. The overall incidence decreased from 0.8% to 0.3%. This might be related to the implementation and improved availability of routine morphology scan, however the possibility of under-reporting could not be excluded. Maternal age of 35 years or more, which constituted 31.6% (28% in 1999 and 24.2% in 2004) of all the parturients, was associated with 36.3% of the cases. This compared with 35% in 1999 and 25.3% in 2004. The rates of preterm delivery (< 37 weeks) and low birth weight (< 2500 gm) were 19.2%. The corresponding rates in 1999 were, 21.3% and 25.1% in 1999 while the rates in 2004 were 12.8% and 16.2%. The corresponding figures for all deliveries in 2009 were 6.0% and 6.4% respectively. The stillbirth rate was 3.4% and the neonatal death rate was 5.9%. These were 19 and 59 times higher than the overall figures respectively. The corresponding rates in 1999 were 4.9% and 5.6% while the corresponding rates in 2004 were 2.9% and 6.2%.

	1999		**2004**		**2009**	
TOTAL INCIDENCE	408	0.8%	241	0.5%	204	0.3%
Singleton	*387*	*94.9%*	*234*	*97.1%*	*192*	*94.1%*
Multiple	*21*	*5.1%*	*7*	*2.9%*	*12*	*5.9%*

PARITY OF THE PATURIENTS

	1999		**2004**		**2009**	
Nulliparous	187	46.2%	145	60.2%	98	48%
Multiparous	218	53.8%	96	39.8%	106	52%

AGE OF THR PATURIENS

	1999		**2004**		**2009**	
< 20 years old	2	0.5%	2	0.8%	0	0.0%
20 - 24 years	29	7.2%	19	8.0%	7	3.4%
25 - 29 years	107	26.4%	60	24.9%	54	26.5%
30 - 34years	123	30.4%	93	38.6%	67	32.8%
35 - 39 years	107	26.4%	48	19.9%	65	31.9%
≥ 40 years	35	8.6%	13	5.4%	9	4.4%
Unknown	2	0.5%	6	2.5%	2	1.0%

ANTENATAL COMPLICATIONS

	1999		**2004**		**2009**	
Anaemia	25	6.4%	14	5.8%	6	2.9%
Hypertension	12	3.1%	8	3.3%	10	4.9%
Antepartum haemorrhage	6	1.5%	8	3.3%	6	2.9%
Diabetes mellitus (including IGT)	4	1.0%	14	5.8%	21	10.3%
Cardiac disease	1	0.3%	2	0.8%	2	1.0%
Other medical/surgical diseases	34	8.7%	10	4.1%	12	5.9%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	249	61.5%	136	56.4%	93	45.6%
Induced labour	85	21.0%	49	20.3%	39	19.1%
No labour	71	17.5%	56	23.2%	72	35.3%

PRESENTATION AND LIE AT DELIVERY

	1999		2004		2009	
Vertex	226	55.4%	218	90.5%	189	92.6%
Breech	37	9.1%	18	7.5%	13	6.4%
Oblique	125	30.6%	0	0.0%	1	0.5%
Face	0	0.0%	1	0.4%	0	0.0%
Transverse	0	0.0%	2	0.8%	0	0.0%
Others	18	4.4%	2	0.8%	1	0.5%
Unknown	2	0.5%	0	0.0%	0	0.0%

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	226	55.4%	138	57.3%	94	46.1%
Vacuum extraction	37	9.1%	16	6.6%	12	5.9%
Forceps delivery	3	0.7%	1	0.4%	2	1.0%
Vaginal breech delivery	15	3.7%	2	0.8%	3	1.5%
LSCS before labour	125	30.6%	55	22.8%	71	34.8%
LSCS after labour	74	10.6%	29	12.0%	21	10.3%
Classical CS	-	-	-	-	1	0.5%
Unknown	2	0.5%	0	0.0%	0	0.0%

GESTATION AT DELIVERY (in completed weeks)

	1999		2004		2009	
< 26 weeks	6	1.5%	0	0.0%	2	1.0%
26 - 28 weeks	12	2.9%	4	1.7%	3	1.5%
29 - 32weeks	24	5.9%	5	2.1%	11	5.4%
33 - 36 weeks	41	10.0%	22	9.1%	23	11.3%
37 - 41 weeks	307	75.2%	209	86.7%	165	80.9%
> 41 weeks	17	4.2%	1	0.4%	0	0.0%
Unknown	1	0.2%	0	0.0%	-	-

BIRTH WEIGHT AT DELIVERY (in grams)

	1999		2004		2009	
< 500 gm	4	1.0%	0	0.0%	1	0.5%
500 - 999 gm	13	3.2%	4	1.7%	2	1.0%
1000 - 1499 gm	17	4.2%	3	1.2%	9	4.4%
1500 - 1999 gm	18	4.4%	7	2.9%	5	2.5%
2000 - 2499 gm	46	11.3%	25	10.4%	22	10.8%
2500 - 2999 gm	94	23.0%	58	24.%	59	28.9%
3000 - 3499 gm	137	33.6%	94	39.0%	69	33.8%
2500 – 3999	63	15.4%	39	16.2%	30	14.7%
≥ 4000 gm	15	3.7%	11	4.6%	7	3.4%
Unknown	1	0.2%	0	0.0%	0	0.0%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	363	89.0%	219	90.9%	185	90.7%
Stillbirths	20	4.9%	7	2.9%	7	3.4%
Antepartum	*14*	*3.4%*	*3*	*1.2%*	*6*	*2.9%*
Intrapartum	*4*	*1.0%*	*2*	*0.8%*	*1*	*0. 5%*
Undetermined	*2*	*0.5%*	*2*	*0.8%*	*0*	*0.0%*
Neonatal deaths	23	5.6%	15	6.2%	12	*5.9%*
Early	*18*	*4.4%*	*15*	*6.2%*	*12*	*5.9%*
Late	*5*	*1.2%*	*0*	*0.0%*	*0*	*0.0%*

Missing data on fetal outcome in 2 (0.5%) in 1999

ASPHYXIA NEONATORUM

	1999		2004		2009	
Apgar score at 1 minute						
0 – 3	37	9.0%	16	6.6%	8	4.0%
4 – 6	37	9.0%	14	5.8%	7	3.5%
Apgar score at 5 minutes s						
0 – 3	26	6.4%	10	4.1%	5	2.5%
4 – 6	17	4.2%	7	2.9%	2	1.0%

OTHER NEONATAL COMPLICATIONS

	1999		2004		2009	
Admission to neonatal ICU	197	48.3%	136	56.4%	94	46.1%
Major infection	11	2.7%	0	0.0%	2	1.0%
Respiratory distress syndrome	8	2.0%	2	0.8%	2	1.0%
Intraventricular haemorrhage	7	1.7%	1	0.4%	1	0.5%
Necrotising enterocolitis	5	1.2%	1	0.4%	1	0.5%
Birth trauma	4	1.0%	2	0.8%	2	1.0%

BIRTH ASPHYXIA

The Apgar score was less than 7 at 1 and 5 minutes in 1.6% and 0.3% of babies respectively. Compared with previous audits, the incidence of low Apgar score was lower at 1 minute (3.8% in 1999 and 3.1% in 2004) but similar at 5 minutes (0.4% in 1999 and 2004). Similar to previous audits, the incidence of low Apgar score was highest in those with vaginal breech delivery. The incidence of very low Apgar score (<4) was 16.8% and the incidence at 5 minutes was 12.4%. The corresponding incidences in 1999 were 10.8% and 6.2% whilst the incidences in 2004 were 29.1% and 25.2%.

	1999		2004		2009	
Apgar score at 1 minute						
0 – 3	215	0.4%	250	0.5%	243	0.3%
4 – 6	1633	3.4%	1298	2.6%	1088	1.3%
Unknown	106	0.2%	203	0.4%	561	0.7%
Apgar score at 5 minutes						
0 – 3	46	0.1%	120	0.2%	138	0.2%
4 – 6	149	0.3%	123	0.2%	112	0.1%
Unknown	195	0.4%	207	0.4%	563	0.7%

LOW APGAR SCORE AND MODE OF DELIVERY

APGAR SCORE <4 AT 1 MINUTE

	1999		2004		2009	
Spontaneous vertex delivery	47	0.2%	89	0.3%	96	0.2%
Vacuum extraction	31	0.5%	24	0.5 %	19	0.3%
Forceps delivery	4	0.5%	3	0.6%	2	0.5%
Vaginal breech delivery	21	10.8%	30	29.1%	27	16.8%
LSCS before labour	52	0.7%	55	0.6%	48	0.2%
LSCS after labour	53	0.9%	43	0.7%	43	0.4%
Classical Caesarean section	7	12.3%	6	10.2%	6	2.6%
Others/unknown	0	0.0%	0	0.0%	2	5.0%

Percentage refers to the percentage of the total number of the corresponding mode of delivery

APGAR SCORE 4-6 AT 1 MINUTE

	1999		2004		2009	
Spontaneous vertex delivery	466	1.7%	369	1.3%	224	0.6%
Vacuum extraction	323	5.1%	214	4.4%	179	2.4%
Forceps delivery	39	0.5%	18	3.9%	14	3.8%
Vaginal breech delivery	49	25.1%	24	23.3%	27	16.8%
LSCS before labour	301	4.0%	289	3.2%	307	1.2%
LSCS after labour	447	7.4%	368	5.8%	308	3.2%
Classical Caesarean section	8	14.0%	15	25.4%	28	11.9%
Others/unknown	0	0.0%	1	100.0%	1	2.5%

Percentage refers to the percentage of the total number of the corresponding mode of delivery

APGAR SCORE <4 AT 5 MINUTES

	1999		2004		2009	
Spontaneous vertex delivery	18	0.1%	63	0.2%	83	0.2%
Vacuum extraction	2	0.0%	4	0.1%	3	0.04%
Forceps delivery	0	0.0%	3	0.6%	1	0.3%
Vaginal breech delivery	12	6.2%	26	25.2%	20	12.4%
LSCS before labour	6	0.0%	15	0.2%	19	0.1%
LSCS after labour	5	0.0%	7	0.1%	10	0.1%
Classical Caesarean section	3	5.3%	2	3.4%	0	0.0%
Others/unknown	0	0.0%	0	0.0%	2	5.0%

Percentage refers to the percentage of the total number of the corresponding mode of delivery

APGAR SCORE 4-6 AT 5 MINUTES

	1999		2004		2009	
Spontaneous vertex delivery	42	0.2%	33	0.1%	28	0.1%
Vacuum extraction	27	0.4%	19	0.4%	17	0.2%
Forceps delivery	4	0.5%	1	0.2%	1	0.3%
Vaginal breech delivery	9	4.6%	4	3.9%	5	3.1%
LSCS before labour	31	0.4%	29	0.3%	25	0.1%
LSCS after labour	34	0.6%	35	0.6%	30	0.3%
Classical Caesarean section	2	3.5%	2	3.4%	6	2.6%
Others/unknown	0	0.0%	0	0.0%	0	0.0%

Percentage refers to the percentage of the total number of the corresponding mode of delivery

BIRTH TRAUMA

The incidence of birth trauma decreased from 0.6% in 1999 to 0.3% in 2009. However, possibility of under-reporting could not be excluded as some of the birth trauma might not be apparent at birth. As in previous audits, the commonest types of birth trauma were cephalhaematoma, fractures and soft tissue trauma. Although the absolute number of birth trauma in spontaneous vertex delivery was high, the actual risk remained at around 0.3% only. Caesarean section was associated with the lowest risk of birth trauma (0.1%). This compared with the 1.3% in forceps delivery and 0.9% in vacuum extraction. There was no birth trauma reported following vaginal breech delivery in 2009.

	1999		2004		2009	
TOTAL INCIDENCE	272	0.6%	194	0.4%	229	0.3%
Singleton	*269*	*99.3%*	*193*	*99.5%*	*227*	*99.1%*
Multiple	*2*	*0.7%*	*1*	*0.5%*	*2*	*0.9%*

CLASSIFICATION OF BIRTH TRAUMA (might be more than 1 for each baby)

	1999		2004		2009	
Cephalhaematoma	157	57.9%	120	61.9%	82	35.8%
Fractures	54	19.9%	59	30.4%	104	45.4%
Soft tissue trauma	30	11.1%	9	4.6%	19	8.3%
Nerve injury	18	6.6%	9	4.6%	12	5.2%
Subaponeurotic haemorrhage	13	4.8%	5	2.6%	8	7.9%
Intracranial haemorrhage	4	1.5%	1	0.5%	3	1.3%
Visceral injury	0	0.0%	0	0.0%	1	0.4%

PARITY OF THE PARTURIENTS

	1999		2004		2009	
Nulliparous	186	68.4%	131	67.5%	123	55.0%
Multiparous	86	31.6%	63	32.5%	103	45.0%

MODE OF DELIVERY

	1999		2004		2009	
Spontaneous vertex delivery	96	35.3%	110	56.7%	125	54.6%
Vacuum extraction	129	47.6%	58	29.9%	64	27.9%
Forceps delivery	22	8.1%	9	4.6%	5	2.2%
Vaginal breech delivery	1	0.4%	0	0.0%	0	0.0%
LSCS before labour	6	2.2%	3	1.5%	17	7.4%
LSCS after labour	18	6.6%	14	7.2%	18	7.9%
Others/unknown	0	0.0%	0	0.0%	0	0.0%

FETAL WEIGHT DISTRIBUTION

	1999		2004		2009	
<500 gm	0	0.0%	0	0.0%	0	0.0%
500 - 999 gm	1	0.4%	0	0.0%	0	0.0%
1000 – 1499 gm	1	0.4%	0	0.0%	0	0.0%
1500 - 1999 gm	1	0.4%	1	0.5%	0	0.0%
2000 - 2499 gm	5	1.8%	0	0.0%	5	2.2%
2500 - 2999 gm	50	18.4%	41	21.1%	30	13.1%
3000 - 3499 gm	106	39.0%	89	45.9%	104	45.4%
3500 - 3999 gm	93	34.2%	45	23.2%	69	30.1%
≥ 4000 gm	15	5.5%	18	9.3%	21	9.2%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	271	99.6%	194	100.0%	229	100.0%
Stillbirths	0	0.0%	0	0.0%	0	0.0%
Neonatal deaths	1	0.4%	0	0.0%	0	0.0%
Low birth weights (<2500 gm)	7	2.6%	1	0.5%	5	2.2%
Singleton	*7*	*100.0%*	*0*	*0.0%*	*3*	*60.0%*
Multiple	*0*	*0.0%*	*1*	*100.0%*	*2*	*40.0%*
Macrosomia (>4000 gm)	15	5.5%	18	9.3%	21	9.2%
Apgar score < 4 at 1 minute	7	2.6%	2	1.0%	3	1.3%
Apgar score < 4 at 5 minutes	0	0.0%	3	1.5%	0	0.0%

MAJOR NEONATAL INFECTIONS

The incidence of major neonatal infections of all live births remained low with the incidence of 0.12%, of which 98% survived for at least 28 days. Since the 1999 audit, only 2 categories of neonatal infection were captured, namely congenital infection and major infections. Although the proportion of congenital infection further increased from 36.4% to 57.4%, the actual incidence of congenital infection remained at 0.07%, while that of major infections remained between 0.03% - 0.04%. These infections might be late complications and the babies might have been transferred to the neonatal unit, or even to another hospital for management. Hence, the incidence might be under-reported.

	1999		2004		2009	
TOTAL INCIDENCE (LIVEBIRTHS)	149	0.3%	22	0.04%	94	0.12%
Singleton	*134*	*89.9%*	*22*	*100.0%*	*90*	*95.7%*
Multiple	*15*	*10.1%*	*0*	*0.0%*	*4*	*4.3%*

CLASSFICATION OF MAJOR NEONATAL INFECTIONS

	1999		2004		2009	
Congenital infection	14	9.4%	8	36.4%	54	57.4%
Major infections	135	90.6%	14	63.6%	40	42.6%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	77	51.7%	16	72.7%	70	74.5%
Induced labour	40	26.8%	4	18.2%	11	11.7%
No labour	32	21.5%	2	9.1%	13	13.8%

DURATION OF LABOUR

	1999		2004		2009	
< 2 hours	55	36.9%	2	9.1%	18	19.1%
2 - 3 hours	23	15.4%	5	22.7%	11	11.7%
4 - 5 hours	17	11.4%	4	18.2%	15	16.0%
6 - 7 hours	17	11.4%	3	13.6%	14	15.0%
8 - 9 hours	7	4.7%	3	13.6%	8	8.5%
10 - 11 hours	13	8.7%	1	4.5%	7	7.4%
12 - 13 hours	3	2.0%	2	9.1	3	3.2%
> 13 hours	9	6.0%	1	4.5%	5	5.3%

Missing data on duration of labour in 5 (3.4%) in 1999, 2 (9.1%) in 2004 and 13 (13.8%) in 2009.

MODE OF DELIVERY

	1999		2004		2009	
Spontaneous vertex delivery	61	40.8%	16	72.7%	55	58.5%
Vacuum extraction	21	14.1%	1	4.5%	25	26.6%
Forceps delivery	1	0.7%	0	0.0%	1	1.1%
Vaginal breech delivery	8	5.4%	0	0.0%	2	2.1%
LSCS before labour	57	38.3%	2	9.1%	13	13.8%
LSCS after labour			3	13.6%	17	18.1%
Classical Caesarean section	1	0.7%	0	0.0%	1	1.1%

GESTATION AT DELIVERY

	1999		2004		2009	
< 29 weeks	15	10.1%	0	0.0%	4	4.3%
29 - 32weeks	22	14.8%	3	13.6%	1	1.1%
33 - 36 weeks	18	12.1%	0	0.0%	9	9.6%
37 - 41 weeks	93	62.4%	18	81.8%	80	85.1%
> 41 weeks			1	4.5%	0	0.0%

Missing data on gestation in 1 (0.7%) in 1999

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	126	84.6%	20	90.9%	92	97.9%
Neonatal deaths	23	15.4%	2	9.1%	1	1.1%
Early	*18*	*12.1%*	*2*	*9.1%*	*1*	*1.1%*
Late	*5*	*3.4%*	*0*	*0.0%*	*0*	*0.0%*

NEONATAL COMPLICATIONS

(Respiratory Distress Syndrome, Intraventricular Haemorrhage, Necrotising Enterocolitis)

The incidences of all these complications reduced over the past 10 years with intraventricular haemorrhage (IVH) having the greatest reduction of 50 folds while respiratory distress syndrome (RDS) reduced by 2.5 folds and necrotising enterocolitis (NEC) by 4.3 folds. The survival rate at 28 days with IVH decreased to 64%, but it is likely associated with the prematurity as well which reflected by the low mean birth weight among the IVH group. Whereas the survival rate for the other 2 conditions remained similar compared with that of 2004. However, these are late complications and the data accuracy depended very much on the feedbacks from the paediatricians. Under-reporting of these complications could not be excluded.

RESPIRATORY DISTRESS SYNDROME

	1999		2004		2009	
TOTAL INCIDENCE (LIVEBIRTHS)	86	0.2%	23	0.05%	63	0.08%
Singleton	*68*	*79.1%*	*23*	*100%*	*59*	*93.7%*
Multiple	*18*	*20.9%*	*0*	*0.0%*	*4*	*6.3%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	79	91.8%	22	95.7%	61	96.8%
Neonatal deaths	7	8.2%	1	4.3%	2	3.2%
Early	*6*	*7.0%*	*0*	*0.0%*	*2*	*3.2%*
Late	*1*	*1.2%*	*1*	*4.3%*	*0*	*0.0%*
Mean birth weight ± SD (gm)	-	-	2412	± 766	2104	± 909

BIRTH ASPHYXIA

	1999		2004		2009	
Apgar score < 7 at 1 minute	42	48.8%	5	21.7%	8	12.9%
Apgar score < 7 at 5 minutes	16	18.6%	2	8.7%	1	1.6%

INTRAVENTRICULAR HAEMORRHAGE

	1999		2004		2009	
TOTAL INCIDENCE (LIVEBIRTHS)	36	0.07%	1	0.002%	11	0.001%
Singleton	*24*	*66.7%*	*1*	*100.0%*	*7*	*63.6%*
Multiple	*12*	*33.3%*	*0*	*0.0%*	*4*	*36.4%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	34	94.4%	1	100.0%	7	63.6%
Neonatal deaths	2	5.6%	0	0.0%	4	36.4%
Early	*1*	*2.8%*	*0*	*0.0%*	*3*	*27.6%*
Late	*1*	*2.8%*	*0*	*0.0%*	*1*	*9.1%*
Mean birth weight ± SD (gm)	-	-	3375	-	987	± 698

BIRTH ASPHYXIA

	1999		2004		2009	
Apgar score < 7 at 1 minute	16	44.4%	0	0.0%	5	45.5%
Apgar score < 7 at 5 minutes	6	22.2%	0	0.0%	2	18.2%

NECROTISING ENTEROCOLITIS

	1999		2004		2009	
TOTAL INCIDENCE (LIVEBIRTHS)	17	0.03%	5	0.01%	6	0.007%
Singleton	*10*	*58.8%*	*4*	*80.0%*	*5*	*83.3%*
Multiple	*7*	*41.2%*	*1*	*20.0%*	*1*	*16.7%*

FETAL OUTCOME

	1999		2004		2009	
Alive at 28 days	16	94.1%	4	80.0%	5	83.3%
Neonatal deaths	1	5.9%	1	20.0%	1	16.7%
Early	*0*	*0.0%*	*0*	*0.0%*	*0*	*0.0%*
Late	*1*	*5.9%*	*1*	*20.0%*	*1*	*16.7%*
Mean birth weight ± SD (gm)	-	-	2399	± 982	1345	±1054

BIRTH ASPHYXIA

	1999		2004		2009	
Apgar score < 7 at 1 minute	8	47.1%	0	0.0%	2	33.3%
Apgar score < 7 at 5 minutes	3	17.6%	0	0.0%	0	0.0%

STILLBIRTHS

The number of stillbirths reported in 2009 was 148 (1.8 per 1,000 births) . According to the data from the Census and Statistics Department of Hong Kong, the total number of stillbirths in 2009 was 158 (1.9 per 1,000births). The under-reporting rate was 6.3%.

The incidence of reported stillbirths decreased from 3.5 to 1.8 per 1,000 total births. About 85% were detected during the antepartum period before the onset of labour. The incidence of low birth weight (< 2500 gm) decreased from 69.2% in 1999 to 65.8% in 2004 and increased to 78.5% in 2009, while none of the case was associated with macrosomia (≥ 4000 gm) in 2009. The cause of most stillbirths were considered unclassifiable/miscellaneous while 12.2% were not investigated. The incidence of unexplained stillbirth decreased from 26.6% to 19.6%. The incidence of associated antepartum haemorrhage during pregnancy was 5.4%, which was lower than that in 2004 but similar to that in 1999. The incidences of associated hypertension and diabetes mellitus increased to 10.8% and 8.8% respectively. The incidences of antepartum haemorrhage, hypertension and diabetes mellitus were higher than the overall figures (1.5%, 1.9% and 6.6% respectively).

INCIDENCE

	1999		2004		2009	
TOTAL INCIDENCE (BIRTHS)	169	0.35%	117	0.24%	148	0.18%
Antepartum	*137*	*81.1%*	*92*	*78.6%*	*125*	*84.5%*
Intrapartum	*11*	*6.5%*	*4*	*3.4%*	*4*	*2.7%*
Undetermined	*21*	*12.4%*	*21*	*17.9%*	*19*	*12.8%*
Singleton	156	66.7%	101	86.3%	123	83.1%
Multiple	13	33.3%	16	13.7%	25	16.9%

DATA FROM CENSUS AND STATISTICS DEPARTMENT

	1999		2004		2009	
TOTAL INCIDENCE (LIVEBIRTHS)	228	0.45%	164	0.33%	158	0.19%

PARITY OF THE PARTURIENTS

	1999		2004		2009	
Nulliparous	94	55.6%	71	60.7%	82	55.4%
Multiparous	75	44.4%	46	39.3%	66	44.6%

AGE OF THE PARTURIENTS

	1999		2004		2009	
< 20 years	2	1.2%	3	2.6%	0	0.0%
20 - 24 years	12	7.1%	18	15.4%	11	7.4%
25 - 29 years	52	30.8%	29	24.8%	33	22.3%
30 - 34 years	57	33.7%	32	27.4%	49	33.1%
35 - 39 years	29	17.1%	26	22.2%	41	27.7%
≥ 40 years	16	0.6%	8	6.8%	13	8.8%
Unknown	1	0.6%	1	0.9%	1	0.7%

ASSOCIATED ANTENATAL COMPLICATIONS

	1999		2004		2009	
Anaemia	17	10.1%	9	7.7%	5	3.4%
Antepartum haemorrhage	9	5.3%	8	6.8%	8	5.4%
Placenta praevia	*1*	*11.1%*	*3*	*37.5%*	*3*	*37.5%*
Placenta abruptio	*6*	*66.7%*	*1*	*12.5%*	*2*	*25.0%*
APH of unknown origin	*2*	*22.2%*	*4*	*50.0%*	*3*	*37.5%*
Hypertension	5	3.0%	10	8.5%	18	12.2%
Mild	*2*	*40.0%*	*2*	*20.0%*	*6*	*33.3%*
Severe	*3*	*60.0%*	*5*	*50.0%*	*8*	*44.4%*
Unclassified	*0*	*0.0%*	*3*	*30.0%*	*4*	*22.2%*
Diabetes mellitus (including IGT)	6	3.6%	7	6.0%	13	8.8%
Other medical/surgical diseases	9	5.3%	0	0.0%	16	10.8%

MAIN CAUSES FOR STILLBIRTHS

	1999		2004		2009	
Unclassifiable / Miscellaneous	71	42.0%	47	40.2%	88	59.5%
Uninvestigated			14	12.0%	18	12.2%
Unexplained	45	26.6%	27	23.1%	29	19.6%
Congenital anomalies	17	10.1%	16	13.7%	5	3.4%
Mechanical	4	2.4%	3	2.6%	2	1.4%
Maternal disorders	1	0.6%	2	1.7%	2	1.4%
Pregnancy-induced hypertension	1	0.6%	2	1.7%	2	1.4%
Antepartum haemorrhage	7	4.1%	1	0.9%	2	1.4%
Unknown	23	13.6%	5	4.3%	0	0.0%

MODE OF DELIVERY

	1999		2004		2009	
Spontaneous vertex delivery	101	59.8%	74	63.2%	100	67.6%
Vacuum extraction	6	3.6%	1	0.9%	1	0.7%
Forceps delivery	3	1.8%	3	2.6%	0	0.0%
Vaginal breech delivery	37	21.9%	26	22.2%	24	16.2%
LSCS before labour	10	5.9%	9	7.7%	18	12.2%
LSCS after labour	11	6.5%	3	2.6%	5	3.8%
Classical Caesarean section	0	0.6%	1	0.9%	0	0.0%

GESTATION AT DELIVERY

	1999		2004		2009	
< 26 weeks	20	11.8%	14	12.0%	19	12.8%
26 - 28 weeks	23	13.6%	23	19.7%	23	15.5%
29 - 32weeks	36	21.3%	18	15.4%	32	21.6%
33 - 36 weeks	37	21.9%	24	20.5%	36	24.3%
37 - 41 weeks	52	30.8%	36	30.8%	38	25.7%
> 41 weeks	1	0.6%	1	0.9%	0	0.0%
Unknown	0	0.0%	1	0.9%	0	0.0%

BIRTH WEIGHT AT DELIVERY

	1999		2004		2009	
< 500 gm	3	1.8%	9	7.7%	5	3.4%
500 - 999 gm	45	26.6%	32	27.4%	51	34.5%
1000 - 1499 gm	24	14.2%	17	14.5%	25	16.9%
1500 - 1999 gm	20	11.8%	10	8.5%	13	8.8%
2000 - 2499 gm	25	14.8%	9	7.7%	22	14.9%
2500 - 2999 gm	17	10.1%	18	15.4%	13	8.8%
3000 - 3499 gm	19	11.2%	16	13.7%	13	8.8%
3500 - 3999 gm	12	7.1%	4	3.4%	5	3.4%
≥ 4000 gm	3	1.8%	2	1.7%	0	0.0%
Unknown	1	0.6%	0	0.0%	1	0.7%

NEONATAL DEATHS

The number of neonatal deaths reported in 2009 was 77. The total number of neonatal deaths in 2009 reported by the Census and Statistics Department of Hong Kong was the same and there was no under-reporting.

The neonatal death rate decreased from 1.5 to 1.0 per 1,000 live births. The official reported figures by the government were 1.6, 1.6 and 0.9 per 1,000 live births in 1999, 2004 and 2009 respectively. The deaths were mostly attributed to other unclassifiable causes which accounted for about 44% of the cases. This was higher than congenital anomalies, which was used to be the most common cause. The incidence remained similar in the past 10 years and ranged from 31.2% - 32.8%. Almost 17% were not investigated. The incidence of antepartum haemorrhage decreased from 12.5% and 13.1% to 3.9%, which was very low and the possibility of under-reporting cannot be excluded.

INCIDENCE

	1999		2004		2009	
TOTAL INCIDENCE (LIVEBIRTHS)	72	0.15%	61	0.12%	77	0.10%
Early neonatal deaths	56	0.11%	50	0.1%	66	0.08%
Late neonatal deaths	16	0.03%	11	0.02%	11	0.01%
Singleton	61	84.7%	49	80.3%	59	76.6%
Multiple	11	15.3%	12	19.7%	18	23.4%

DATA FROM CENSUS AND STATISTICS DEPARTMENT

	1999		2004		2009	
TOTAL INCIDENCE (LIVEBIRTHS)	79	0.16%	76	0.16%	77	0.09%
Early neonatal deaths	59	0.12%	60	0.12%	62	0.07%
Late neonatal deaths	20	0.04%	16	0.03%	15	0.02%

PARITY OF THE PARTURIENTS

	1999		2004		2009	
Nulliparous	40	65.6%	40	65.6%	45	58.4%
Multiparous	21	34.4%	21	34.4%	32	41.6%

AGE OF THE PARTURIENTS

	1999		2004		2009	
< 20 years	3	4.2%	2	3.3%	1	1.3%
20 - 24 years	5	6.9%	7	11.5%	5	6.5%
25 - 29 years	12	16.7%	9	14.8%	15	19.5%
30 - 34 years	23	31.9%	22	36.1%	17	22.1%
35 - 39 years	26	36.1%	18	29.5%	29	37.7%
≥ 40 years	3	4.2%	3	4.9%	9	11.7%
Unknown	1	0.6%	1	0.9%	1	1.3%

ANTENATAL COMPLICATIONS

	1999		2004		2009	
Anaemia	2	2.8%	5	8.2%	5	6.5%
Antepartum haemorrhage	9	12.5%	8	13.1%	3	3.9%
Placenta praevia	*0*	*0.0%*	*1*	*12.5%*	*0*	*0.0%*
Placenta abruptio	*2*	*22.2%*	*0*	*0.0%*	*1*	*33.3%*
APH of unknown origin	*6*	*66.7%*	*7*	*87.5%*	*2*	*66.6%*
Other causes	*1*	*11.1%*	*0*	*0.0%*	*0*	*0.0%*
Hypertension	3	4.2%	5	8.2%	6	7.8%
Mild	*1*	*33.3%*	*2*	*40.0%*	*3*	*50.0%*
Severe	*2*	*66.7%*	*3*	*60.0%*	*2*	*33.3%*
Unclassified	*0*	*0.0%*	*0*	*0.0%*	*1*	*16.7%*
Diabetes mellitus (including IGT)	3	4.2%	4	6.6%	10	13.0%
Other medical/surgical diseases	2	2.8%	2	3.3%	12	15.6%

MAIN OBSTETRIC CAUSES ACCOUNTING FOR THE NEONATAL DEATHS

	1999		2004		2009	
Congenital anomalies	23	31.9%	20	32.8%	24	31.2%
Unclassifiable / Miscellaneous	21	29.2%	20	32.8%	34	44.2%
Uninvestigated			6	9.8%	13	16.9%
Unexplained	6	8.3%	7	11.5%	4	5.2%
Mechanical	2	2.8%	0	0.0%	1	1.3%
Maternal disorder	1	1.4%	0	0.0%	0	0.0%
Antepartum haemorrhage	1	1.4%	2	3.3%	1	1.3%
Pregnancy induced hypertension	1	1.4%	1	1.6%	0	0.0%
Unknown	17	23.6%	5	8.2%	0	0.0%

MODE OF DELIVERY

	1999		2004		2009	
Spontaneous vertex delivery	32	44.4%	24	39.3%	37	48.1%
Vacuum extraction	3	4.2%	2	3.3%	1	1.3%
Forceps delivery	0	0.0%	7	11.5%	1	1.3%
Vaginal breech delivery	17	23.6%	0	0.0%	12	15.6%
LSCS before labour	10	13.9%	13	21.3%	21	27.3%
LSCS after labour	7	9.7%	13	21.3%	4	5.2%
Classical Caesarean section	3	4.2%	2	3.3%	1	1.3%
Unknown	1	0.6%	0	0.0%	0	0.0%

GESTATION AT DELIVERY

	1999		2004		2009	
< 26 weeks	26	36.1%	20	32.8%	27	35.1%
26 - 28 weeks	8	11.1%	11	18.0%	8	10.4%
29 - 32weeks	8	11.1%	7	11.5%	8	10.4%
33 - 36 weeks	8	11.1%	7	11.5%	11	14.3%
37 - 41 weeks	19	26.4%	15	24.6%	23	29.9%
> 41 weeks	3	4.2%	1	1.6%	0	0.0%
Unknown	0	0.0%	0	0.0%	0	0.0%

BIRTH WEIGHT AT DELIVERY

	1999		2004		2009	
< 500 gm	8	11.1%	5	8.2%	6	7.8%
500 - 999 gm	26	36.2%	25	41.0%	27	35.1%
1000 - 1499 gm	7	9.7%	5	8.2%	10	13.0%
1500 - 1999 gm	3	4.2%	5	8.2%	3	3.9%
2000 - 2499 gm	10	13.9%	8	13.1%	8	10.4%
2500 - 2999 gm	5	6.9%	6	9.8%	11	14.3%
3000 - 3499 gm	6	8.3%	4	6.6%	8	10.4%
3500 - 3999 gm	5	6.9%	2	3.3%	2	2.6%
≥ 4000 gm	1	1.4%	1	1.6%	2	2.6%
Unknown	1	1.4%	0	0.0%	0	0.0%

MATERNAL DEATHS

Maternal death in this report was defined as death from conception up to 1 year after delivery. The exact cause of maternal death was not captured in the audit exercise and the information was obtained from individual hospital. The maternal mortality ratios (MMR) were 10.3, 6.1 and 2.5 per 100,000 live births in 1999, 2004 and 2009 respectively. The official reported figures from the Census and Statistics Department were 2.0, 4.1 and 2.4 per 100,000 registered live births respectively. The definition of maternal death used was the number of deaths of women due to complications of pregnancy, child birth and puerperium. The time frame was not specified. The difference in the number is probably related to the different definition used.

INCIDENCE

	1999	**2004**	**2009**
Number	5	3	2
MMR (per 100,000 live births)	10.3	6.1	2.5

CAUSES OF MATERNAL DEATH

	19994	**2004**	**2009**
Amniotic fluid embolism	0	0	1
Hepatic failure	0	1	1
Suicide	1	1	0
Pneumonia	1	0	0
Pulmonary embolism	1	0	0
Ruptured vertebral artery aneurysm	1	0	0
Massive Post-partum Haemorrhage	0	1	0
No cause identified	1	0	0

DATA FROM CENSUS AND STATISTICS DEPARTMENT

	1999	**2004**	**2009**
Number	1	2	2
MMR (per100,000 registered live births)	2.0	4.1	2.5
Cause of death			
Haemorrhage of pregnancy & childbirth	*0*	*0*	*0*
Obstetrical pulmonary embolism	*1*	*0*	*0*
Other direct obstetric deaths	*0*	*2*	*2*
Others	*0*	*0*	*0*

Maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (ICD-10).
Maternal mortality ratio refers to the number of maternal deaths in a calendar year per hundred thousand live births of that year.

PARITY OF PARTURIENTS

	1999		2004		2009	
Nulliparous	3	60.0%	2	66.7%	1	50.0%
Multiparous	2	40.0%	1	33.3%	1	50.0%

AGE OF THE PARTURIENTS

	1999		2004		2009	
20 - 24 years	1	20.0%	0	0.0%	0	0.0%
25 - 29 years	0	0.0%	1	33.3%	0	0.0%
30 - 34 years	0	0.0%	1	33.3%	1	50.0%
35 - 39 years	2	40.0%	1	33.3%	0	0.0%
≥ 40 years	2	40.0%	0	0.0%	1	50.0%

ASSOCIATED COMPLICATIONS

	1999		2004		2009	
Hypertension	1	20.0%	0	0.0%	0	0.0%
Antepartum haemorrhage	1	20.0%	0	0.0%	0	0.0%
Cardiac disease	1	20.0%	0	0.0%	0	0.0%
Anaemia	0	0.0%	1	33.3%	0	0.0%
Diabetes mellitus	0	0.0%	1	33.3%	0	0.0%
Post-partum haemorrhage	-	-	1	33.3%	1	50.0%
Hysterectomy	-	-	1	33.3%	0	0.0%

There might be more than 1 complication in each parturient

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	1	20.0%	1	33.3%	1	50.0%
Induced labour	1	20.0%	1	33.3%	0	0.0%
No labour	3	60.0%	1	33.3%	1	50.0%

MODE OF DELIVERY

	1999		2004		2009	
Normal spontaneous delivery	0	0.0%	1	33.3%	0	0.0%
Vacuum extraction	1	20.0%	0	0.0%	0	0.0%
LSCS before labour	4	80.0%	1	33.3%	1	50.0%
LSCS after labour	0	0.0%	1	33.3%	1	50.0%

GESTATION AT DELIVERY

	1999		2004		2009	
26 - 28 weeks	0	0.0%	1	33.3%	0	0.0%
29 - 32 weeks	1	20.0%	0	0.0%	0	0.0%
33 - 36 weeks	0	0.0%	0	0.0%	0	0.0%
37 - 41 weeks	4	80.0%	2	66.7%	2	100%
≥ 42 weeks	0	0.0%	0	0.0%	0	0.0%

BIRTH WEIGHT AT DELIVERY

	1999		2004		2009	
1000 - 1499 gm	0	0.0%	1	33.3%	0	0.0%
1500 - 1999 gm	1	20.0%	0	0.0%	0	0.0%
2000 - 2499 gm	0	0.0%	0	0.0%	1	33.3%
2500 - 2999 gm	1	20.0%	0	0.0%	1	33.3%
3000 - 3499 gm	1	20.0%	0	0.0%	1	33.3%
3500 - 3999 gm	1	20.0%	1	33.3%	0	0.0%
≥ 4000 gm	0	0.0%	1	33.3%	0	0.0%
Unknown	1	20.0%	0	0.0%	0	0.0%

One of the maternal deaths was a twin pregnancy with one intrauterine death and one livebirth

FETAL OUTCOME

	1999		2004		2009	
Alive at 28days	5	100.0%	3	100.0%	2	66.6%
Intrauterine death (unborn)	0	0.0%	0	0.0%	1	33.3%
Neonatal death	0	0.0%	0	0.0%	0	0.0%

One of the maternal deaths was a twin pregnancy with one intrauterine death and one livebirth

MULTIPLE PREGNANCIES

The incidence of multiple pregnancies increased from 0.9% to 1.5% and most of them were twins. The proportion of triplets among the multiple pregnancies decreased from 3.4% to 1.3%. Higher multiple pregnancy was reported once in 1994, but not thereafter. There was an overall increase in maternal age with the incidence of age between 35-39 increased from 30.7% to 36.3% and ≥40 increased from 6.2% to 7.9%. The incidence of diabetes mellitus increased from 9.8% to 13.6%. The incidence of hypertension and antepartum haemorrhage increased from 6.4% and 3.6% in 1999 to 9.9% and 6.1% in 2004 and returned to 8.3% and 2.7% in 2009 respectively.

Caesarean section before labour became the most common mode of delivery with the rate increased from 45.4% to 68.2%. Within the 154 cases of twin 1 whom delivered vaginally, 6 (3.9%) of their corresponded twin 2 required second stage Caesarean section because of fetal distress or malpresentation. The stillbirth rate slightly decreased from 1.4% to 1.1% and that of neonatal death dropped from 1.2% to 0.8%.

	1999		**2004**		**2009**	
Total incidence	450	0.9%	537	1.1%	1167	1.5%
Twin pregnancy	*435*	*96.6%*	*528*	*98.3%*	*1152*	*98.7%*
Triplet pregnancy	*15*	*3.4%*	*9*	*1.7%*	*15*	*1.3%*
Quadruplet or above	*0*	*0.0%*	*0*	*0.0%*	*0*	*0.0%*
Total no. of babies	915	1.9%	1083	2.2%	2343	2.9%

PARITY OF PARTURIENTS

	1999		**2004**		**2009**	
Para 0	284	63.1%	344	64.1%	656	56.2%
Para 1	127	28.2%	154	28.7%	414	35.5%
Para 2	27	6.0%	29	5.4%	87	7.5%
Para 3 & above	12	2.7%	10	1.9%	10	0.9%

AGE OF THE PARTURIENTS

	1999		**2004**		**2009**	
< 20 years	1	0.4%	4	0.7%	6	0.3%
20 - 24 years	25	5.6%	41	7.6%	89	3.8%
25 - 29 years	91	20.2%	100	18.6%	390	16.6%
30 - 34 years	165	36.7%	180	33.5%	802	34.2%
35 - 39 years	138	30.7%	155	28.9%	850	36.3%
≥ 40 years	28	6.2%	42	7.4%	186	7.9%
Unknown	2	0.4%	15	2.8%	20	0.9%

ANTENATAL COMPLICATIONS

	1999		2004		2009	
Anaemia	35	7.6%	31	5.8%	39	3.3%
Antepartum haemorrhage	16	3.6%	33	6.1%	31	2.7%
Placenta praevia	*2*	*12.5%*	*7*	*21.2%*	*7*	*22.6%*
Placenta abruptio	*1*	*6.3%*	*0*	*0.0%*	*1*	*3.2%*
APH of unknown origin	*12*	*75.0%*	*25*	*75.8%*	*22*	*71.0%*
Other causes	*1*	*6.3%*	*1*	*3.0%*	*1*	*3.2%*
Hypertension	29	6.4%	53	9.9%	97	8.3%
Mild	*19*	*65.5%*	*24*	*45.3%*	*32*	*33.0%*
Severe	*10*	*34.5%*	*20*	*37.7%*	*25*	*25.8%*
Unclassified	*0*	*0.0%*	*9*	*17.0%*	*40*	*41.2%*
Diabetes mellitus (including IGT)	44	9.8%	59	11.0%	159	13.6%
Other medical/surgical diseases	34	7.6%	26	4.8%	70	6.0%

MATERNAL COMPLICATIONS

	1999		2004		2009	
Postpartum haemorrhage	23	5.1%	21	3.9%	212	18.2%
Rupture of uterus	0	0.0%	0	0.0%	0	0.0%
Hysterectomy	0	0.0%	2	0.4%	2	0.2%

MODE OF ONSET OF LABOUR

	1999		2004		2009	
Spontaneous	166	36.9%	175	32.6%	297	25.4%
Induced labour	73	16.2%	49	9.1%	68	5.8%
No labour	211	46.9%	313	58.3%	801	68.6%

Missing data on mode of onset of labour in 1 case (0.1%) in 2009.

GESTATION AT DELIVERY

	1999		2004		2009	
< 26 weeks	8	1.8%	10	1.9%	25	1.1%
26-28 weeks	11	2.4%	14	2.6%	13	0.6%
29 - 32 weeks	38	8.4%	52	9.7%	161	6.9%
33 - 36 weeks	149	33.1%	197	36.7%	949	40.5%
37 - 41 weeks	235	52.2%	255	47.5%	1179	50.3%
> 41 weeks	2	0.4%	1	0.2%	2	0.1%
Unknown	7	1.6%	8	1.5%	14	0.6%

PRESENTATION AND LIE FOR EACH BABY

	1999		2004		2009	
Vertex	606	66.2%	776	71.7%	1791	76.4%
Breech	246	26.9%	276	25.5%	523	22.3%
Transverse lie	26	2.8%	19	1.8%	17	0.7%
Oblique lie	8	0.9%	2	0.2%	4	0.2%
Compound	2	0.2%	1	0.1%	0	0.0%
Others	14	1.5%	9	0.8%	6	0.3%
Unknown	13	1.4%	0	0.0%	2	0.1%

MODE OF DELIVERY FOR EACH BABY

	1999		2004		2009	
Spontaneous vertex delivery	177	19.3%	155	14.3%	222	9.5%
Vacuum extraction	53	5.8%	28	2.6%	25	1.1%
Forceps delivery	20	2.2%	18	1.7%	16	0.7%
Vaginal breech delivery	47	5.1%	29	2.7%	38	1.6%
LSCS before labour	415	45.4%	619	57.2%	1599	68.2%
LSCS after labour	179	19.6%	232	21.4%	430	18.4%
Classical Caesarean section	2	0.2%	2	0.2%	11	0.5%
Others	9	1.0%	0	0.0%	0	0.0%
Unknown	13	1.4%	0	0.0%	2	0.1%

BIRTH WEIGHT AT DELIVERY

	1999		2004		2009	
< 500 gm	19	2.1%	7	0.6%	7	0.3%
500 - 999 gm	28	3.1%	43	4.0%	42	1.8%
1000 - 1499 gm	65	7.1%	61	5.6%	99	4.2%
1500 - 1999 gm	140	15.3%	176	16.3%	311	13.3%
2000 - 2499 gm	282	30.8%	363	33.5%	855	36.5%
2500 - 2999 gm	305	33.3%	356	32.9%	827	35.3%
3000 - 3499 gm	64	7.0%	60	5.5%	176	7.5%
3500 - 3999 gm	6	0.7%	2	0.2%	14	0.6%
≥ 4000 gm	0	0.0%	0	0.0%	0	0.0%
Unknown	6	0.7%	15	1.4%	12	0.5%

FETAL OUTCOME

	1999		2004		2009	
Alive at 28days	869	95.3%	1054	97.4%	2300	98.2%
Stillbirths	13	1.4%	16	1.5%	25	1.1%
Antepartum	-	-	*12*	*75.0%*	*21*	*84%*
Unknown	-	-	*4*	*25.0%*	*4*	*16%*
Neonatal death	11	1.2%	12	1.1%	18	0.8%
Early	-	-	*9*	*75.0%*	*13*	*72.2%*
Late	-	-	*3*	*25.0%*	*5*	*27.8%*

Missing data in fetal outcome 19 (2.1%) in 1999

OTHER NEONATAL COMPLICATIONS

	1999		2004		2009	
Apgar score <4 at 1 minute	21	2.3%	30	2.8%	29	1.2%
Apgar score 4-6 at 1 minute	127	13.9%	99	9.1%	122	5.2%
Apgar score <4 at 5 minutes	6	0.7%	17	1.6%	15	0.6%
Apgar score 4-6 at 5 minutes	14	1.5%	7	0.6%	15	0.6%
Admission to neonatal ICU	367	40.2%	464	42.8%	681	29.1%
Major congenital abnormalities	19	1.8%	8	0.7%	12	0.5%
Respiratory distress syndrome	18	2.0%	0	0.0%	4	0.2%
Intraventricular haemorrhage	12	1.3%	0	0.0%	4	0.2%
Necrotising enterocolitis	7	0.8%	1	0.1%	1	0.03%
Birth trauma	2	0.2%	1	0.1%	2	0.09%
Major infection	14	1.5%	0	0.0%	0	0.0%

OUTCOME OF PREGNANCIES WITH NORMAL AND ABNORMAL ANTENATAL COURSE

The parturients were divided into two groups according to whether they had any antenatal complications. Parturient was considered to have normal antenatal course if all of the following criteria were satisfied:

1. age less than 35
2. a singleton pregnancy in vertex presentation
3. no medical/surgical disease
4. no obstetrical complications
5. no previous uterine scar

The proportion of parturients with normal antenatal course decreased from 54.8 to 52.1%. The decrease in incidence might be explained by a higher proportion of parturients with advanced maternal age (increased from 28% to 31.6%) and previous Caesarean sections (increased from 9.2% to 12.7%). The overall complication rates (any maternal or fetal complications) were 10.7% and 22.1% in those with normal and abnormal antenatal course respectively.

INCIDENCE

	1999		**2004**		**2009**	
TOTAL INCIDENCE	48459		49656		79732	
Normal antenatal course	*26560*	*54.8%*	*26664*	*53.7%*	*41517*	*52.1%*
Abnormal antenatal course	*21899*	*45.2%*	*22992*	*46.3%*	*38215*	*47.9%*

MODE OF DELIVERY

About 2/3 of the parturients with a normal antenatal course delivered vaginally as compared with less than half of those with an abnormal antenatal course. The Caesarean section rate in those with an abnormal antenatal course was about 54% compared with 32% in those with a normal antenatal course. There was a trend of increasing Caesarean section rate in parturients with both a normal and an abnormal antenatal course.

PRETERM DELIVERIES AND LOW BIRTHWEIGHT

The rates of preterm delivery and low birth weight were significantly higher when the parturients had an abnormal antenatal course. These rates had not changed much over the past 10 years.

FETAL OUTCOME

The rates of asphyxiation (Apgar score <4 at 5 minutes for live births), stillbirth and neonatal death were significantly higher in those with an abnormal antenatal course. However, there was an improvement in the fetal outcome in terms of the stillbirth and neonatal death rates since 1994 and the improvement was more marked in those with abnormal antenatal course. The rates of very low Apgar score (<4) at 5 minutes in both cases with normal and abnormal antenatal course were higher in 2009 than that in 2004.

MATERNAL COMPLICATIONS (PARTURIENTS)

	Normal antenatal course		Abnormal antenatal course	
Postpartum haemorrhage	912	2.2%	2437	6.4%
Uterine rupture	0	0.0%	6	0.02%
Hysterectomy	8	0.02%	32	0.08%
Internal iliac artery ligation	0	0.0%	2	0.01%
Uterine artery embolisation	7	0.02%	17	0.04%
Maternal death	1	0.002%	1	0.003%
Puerperal pyrexia	170	0.4%	254	0.7%
Preterm labour (<37 weeks)	1464	3.5%	3409	9.0%
Singleton	*1464*	*3.5%*	*2840*	*7.7%*
Multiple	-	-	*569*	*49.0%*

Missing data on gestation in 411 (0.5%)

FETAL OUTCOME (BABIES)

	Normal antenatal course		Abnormal antenatal course	
Alive at 28 days	41463	99.87%	39220	99.57%
Stillbirths	45	0.11%	103	0.26%
Neonatal deaths	9	0.02%	68	0.17%
Low birth weight (<2500 gm)	1354	3.3%	3761	9.6%
Singleton	*1354*	*3.3%*	*2447*	*6.6%*
Multiple	-	-	*1314*	*56.4%*
Macrosomia (>4000 gm)	969	2.4%	1111	2.8%
Apgar score < 4 at 1 minute	73	0.2%	170	0.4%
Apgar score < 4 at 5 minutes	44	0.1%	94	0.2%
Birth trauma	110	0.3%	119	0.3%

Missing data on birth weight in 610 (0.75%)

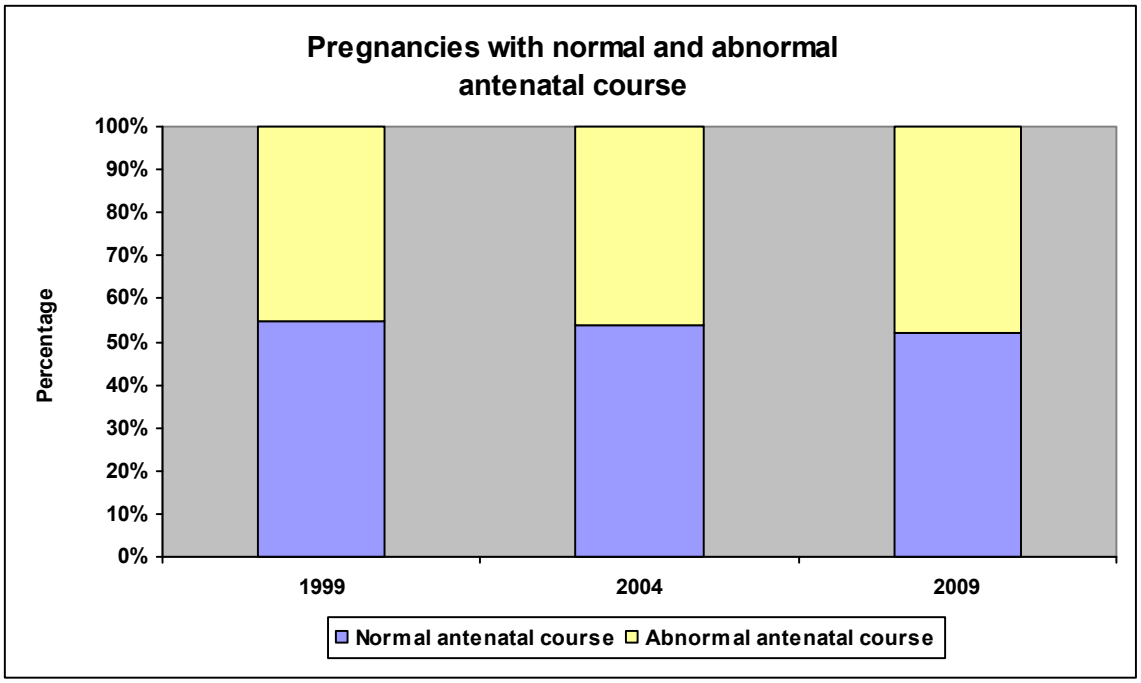

Figure O16 – Normal and abnormal antenatal course

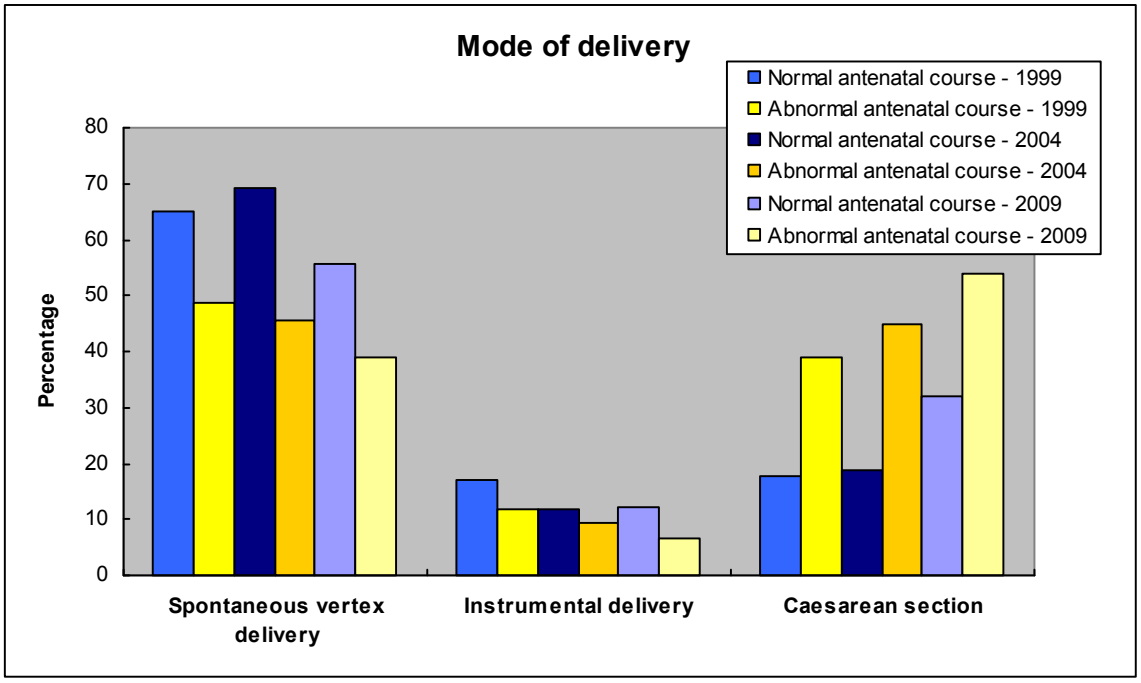

Figure O17 – Mode of delivery

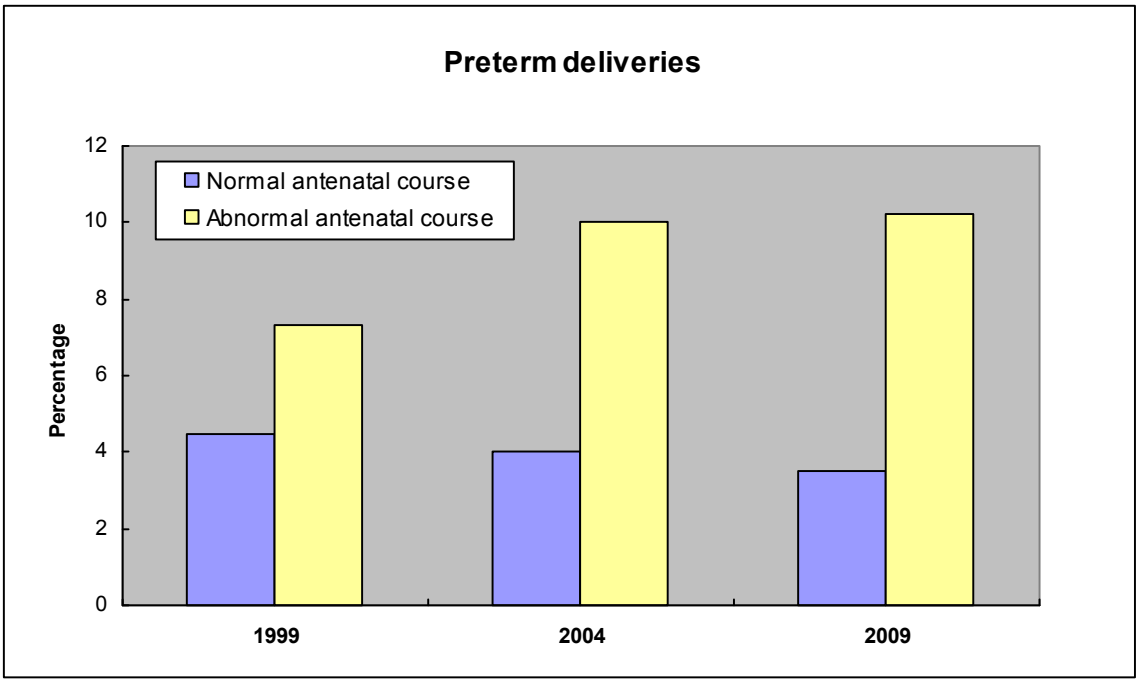

Figure O18 – Preterm deliveries

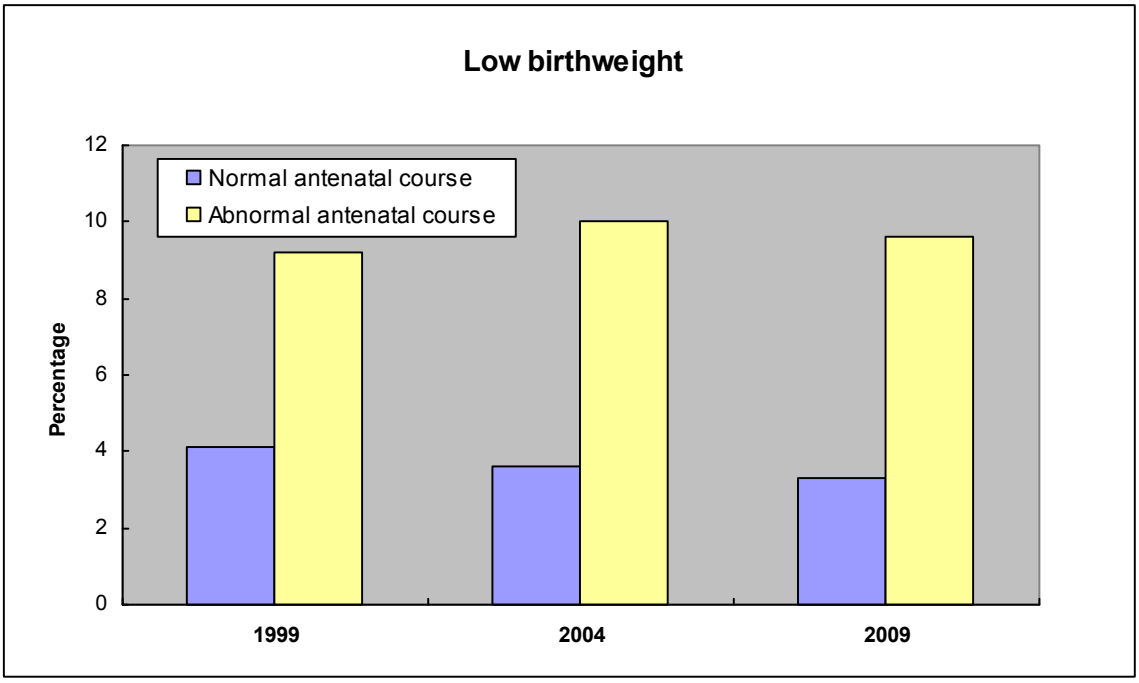

Figure O19 – Low birth weight

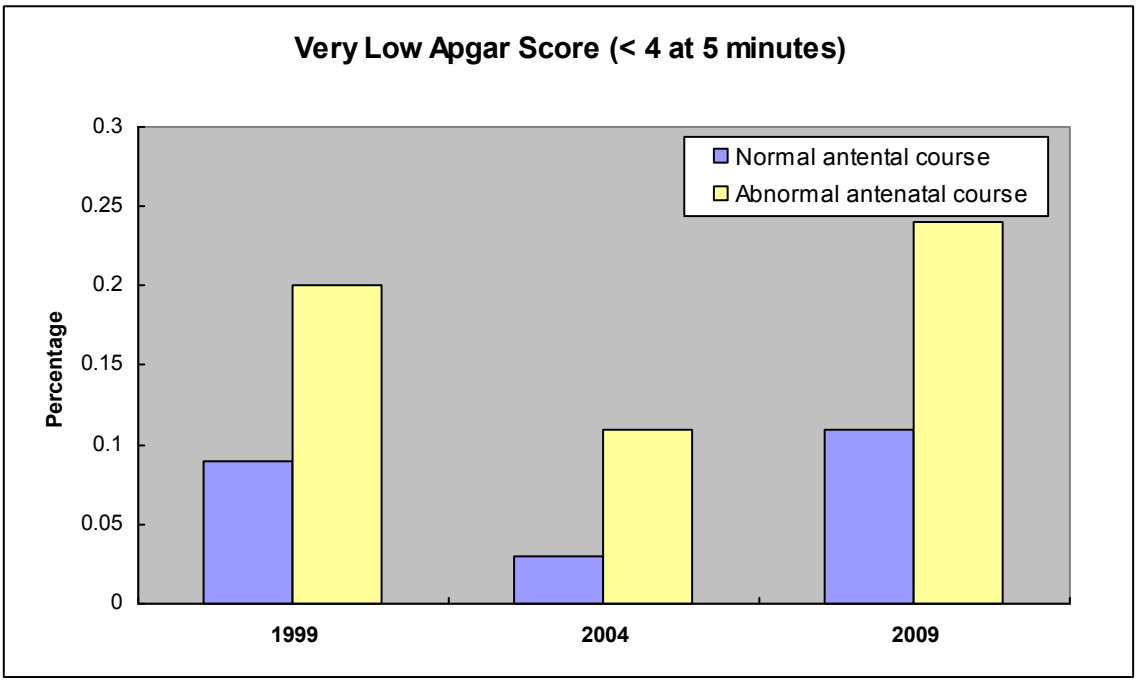

Figure O20 – Very low Apgar score

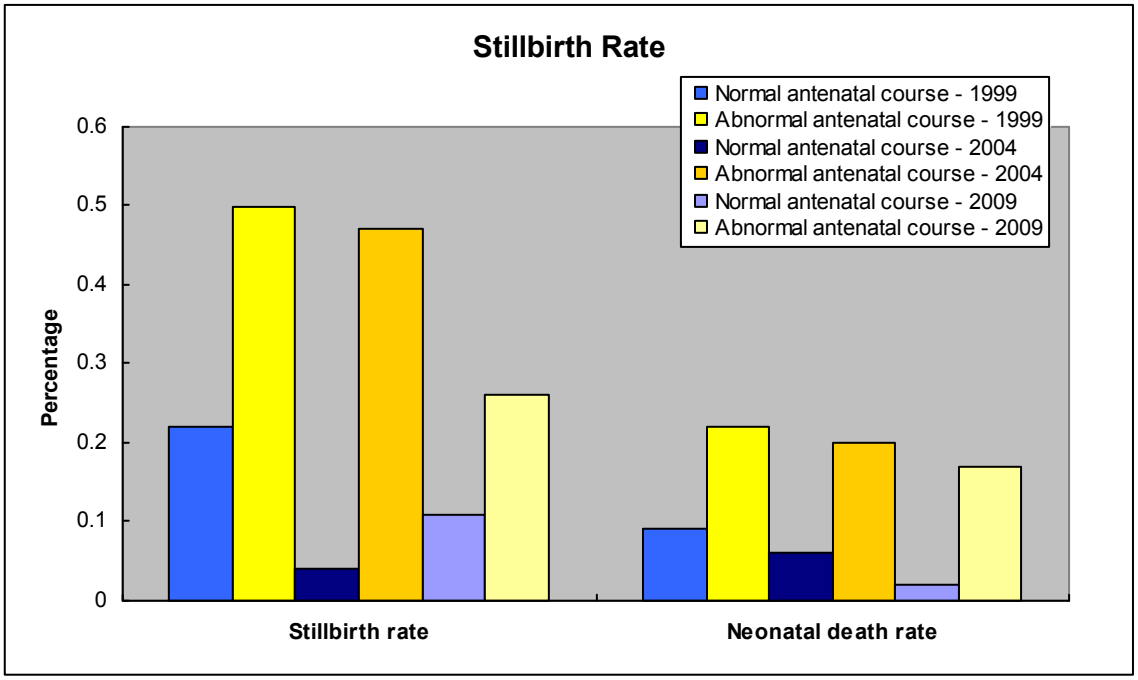

Figure O21 – Stillbirth and neonatal death rate

OUTCOME OF PREGNANCIES IN RESIDENTS AND NON-RESIDENTS

In recent years, there has been an influx of parturients from mainland China delivering in Hong Kong, a significant proportion of them are not Hong Kong residents. The obstetric characteristics and performance of these so called non-entitled persons (NEP) were audited in this current exercise and compared with local residents.

Parturients who were non-residents accounted for 44.5% of the total number of maternities. Their mean age was 30.2 ± 5.1 years, which was younger than the local residents (mean age 33.0 ± 4.8 years). A higher proportion of them was multiparous (59.3%), compared with only 45.3% were multiparous in the local residents. It may be related to the "One-Child Policy" in China. Similar to 2004, they had a lower incidence of having antenatal complications, with an overall rate of 19.8% compared with 8.8% in the local residents. The incidence of preterm delivery was also lower (5.1% versus 6.9%).

The incidence of born before arrival remained low for both non-residents and residents (0.2%). The residents were more likely to have a spontaneous vaginal delivery and less likely to require a caesarean section. The Caesarean Section rate for the non-residents was approaching 50% and the two commonest indications were previous uterine scars and social reasons. The mean birth weight of the babies was similar (3207 ± 427 gm for non-residents versus 3125 ± 480 gm for residents). However, the incidence of low birth weight (non-residents 4.3% versus residents 7.9%), the rate of admission to neonatal ICU (non-residents 4.7% versus residents 13.9%) and the rates of neonatal complications were all lower in the non-residents group. This could be due to the lower preterm delivery rates.

	2004				**2009**			
	Residents		**Non-Residents**		**Residents**		**Non-Residents**	
Total no. of maternities	39401	80.2%	9709	19.8%	44258	55.5%	35474	44.5%
Singleton	*38956*	*98.9%*	*9617*	*99.1%*	*43560*	*98.4%*	*35005*	*98.7%*
Twins	*437*	*1.1%*	*91*	*1.1%*	*686*	*1.6%*	*466*	*1.3%*
Triplets	*8*	*0.02%*	*1*	*0.01%*	*12*	*0.03%*	*3*	*0.01%*
Total no. of babies	39854	80.3%	9802	19.7%	44963	55.6%	35945	44.4%

PARITY OF THE PATURIENTS

	2004				**2009**			
	Residents		**Non-Residents**		**Residents**		**Non-Residents**	
Para 0	21399	54.3%	6101	62.8%	24230	54.7%	14434	40.7%
Para 1	14179	36.0%	3134	32.3%	16127	36.4%	18271	51.5%
Para 2	3038	7.7%	395	4.1%	3130	7.1%	2471	7.0%
Para 3 & above	785	2.0%	79	0.8%	771	1.7%	298	0.8%

AGE OF THE PATURIENTS

	2004				2009			
	Residents		Non-Residents		Residents		Non-Residents	
< 20 years	334	0.8%	61	0.6%	170	0.4%	207	0.6%
20 - 24 years	3297	8.4%	2061	21.2%	1952	4.4%	4578	13.1%
25 - 29 years	8606	21.8%	3958	40.8%	7510	17.1%	11811	33.7%
30 - 34 years	15255	38.7%	2504	25.8%	17036	38.8%	10495	30.0%
35 - 39 years	8877	22.5%	795	8.2%	13804	31.4%	6725	19.2%
≥ 40 years	2079	5.3%	154	1.6%	3478	7.9%	1218	3.5%
Unknown	953	2.4%	176	1.8%	308	0.7%	440	1.2%

ASSOCIATED ANTENATAL COMPLICATIONS

	2004				2009			
	Residents		Non-Residents		Residents		Non-Residents	
Antepartum haemorrhage	896	2.3%	88	0.9%	957	2.2%	213	0.6%
Placenta praevia	*255*	*28.5%*	*35*	*39.8%*	*507*	*53.0%*	*96*	*45.1%*
Placenta abruptio	*64*	*7.1%*	*8*	*9.1%*	*354*	*37.0%*	*101*	*47.4%*
APH of unknown origin	*534*	*59.6%*	*43*	*48.9%*	*58*	*6.1%*	*15*	*7.0%*
Other causes	*43*	*4.8%*	*2*	*2.3%*	*38*	*4.0%*	*1*	*0.5%*
Diabetes mellitus	3016	7.7%	92	0.9%	4590	10.4%	638	1.8%
Pre-existing DM	*68*	*2.3%*	*2*	*2.2%*	*74*	*1.6%*	*29*	*4.5%*
GDM	*719*	*23.8%*	*35*	*38.0%*	*1095*	*23.9%*	*220*	*34.5%*
IGT	*2229*	*73.9%*	*55*	*59.8%*	*3421*	*74.5%*	*389*	*61.0%*
Hypertension	1097	2.8%	153	1.6%	1021	2.3%	368	1.0%
Mild	*503*	*45.9%*	*59*	*38.6%*	*518*	*50.7%*	*166*	*45.1%*
Severe	*280*	*25.5%*	*54*	*35.3%*	*275*	*26.9%*	*120*	*32.6%*
Unclassified	*314*	*28.6%*	*40*	*26.1%*	*228*	*22.3%*	*82*	*22.3%*
Anaemia	1705	4.3%	251	2.6%	1726	3.9%	553	1.6%
Cardiac diseases	352	0.9%	27	0.3%	404	0.9%	66	0.2%
Surgical diseases	201	0.5%	17	0.2%	199	0.4%	51	0.1%
Other medical diseases	1397	3.5%	62	0.6%	2032	4.6%	186	0.5%

MODE OF ONSET OF LABOUR

	2004				2009			
	Residents		Non-Residents		Residents		Non-Residents	
Spontaneous	24444	62.0%	6875	70.8%	24355	55.0%	17682	49.8%
Induced labour	7480	19.0%	1545	15.9%	8782	19.8%	4324	12.2%
No labour	7477	19.0%	1289	13.3%	11116	25.1%	13465	38.0%

Missing data on onset of labour in 8 cases in 2009

GESTATION AT DELIVERY

	2004				2009			
	Residents		Non-Residents		Residents		Non-Residents	
< 26 weeks	65	0.2%	6	0.1%	87	0.2%	8	0.02%
26-28 weeks	135	0.3%	11	0.1%	118	0.3%	13	0.04%
29 - 32 weeks	348	0.9%	46	0.5%	360	0.8%	123	0.3%
33 - 36 weeks	2249	5.7%	430	4.4%	2509	5.7%	1655	4.7%
37 - 41 weeks	36118	91.7%	8896	91.6%	40901	92.4%	33345	94.0%
> 41 weeks	365	0.9%	308	3.2%	78	0.2%	132	0.4%
Unknown	121	0.3%	10	0.1%	205	0.5%	198	0.6%

MODE OF DELIVERY FOR EACH BABY

	2004				2009			
	Residents		Non-Residents		Residents		Non-Residents	
Spontaneous delivery	22520	56.5%	6378	65.1%	23842	53.1%	14576	40.6%
Vacuum extraction	3902	9.8%	921	9.4%	3907	8.7%	3428	9.5%
Forceps delivery	373	0.9%	92	0.9%	284	0.6%	89	0.2%
Vaginal breech delivery	81	0.2%	27	0.3%	106	0.2%	55	0.2%
LSCS before labour	7624	19.1%	1299	13.3%	11285	25.1%	13397	37.3%
LSCS after labour	5299	13.3%	1079	11.0%	5322	11.8%	4339	12.1%
Classical CS before labour	40	0.1%	5	0.05%	66	0.15%	24	0.07%
Classical CS after labour	14	0.04%	1	0.01%	112	0.26%	32	0.09%
Others	1	0.003%	0	0.0%	6	0.0%	2	0.0%

Missing data on mode of delivery in 36 cases in 2009

BIRTH WEIGHT AT DELIVERY

	2004				2009			
	Residents		Non-Residents		Residents		Non-Residents	
< 500 gm	16	0.04%	2	0.02%	28	0.06%	5	0.01%
500 - 999 gm	154	0.4%	13	0.1%	172	0.4%	18	0.05%
1000 - 1499 gm	229	0.6%	17	0.2%	259	0.6%	62	0.2%
1500 - 1999 gm	485	1.2%	89	0.9%	605	1.3%	211	0.6%
2000 - 2499 gm	1897	4.8%	362	3.7%	2509	5.6%	1246	3.5%
2500 - 2999gm	10428	26.2%	2316	23.6%	12659	28.2%	8784	24.4%
3000 - 3499 gm	17504	43.9%	4573	46.7%	19909	44.3%	16841	46.9%
3500 - 3999 gm	7612	19.1%	2058	21.0%	7551	16.8%	7177	20.0%
≥ 4000 gm	1419	3.6%	367	3.7%	1080	2.4%	1182	3.3%
Unknown	110	0.3%	5	0.1%	191	0.4%	419	1.2%

MATERNAL COMPLICATIONS

	2004				2009			
	Residents		Non-Residents		Residents		Non-Residents	
Born before arrival	126	0.3%	49	0.5%	88	0.2%	66	0.2%
Postpartum haemorrhage	1024	2.6%	271	2.8%	2449	2.7%	900	1.4%
Manual removal of placenta	837	2.1%	196	2.0%	693	1.6%	632	1.8%
Puerperal pyrexia	239	0.6%	55	0.6%	324	0.7%	100	0.3%
Third degree laceration	12	0.03%	4	0.04%	50	0.1%	17	0.05%
Hysterectomy	20	0.5%	1	0.01%	31	0.1%	9	0.03%
Rupture of uterus	4	0.01%	1	0.01%	4	0.01%	2	0.01%
Uterine artery ligation	2	0.005%	1	0.01%	2	0.005%	0	0.0%
Uterine artery embolisation	-	-	-	-	18	0.04%	6	0.02%
Preterm (<37 weeks)	2797	7.1%	495	5.1%	3074	6.9%	1799	5.1%
Singleton	*2575*	*92.1%*	*444*	*89.7%*	*2714*	*88.3%*	*1590*	*88.4%*
Multiple	*222*	*7.9%*	*51*	*10.3%*	*360*	*11.7%*	*209*	*11.6%*
Maternal death	3	0.008%	0	0.0%	1	0.002%	1	0.003%

FETAL OUTCOME

	2004				2009			
	Residents		Non-Residents		Residents		Non-Residents	
Alive at 28 days	39712	99.6%	9766	99.6%	44780	99.6%	35903	99.9%
Stillbirths	92	0.2%	25	0.3%	120	0.27%	28	0.08%
Antepartum	*73*	*79.3%*	*19*	*76.0%*	*104*	*86.7%*	*21*	*75.0%*
Intrapartum	*4*	*4.3%*	*0*	*0.0%*	*1*	*0.8%*	*3*	*10.7%*
Undetermined	*15*	*16.3%*	*6*	*24.0%*	*15*	*12.5%*	*4*	*14.3%*
Neonatal deaths	50	0.1%	11	0.1%	63	0.14%	14	0.04%
Early	*40*	*80.0%*	*10*	*90.9%*	*53*	*84.1%*	*13*	*92.9%*
Late	*10*	*20.0%*	*1*	*9.1%*	*10*	*15.9%*	*1*	*7.1%*
Low birth weight (<2500 gm)	2781	7.0%	483	4.9%	3573	7.9%	1542	4.3%
Singleton	*533*	*19.2%*	*117*	*24.2%*	*2697*	*75.5%*	*1104*	*71.6%*
Multiple	*2248*	*80.8%*	*366*	*75.8%*	*876*	*24.5%*	*438*	*28.4%*
Macrosomia (>4000 gm)	1342	3.4%	342	3.5%	1080	2.4%	1182	3.3%
Apgar score <4 at 1 minute	197	0.5%	53	0.5%	202	0.5%	41	0.1%
Apgar score <4 at 5 minutes	91	0.2%	29	0.3%	113	0.3%	25	0.1%

OTHER NEONATAL COMPLICATIONS

	2004				2009			
	Residents		Non-Residents		Residents		Non-Residents	
Admission to NICU	7408	18.6%	1545	15.8%	6265	13.9%	1702	4.7%
Major Congenital Abn.	201	0.5%	40	0.4%	122	0.3%	82	0.2%
RDS	20	0.05%	3	0.03%	38	0.1%	25	0.1%
IVH	1	0.003%	0	0.0%	9	0.02%	2	0.01%
Necrotising enterocolitis	4	0.01%	1	0.01%	6	0.01%	0	0.0%
Birth trauma	13	0.03%	6	0.1%	150	0.3%	79	0.2%
Major infection	18	0.05%	4	0.04%	29	0.1%	11	0.03%

MCA- Major congenital abnormalities; RDS- Resp distress syndrome; IVH -Intraventricular haemorrhage

The Gynaecological Report

2009

GENERAL GYNAECOLOGICAL STATISTICS

BACKGROUND INFORMATION OF THE RETURNED GYNAECOLOGICAL DATA

	1999		2004		2009	
Total number of records analyzed	76344		75053		70190	
Records with complete data	*70772*	*92.7%*	*73865*	*98.4%*	*65157*	*92.8%*
Records with incomplete data	*5572*	*7.3%*	*1188*	*1.6%*	*5033*	*7.2%*
Missing data on age	898	1.2%	231	0.3%	908	1.3%
Missing data on both admission/discharge date	376	0.5%	621	0.8%	1469	2.1%
Missing data on admission/discharge status	-	-	233	0.3%	2689	3.8%
No diagnosis recorded	1721	2.3%	325	0.43%	101	1.4%
No procedure recorded	2002	2.6%	385	0.51%	174	2.5%
No diagnosis and procedure recorded	-	-	295	0.39%	533	7.6%

STATUS AT ADMSSION

The total number of gynaecological admissions slightly decreased from 76,344 in 1999 to 75,053 in 2004 and further decreased to 70,190 in 2009. This represented a 8.1% drop over the 10 years period. Scheduled admissions rate remained around 70% of all admissions but day admission rate dropped from 14.7% in 2004 to 9.3% in 2009. Emergency admissions constituted 26-29% of all admissions in the 10 years period.

	1999		**2004**		**2009**	
Emergency admissions	21955	28.8%	19906	26.5%	15919	27.8%
Elective admissions	51001	66.8%	41996	56.0%	40436	57.5%
Day admissions	-	-	11071	14.7%	6553	9.3%
Unplanned readmissions	610	0.8%	895	1.2%	663	0.9%
Transfer in from other specialties	1229	1.6%	973	1.3%	823	1.2%
Missing data	1549	2.0%	212	0.3%	2286	3.3%
Total no. of admissions	**76344**		**75053**		**70190**	

STATUS AT DISCHARGE

Majority of the cases were discharged home and the rate remained above 95%. The number of deaths remained very low and constituted 0.03% of all admissions in the 10 years period. The rate of discharge against medical advice increased from 0.3% in 1999 to 0.6% in 2004 while the rate of transfer to other specialties continued to drop from 0.5% in 1999 to 0.2% in 2009.

	1999		**2004**		**2009**	
Home	74540	97.6%	74229	98.9%	67106	95.6%
Transfer to convalescence hospitals	73	0.1%	63	0.08%	43	0.1%
Transfer to other specialties	418	0.5%	247	0.3%	114	0.2%
Discharge against medical advice	264	0.3%	275	0.4%	454	0.6%
Death	26	0.03%	22	0.03%	23	0.03%
Missing data	1023	1.3%	217	0.3%	2450	3.5%
Total no. of admissions	**76344**		**75053**		**70190**	

SUMMARY OF DISTRIBUTION OF VARIOUS DIAGNOSES

For each admission, there might be more than one diagnosis under different or same category. The admission rate for uterine pathology steadily increased from 10.1% to 18.1% in the 10 years period and that for genital displacement/urinary disorders increased from 1.4% to 3.9%. Disorders of pregnancy and reproduction remained the most common condition for admission but its rate dropped from 50.3% to 46.8%. Uterine pathology and menstrual disorder were the second and third while vaginal pathology remained the least common indication for admission.

Classification of diagnoses	**1999**		**2004**		**2009**	
Vulva, perineum and urethra	1862	2.4%	1882	2.5%	1727	2.5%
Vagina	566	0.7%	486	0.7%	441	0.6%
Cervix	5529	7.2%	5240	7.0%	4351	6.2%
Uterus	7738	10.1%	11615	15.5%	12717	18.1%
Fallopian tubes	1585	2.1%	1742	2.3%	1397	2.0%
Ovaries	5784	7.6%	7508	10.0%	7267	10.4%
Broad ligaments & pelvic peritoneum	861	1.1%	957	1.3%	906	1.3%
Genital displacement / urinary disorders	1101	1.4%	2129	2.8%	2766	3.9%
Menstrual disorders	10658	14.0%	9235	12.3%	8000	11.4%
Pregnancy and reproductive disorders	38376	50.3%	36211	48.3%	32817	46.8%
Non-obstetric diseases in pregnancy	1747	2.3%	1909	2.5%	2161	3.1%
Other gynaecological diseases	2473	3.2%	2542	3.4%	1771	2.5%
Other non-gynaecological diseases	2434	3.2%	2251	3.0%	1890	2.7%
Total no. of admissions	**76344**		**75053**		**70190**	

TEN COMMONEST DIAGNOSES

First trimester termination of pregnancy and miscarriage remained the top two most common diagnoses for admission, however the overall rate of the former dropped from 20.5% in to 12.2% in the 10 years period while that of the latter fluctuated between 9.7% and 11.4%. Fibroid was the third most common diagnosis and the rate increased from 7.2% to 9.8%. Subfertility was the 4th most common diagnosis and its rate doubled between 1999 and 2009. Threatened miscarriage ranked the 5th and the rate remained 7-8%.

Diagnoses	**1999**		**2004**		**2009**	
	Ranking	%	Ranking	%	Ranking	%
First trimester termination of pregnancy	1	20.5	1	19.4	1	12.2
Silent /spontaneous miscarriage	2	11.4	2	9.7	2	10.8
Fibromyoma	5	7.2	3	9.6	3	9.8
Subfertility	6	4.2	5	6.6	4	9.3
Threatened miscarriage	4	7.7	4	6.7	5	7.9
Dysfunctional uterine bleeding	3	10.9	6	6.0	6	4.1
Menorrhagia	-	-	10	3.2	7	3.8
Benign ovarian tumour/benign cysts	9	3.0	8	3.6	8	3.4
Endometrial polyp	-	0.9	-	2.0	9	3.3
Cervical intra-epithelial neoplasia	7	3.6	7	4.0	10	3.3

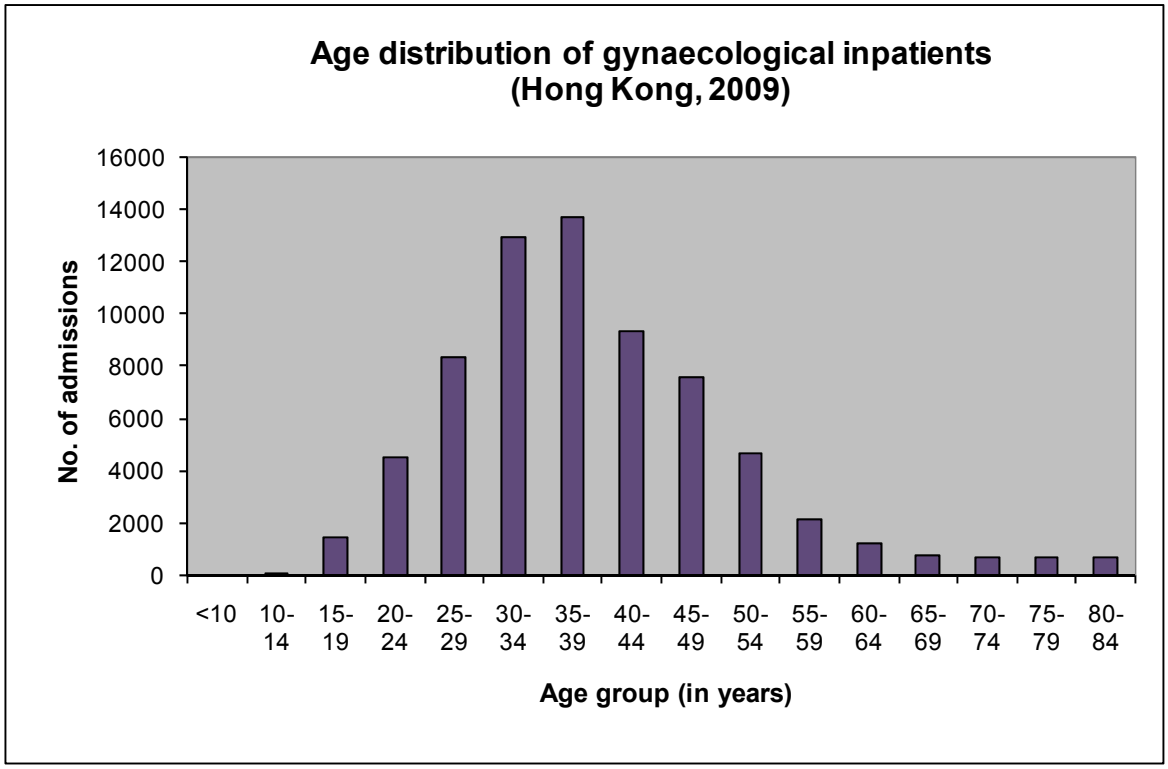

Figure G1 – Age distribution of gynaecological inpatients admission

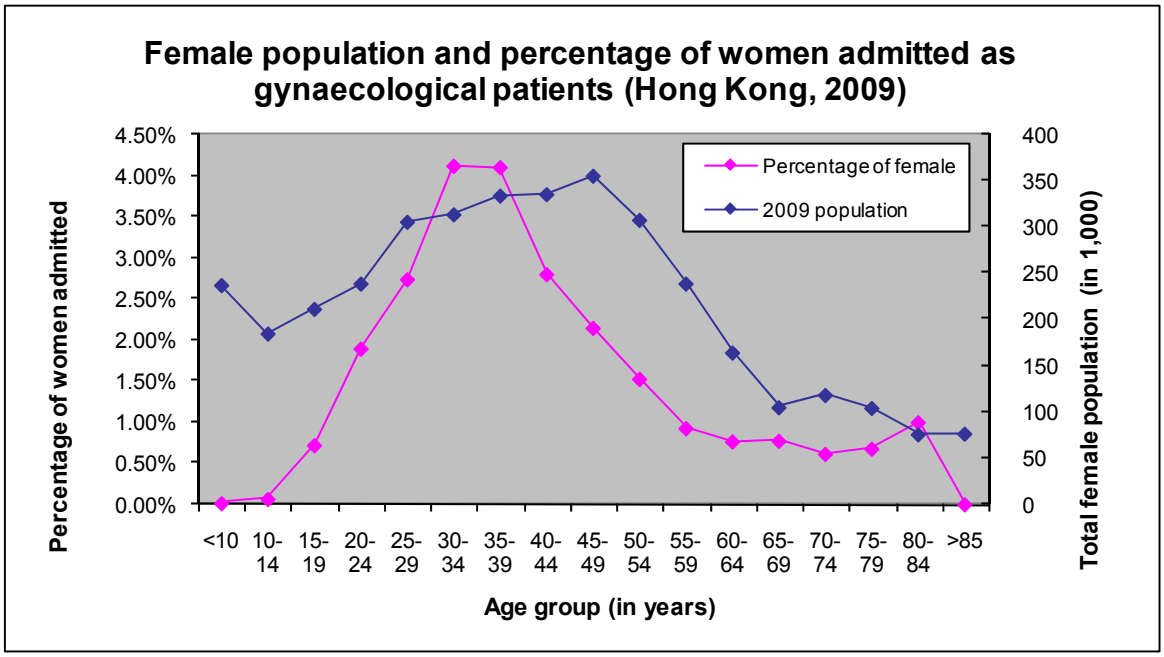

Figure G2 – Percentage of women admitted

DETAILED BREAKDOWN OF INDIVIDUAL DIAGNOSIS

DISEASES OF VULVA, PERINEIUM AND URETHRA

The number of admissions for this category of diseases dropped from 1,837 in 1999 and 1,862 in 2004 to 1,715 in 2009. This represented an overall 6.6% drop over the 10 years period. The number of vulval dystrophies increased by 30.9% while that of benign neoplasms decreased by 25.8% and that of malignant neoplasms fluctuated between 80-90 cases per year. The number of congenital anomalies dropped markedly by 73.1%.

	1999		2004		2009	
Infection	895	48.7%	767	41.2%	890	51.9%
Retention cyst	317	17.3%	331	17.8%	198	11.5%
Benign neoplasm	194	10.6%	168	9.0%	144	8.4%
Vulval dystrophy	84	4.6%	166	8.9%	110	6.4%
Malignant neoplasm	80	4.4%	87	4.7%	91	5.3%
Trauma	104	5.7%	148	7.9%	75	4.4%
Urethral lesions	29	1.6%	17	0.9%	17	1.0%
Congenital anomalies	52	2.8%	22	1.2%	14	0.8%
Miscellaneous	127	6.9%	171	9.2%	188	11.0%
Total no. of admissions	***1837***	***(2.4%)***	***1862***	***(2.4%)***	***1715***	***(2.4%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

DISEASES OF VAGINA

The number of admissions for vaginal diseases dropped from 566 in 1999 to 479 in 2004 and 438 in 2009. This represented an overall 22.6% drop over the 10 years period. The number of vaginal intra-epithelial neoplasia increased by 45.3% while that of malignant neoplasms decreased by 36.5%. The number of atrophic vaginitis dropped by 66.1%.

	1999		2004		2009	
Vaginal intra-epithelial neoplasia	64	11.3%	96	20.0%	93	21.2%
Infection	128	22.6%	99	20.7%	71	16.2%
Malignant neoplasm	74	13.1%	64	13.4%	47	10.7%
Trauma	38	6.7%	47	9.8%	47	10.7%
Benign neoplasm	40	7.1%	39	8.1%	34	7.8%
Retention cyst	50	8.8%	35	7.3%	27	6.2%
Congenital anomalies	26	4.6%	24	5.0%	20	4.6%
Atrophic vaginitis	56	9.9%	18	3.8%	19	4.3%
Fistula	21	3.7%	9	1.9%	10	2.3%
Miscellaneous	73	*12.9%*	55	11.5%	73	16.7%
Total no. of admissions	***566***	***(0.7%)***	**479**	**(0.6%)**	**438**	**(0.6%)**

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

DISEASES OF UTERINE CERVIX

The number of admissions for cervical diseases decreased from 5,529 in 1999 to 5,187 in 2004 and 4,319 in 2009. This represented an overall 21.9% drop over the 10 years period. The number of cervical intra-epithelial neoplasia decreased by 15.2% and that of carcinoma of cervix fluctuated between 951 to 1067 cases per year.

	1999		2004		2009	
Cervical intra-epithelial neoplasia	2725	49.3%	3016	58.1%	2309	53.5%
Carcinoma of cervix	1049	19.0%	951	18.3%	1067	24.7%
Benign neoplasm	939	17.0%	890	17.2%	662	15.3%
Infection	650	11.8%	146	2.8%	112	2.6%
Congenital anomalies	23	0.4%	22	0.4%	16	0.4%
Other malignancies of cervix	12	0.2%	29	0.6%	23	0.5%
Trauma	27	0.5%	20	0.4%	8	0.2%
Miscellaneous	158	2.9%	171	3.3%	154	3.6%
Total no. of admissions	***5529***	***(7.2%)***	***5187***	***(6.9%)***	***4319***	***(6.2%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

DISEASES OF UTERINE BODY

The number of admissions for uterine diseases increased from 7,738 in 1999 to 11,044 in 2004 and 12,024 in 2009. This represented an overall 55.4% increase over the 10 years period. The number of endometrial polyps increased by 3.5 folds, while that of fibroids increased by 27.4% and that of adenomyosis increased by 79.2%. The number of carcinoma of corpus doubled while that of other malignancy of the uterine body tripled.

	1999		2004		2009	
Fibromyoma	5422	70.1%	7190	65.1%	6908	57.5%
Endometrial polyp	658	8.5%	1512	13.7%	2310	19.2%
Carcinoma of corpus	622	8.0%	983	8.9%	1249	10.4%
Adenomyosis	572	7.4%	959	8.7%	1025	8.5%
Endometrial hyperplasia	258	3.3%	365	3.3%	552	4.6%
Infection	202	2.6%	267	2.4%	211	1.8%
Other malignancy of the uterine body	46	0.6%	92	0.8%	151	1.3%
Congenital anomalies	66	0.9%	66	0.6%	77	0.6%
Atrophic endometritis	36	0.5%	32	0.3%	38	0.3%
Trauma	37	0.5%	26	0.2%	24	0.2%
Myohyperplasia	31	0.4%	34	0.3%	12	0.1%
Miscellaneous	126	1.6%	89	0.8%	160	1.3%
Total no. of admissions	***7738***	***(10.1%)***	***11044***	***(14.7%)***	***12024***	***(17.3%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

DISEASES OF FALLOPIAN TUBES

The number of admissions for tubal diseases increased from 1,585 in 1999 to 1,722 in 2004 and decreased down to 1,386 in 2009. This represented an overall 12.6% drop over the 10 years period. The number of acute pelvic inflammatory disease dropped by 20% while that of the chronic form fluctuated between 362 and 440 cases per year.

	1999		2004		2009	
Acute pelvic inflammatory disease	1051	66.3%	1129	65.6%	841	60.7%
Chronic pelvic inflammatory disease	362	22.8%	440	25.6%	365	26.3%
Benign neoplasm	37	2.3%	54	3.1%	60	4.3%
Tuberculosis salpingitis	26	1.6%	14	0.8%	19	1.4%
Malignant neoplasm	49	3.1%	37	2.1%	17	1.2%
Miscellaneous	68	4.3%	68	3.9%	95	6.9%
Total no. of admissions	***1585***	***(2.1%)***	***1722***	***(2.3%)***	***1386***	***(2.0%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

DISEASES OF OVARY

The number of admissions for ovarian diseases increased from 5,784 in 1999 to 7,381 in 2004 and decreased to 7,090 in 2009. This represented an overall 22.6% increase over the 10 years period. The number of benign ovarian tumours, including dermoid cysts, increased by 30% while that of endometriotic cysts increased by 11.4%. The number of primary epithelial malignant tumour increased by 37.0% and that of borderline malignant tumour increased by 2.1 folds.

	1999		2004		2009	
Benign tumour/benign cyst	2254	39.0%	2701	36.6%	2410	34.0%
Endometriotic cyst	1891	32.7%	2426	32.9%	2106	29.7%
Primary malignant tumour – epithelial	975	16.9%	1526	20.7%	1336	18.8%
Dermoid cyst	-	-	-	-	526	7.4%
Retention/functional cyst	455	7.9%	462	6.3%	346	4.9%
Primary malignant tumour – non-epithelial	82	1.4%	137	1.9%	229	3.2%
Borderline malignant tumour	59	1.0%	101	1.4%	125	1.8%
Polycystic ovarian disease	-	-	-	-	48	0.7%
Secondary malignant tumour	27	0.5%	41	0.6%	45	0.6%
Miscellaneous	122	2.1%	114	1.5%	96	1.4%
Total no. of admissions	***5784***	***(7.6%)***	***7381***	***(9.8%)***	***7090***	***(10.1%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

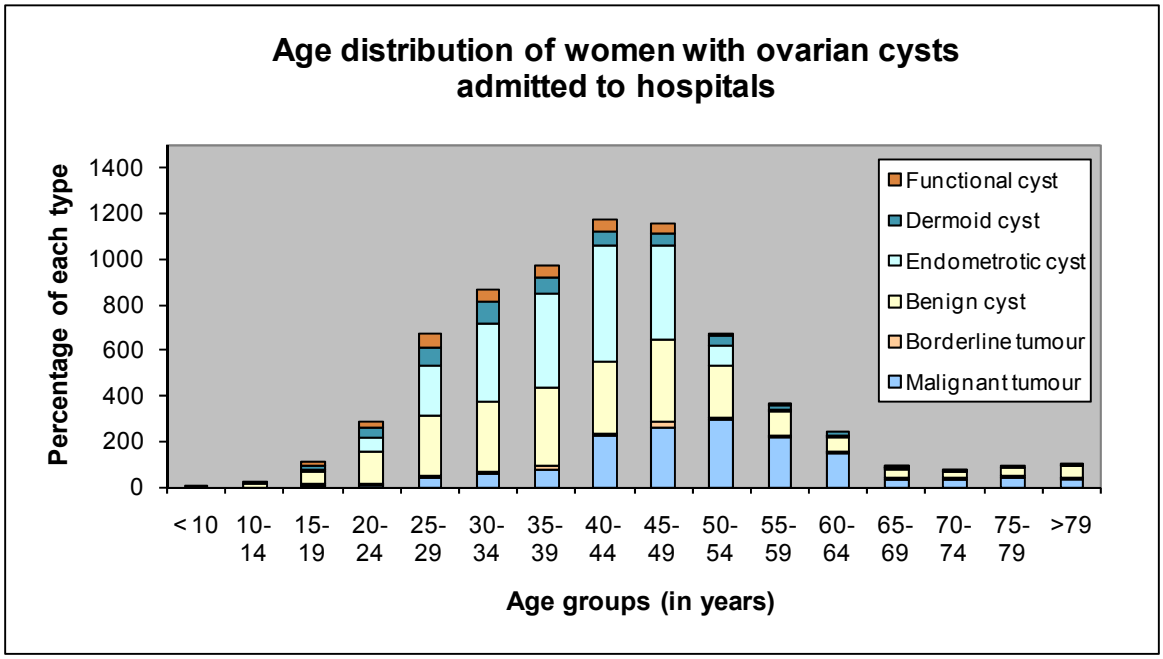

Figure G3 – Ovarian tumour: age distribution in number

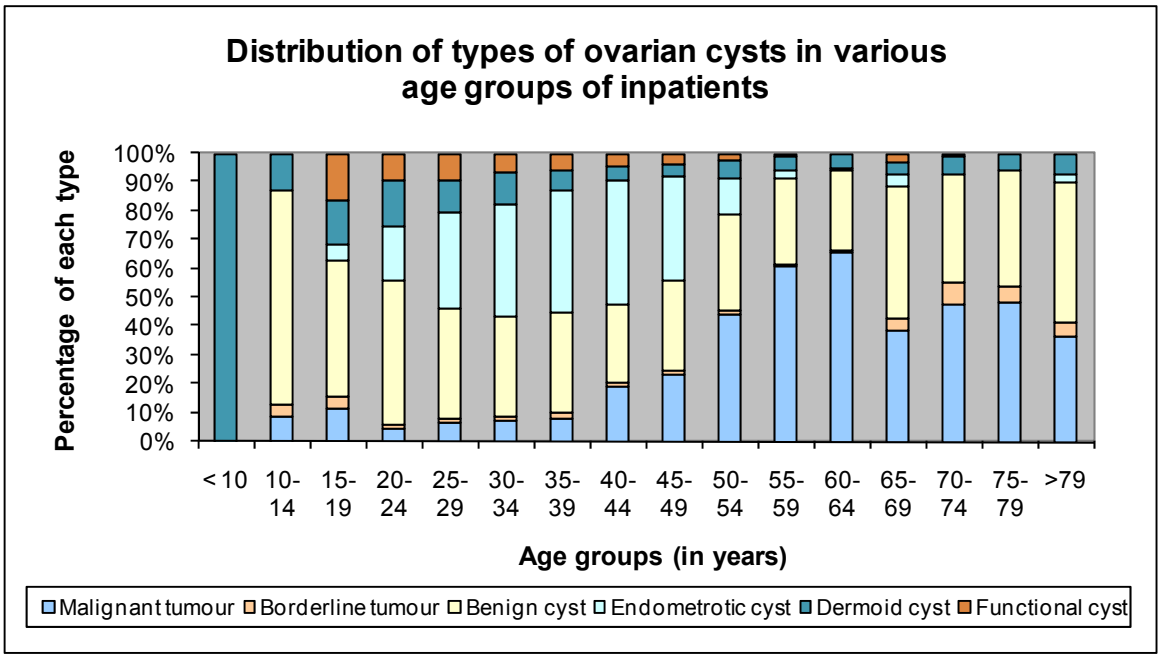

Figure G4 – Ovarian tumour: age distribution in percentage

DISEASES OF BROAD LIGAMENTS AND PELVIC PERITONEUM

The number of admissions for this category of diseases increased from 861 in 1999 to 940 in 2004 and decreased back to 875 in 2009. This represented an overall 1.6% increase over the 10 years period. The number of pelvic endometriosis decreased by 32.4%. Peritoneal carcinoma and recto-vaginal endometriosis were new items included in 2009 and the number was 194 and 18 respectively.

	1999		2004		2009	
Pelvic endometriosis	688	79.2%	681	72.4%	465	53.1%
Peritoneal carcinoma	-	-	-	-	194	22.2%
Paraovarian/paratubal cyst	94	10.8%	140	14.9%	120	13.7%
Recto-vaginal endometriosis	-	-	-	-	18	2.1%
Miscellaneous	87	10.0%	136	14.5%	109	12.5%
Total no. of admissions	***861***	***(1.1%)***	***940***	***(1.3%)***	***875***	***(1.2%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

GENITAL DISPLACMENT/URINARY DISORDERS

The number of admissions for this category of disorders increased from 1,101 in 1999 to 1,505 in 2004 and 1,953 in 2009. This represented an overall 77.4% increase over the 10 years period. In 2009, vaginal prolapse was divided into anterior and posterior compartment, rather than grouping them together as cystocele/rectocele/enterocele. Anterior compartment prolapse only occurred in 387 (19.8%) admissions, posterior prolapse only in 38 (1.9%) and both in 127 (6.5%). The number of uterine prolapse increased by 19.6% and that of vaginal prolapse doubled between 2004 and 2009. The number of stress incontinence steadily increased by 2.8 folds over the 10 years period.

	1999		2004		2009	
Uterine prolapse	806	73.2%	854	56.7%	964	49.4%
Genuine stress incontinence	195	17.7%	327	21.7%	541	27.7%
Cystocele/rectocele/enterocele	398	36.1%	555	36.9%	*(552)*	*(28.3%)*
Anterior vaginal prolapse	-	-	-	-	514	26.3%
Posterior vaginal prolapse	-	-	-	-	165	8.4%
Detrusor instability	18	1.6%	77	5.1%	92	4.7%
Voiding difficulty	-	-	114	7.6%	78	4.0%
Vault prolapse	-	-	31	2.1%	61	3.1%
Sensory urgency	-	-	41	2.7%	28	1.4%
Detrusor hyperreflexia	-	-	4	0.3%	8	0.4%
Other urinary disorders	-	-	100	6.6%	239	12.2%
Miscellaneous	47	4.3%	26	1.7%	76	3.9%
Total no. of admissions	***1101***	***(1.4%)***	***1505***	***(2.0%)***	***1953***	***(2.8%)***

In 2009, 127 cases had concurrent anterior and posterior vaginal prolapse
The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

DISORDERS OF MENSTRUATION

The number of admissions for menstrual disorders decreased from 10,658 in 1999 to 9,122 in 2004 and 7,882 in 2009. This represented an overall 26.0% drop over the 10 years period. The number of dysfunctional uterine bleeding decreased by 64.85 in the 10 years period while that of menorrhagia increased by 12.5% between 2004 and 2009. The number of admissions for postmenopausal bleeding fluctuated between 1,816 and 1,931 cases per year.

	1999		2004		2009	
Dysfunctional uterine bleeding	8209	77.0%	4515	49.5%	2887	36.6%
Menorrhagia	-	-	2396	26.3%	2696	34.2%
Postmenopausal bleeding	1931	18.1%	1816	19.9%	1906	24.2%
Dysmenorrhea	301	2.8%	299	3.3%	201	2.6%
Secondary amenorrhoea	92	0.9%	83	0.9%	35	0.4%
Primary amenorrhoea	45	0.4%	30	0.3%	19	0.2%
Miscellaneous	141	1.3%	91	1.0%	255	3.2%
Total no. of admissions	***10658***	***(14.0%)***	***9122***	***(12.2%)***	***7882***	***(11.3%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

DISORDERS OF PREGNANCY AND REPRODUCTION

The number of admissions for this category of disorders decreased from 38,376 in 1999 to 35,903 in 2004 and 32,646 in 2009. This represented an overall 14.9% drop over the 10 years period. The number of first trimester termination of pregnancies (TOP) decreased by 44.6% while that of second trimester termination of pregnancies decreased by 21.7%. The number of ectopic pregnancies increased by 25.7% while that of threatened and spontaneous/silent miscarriage remained 4,994-5,820 and 7,272-8,608 respectively. There was a marked increased in molar pregnancy/trophoblastic diseases in 2009 with an overall increase of 45.5%. The number of subfertility doubled while that of tubal occlusion/sterilization decreased dramatically by 10 folds.

	1999		2004		2009	
First trimester termination of pregnancy	15482	40.3%	14584	40.6%	8582	26.3%
Spontaneous/Silent miscarriage	8608	22.4%	7272	20.3%	7564	23.2%
Subfertility	3138	8.2%	4974	13.9%	6500	19.9%
Threatened miscarriage	5820	15.2%	4994	13.9%	5563	17.0%
Ectopic pregnancy	926	2.4%	1049	2.9%	1164	3.6%
Second trimester TOP	1233	3.2%	1098	3.1%	966	3.0%
Hyperemesis gravidarum	726	1.9%	539	1.5%	599	1.8%
Molar pregnancy/trophoblastic diseases	213	0.6%	213	0.6%	310	0.9%
Other postpartum complications	243	0.6%	188	0.5%	282	0.9%
For tubal occlusion / sterilization	2346	6.1%	677	1.9%	242	0.7%
Secondary postpartum haemorrhage	145	0.4%	147	0.4%	220	0.7%
Miscellaneous	526	1.4%	458	1.3%	875	2.7%
Total no. of admissions	***38376***	***(50.3%)***	***35903***	***(47.8%)***	***32646***	***(46.5%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

NON-OBSTETRIC COMPLICATIONS IN PREGNANCY

The number of admissions for this category of disorders increased from 1,747 in 1999 to 1,902 in 2004 and 2,139 in 2009. This represented an overall 22.4% increase over the 10 years period. The number of non-specific abdominal pain complicating pregnancy increased by 15.5%. The number of malignant tumours of the genital tract during pregnancy fluctuated between 9 and 32 while that of benign tumours fluctuated between 57 and 127 cases per year.

	1999		2004		2009	
Non-specific abdominal pain	1177	67.4%	1254	65.9%	1360	63.6%
Medical diseases	385	22.0%	524	27.5%	662	30.9%
Benign tumour of the genital tract	127	7.3%	57	3.0%	91	4.3%
Surgical diseases	47	2.7%	42	2.2%	38	1.8%
Malignant tumour of the genital tract	13	0.7%	32	1.7%	9	0.4%
Total no. of admissions	***1747***	***(2.3%)***	***1902***	***(2.5%)***	***2139***	***(3.0%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

MISCELLANEOUS GYNAECOLOGICAL CONDITIONS

The number of admissions for this category of conditions decreased from 2,463 in 1999 and 2,509 in 2004 to 1,766 in 2009. This represented an overall 28.3% drop over the 10 years period. The number of complications subsequent to previous treatment decreased by 21.1% and the proportion instituted in the same hospital varied from 61.9% to 67.2%. The overall rate of abdominal pain of unknown cause decreased by 41.5%.

	1999		2004		2009	
Complications subsequent to previous treatment in same hospital	754	31.9%	813	32.4%	551	31.2%
Abdominal pain of unknown cause	781	33.0%	861	34.3%	457	25.9%
Complications subsequent to previous treatment in other hospitals	374	15.8%	396	15.8%	339	19.2%
Retained IUCD	377	15.9%	328	13.1%	262	14.8%
Translocated IUCD	-	-	10	0.4%	15	0.9%
Miscellaneous	190	8.0%	134	5.3%	147	8.3%
Total no. of admissions	***2463***	***3.3%***	***2509***	***3.3%***	***1766***	***2.5%***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

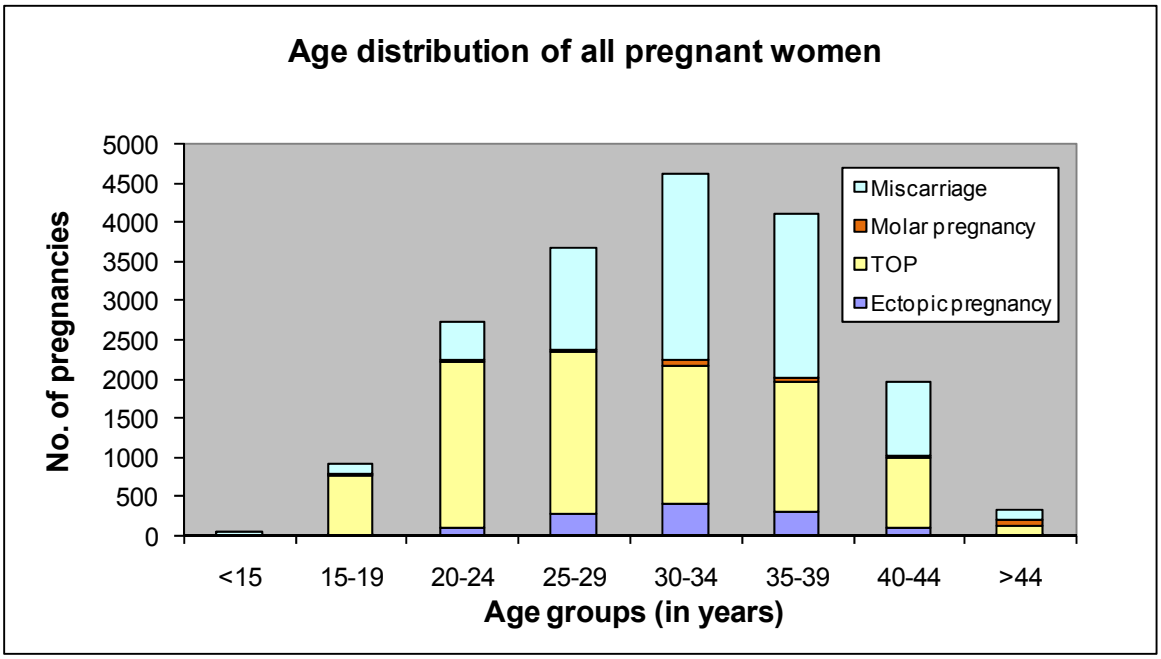

Figure G5 – Age distribution of all pregnant women

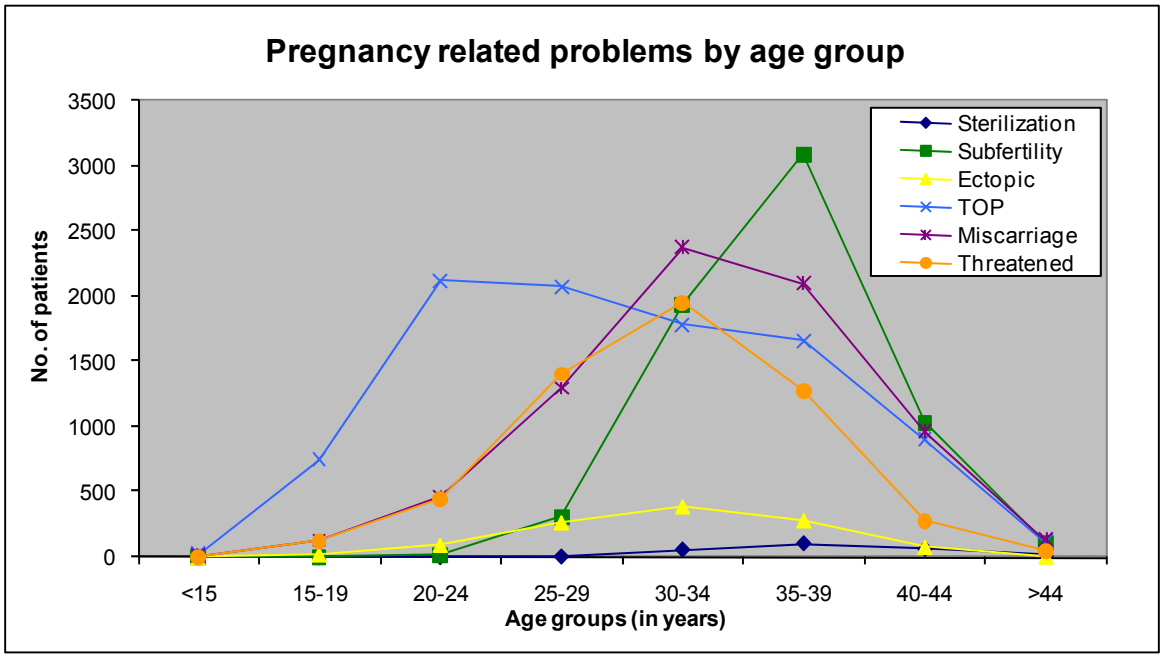

Figure G6 – Pregnancy related problems by age groups

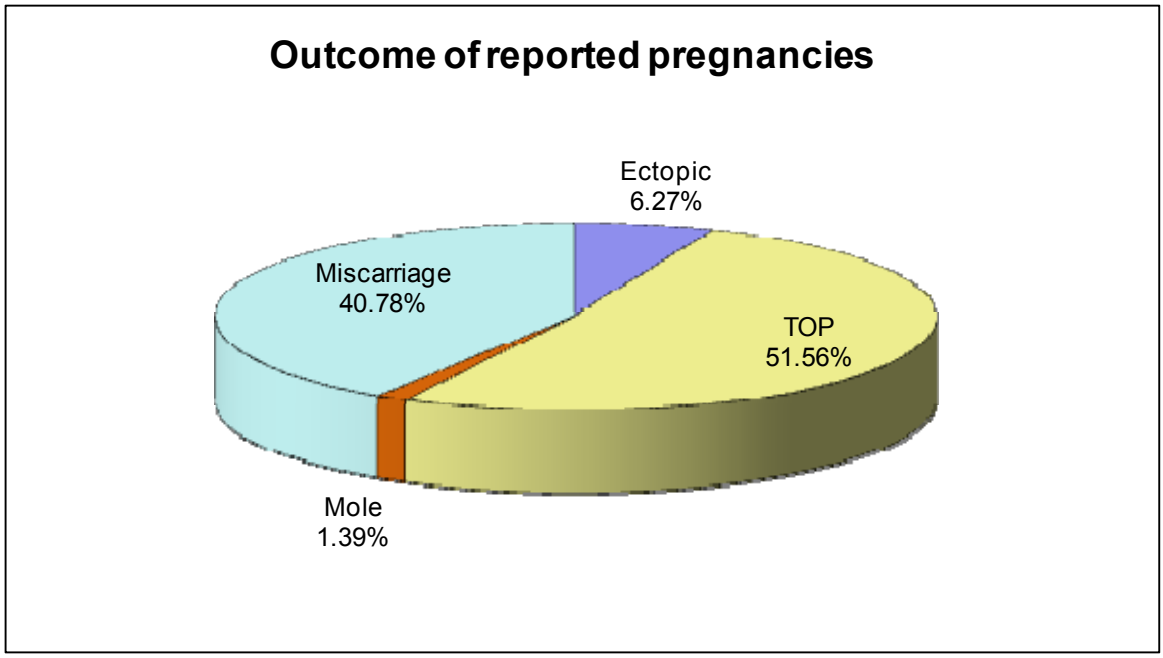

Figure G7 – Abnormal outcome of reported pregnancies

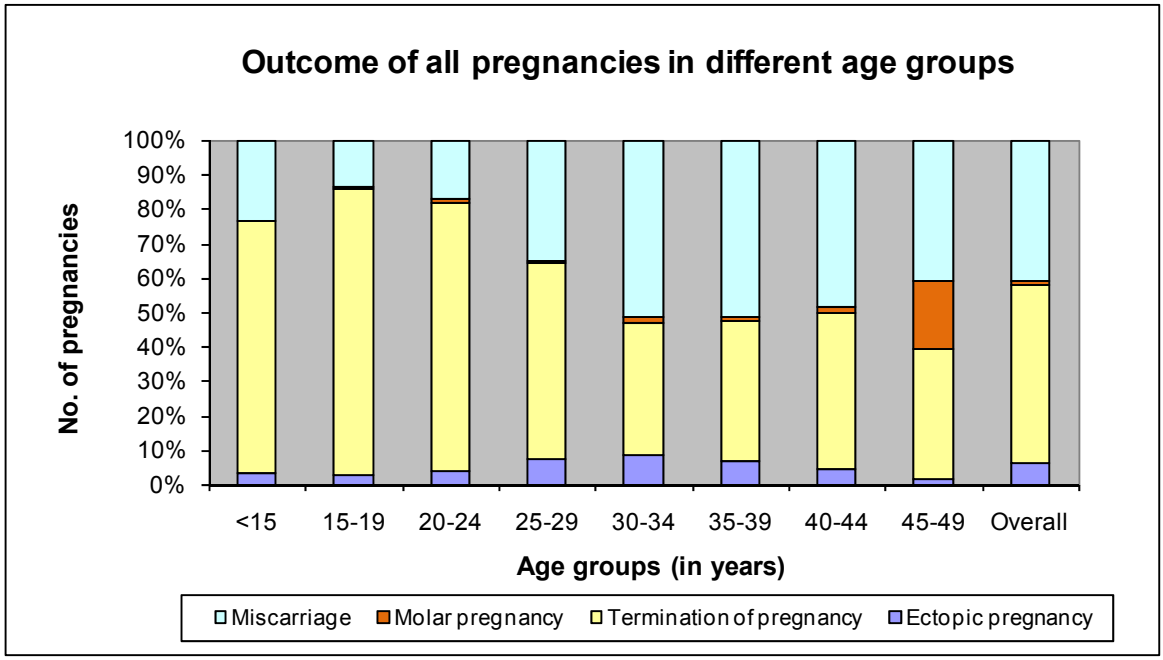

Figure G8 – Abnormal outcome of all pregnancies in different age groups

MISCELLANEOUS NON-GYNAECOLOGICAL CONDITIONS

The number of admissions for this category of conditions decreased from 2,434 in 1999 to 2,199 in 2004 and 1,810 in 2009. This represented an overall 25.6% decrease over the 10 years period. Diseases of the urinary tract remained the most common condition under this category. In general, there was an overall trend of decrease in the number of cases in most of the disease entities with the exception of musculo-cutaneous and breast disease. The number of breast diseases increased markedly from 76 in 1999 to 305 in 2004 and decreased dramatically back to 88 in 2009.

	1999		2004		2009	
Urinary tract disease	490	20.1%	374	17.0%	311	17.2%
Gastrointestinal tract disease	378	15.5%	279	12.7%	251	13.9%
Blood disease	212	8.7%	231	10.5%	209	11.5%
Cardiovascular disease	233	9.6%	201	9.1%	189	10.4%
Musculocutaneous disease	88	3.6%	114	5.2%	100	5.5%
Breast disease	76	3.1%	305	13.9%	88	4.9%
Endocrine disease	237	9.7%	126	5.7%	88	4.9%
Respiratory disease	94	3.9%	49	2.2%	78	4.3%
Central nervous system disease	102	4.2%	61	2.8%	52	2.9%
No diagnosis	8	0.3%	230	10.5%	225	12.4%
Miscellaneous	631	25.9%	281	12.8%	299	16.5%
Total no. of admissions	***2434***	***(3.2%)***	***2199***	***(2.9%)***	***1810***	***(2.6%)***

The percentage of individual diagnosis refers to the percentage under this disease category while that of the total no. of admissions refers to the percentage of all admissions.

SUMMARY OF DISTRIBUTION OF TREATMENT

The data represented the actual outcome procedure performed, not according to the original intention approach. For each admission, there may be more than one form of treatment under the same or different category. Non-operative treatment replaced minor vaginal/vulval operations to be the most common form of treatment and its rate increased from 32.0% to 43.2% in the 10 years period. Minor vaginal/vulval operations became the second and its rate dropped from 42.0% to 31.2%. The rate of endoscopic operations continued to rise from 14.1% to 20.6% and was the third most common form of treatment. While major abdominal operations for benign conditions remained about 8%, that for malignant conditions increased from 1.0% to 3.8% and major vaginal operations increased from 0.8% to 1.5%. The rate of assisted reproduction procedures also increased from 3.2% to 7.2% in the 10 years period.

	1999		**2004**		**2009**	
Major abdominal operations (benign)	6210	8.1%	6418	8.6%	5863	8.4%
Major abdominal operations (malignant)	796	1.0%	1643	2.2%	2706	3.8%
Major vaginal operations	648	0.8%	972	1.3%	1008	1.5%
Major vulval operations	94	0.1%	103	0.1%	128	0.2%
Endoscopic operations	10743	14.1%	13842	18.4%	14436	20.6%
Colposcopic related procedures	3387	4.4%	3102	4.1%	2497	3.6%
Assisted reproduction procedures	2420	3.2%	3464	4.6%	5059	7.2%
Minor abdominal operations	854	1.1%	210	0.3%	140	0.2%
Minor vaginal/vulval operations	32077	42.0%	28798	38.4%	21910	31.2%
Radiotherapy	133	0.2%	183	0.2%	149	0.2%
Non-operative treatment	24461	32.0%	27282	36.4%	30342	43.2%
Total no. of admissions	***76344***		***75053***		***70190***	

TEN COMMONEST TREATMENT MODALITIES

Observations and investigations and suction termination of pregnancy remained the most common treatment modalities with the rate of the former increased from 21.9% to 27.5% and that of the latter decreased from 19.9% to 12.3% in the 10 years period. The rate of evacuation of uterus after miscarriage also decreased from 9.2% to 5.6%. The rate of abdominal hysterectomy for benign conditions decreased from 4.5% to 3.7% while that of laparoscopic ovarian cystectomy increased from 1.5% to 3.3%.

Treatment Modalities	1999		2004		2009	
	Ranking	%	Ranking	%	Ranking	%
Observations and investigations	1	21.9	1	24.3	1	27.5
Suction termination of pregnancy	2	19.9	2	19.4	2	12.3
D&C/polypectomy	5	6.9	5	6.0	3	6.8
Diagnostic hysteroscopy	4	7.1	4	6.5	4	6.7
Evacuation of uterus after miscarriage	3	9.2	3	6.9	5	5.6
Embryo transfer	12	1.6	12	2.3	6	3.9
Total hysterectomy ± SO (benign)	6	4.5	6	4.8	7	3.7
Laparoscopic ovarian cystectomy	14	1.5	7	3.1	8	3.3
Prostaglandins	8	2.4	13	1.9	9	3.2
Antibiotics (as primary treatment)	7	2.8	8	2.7	10	2.8

DETAILED BREAKDOWN OF INDIVIDUAL TREATMENT

MAJOR ABDOMINAL OPERATIONS FOR BENIGN/PRE-MALIGNANT CONDITIONS

The number of admissions for this category of treatment decreased from 6,210 in 1999 and 6,137 in 2004 to 4,413 in 2009. This represented an overall 28.9% decrease over the 10 years period. Salpingo-oophorectomy was separated from total and subtotal hysterectomy as an individual procedure in 2009, which explained the dramatic increase in the number of this procedure in 2009. The number of abdominal hysterectomies decreased by 21.9% while that of abdominal ovarian cystectomies decreased by 53.5%. The number of abdominal myomectomies fluctuated between 887 and 1,142 cases per year, while that of abdominal operations for stress incontinence decreased dramatically by 96.6% with only 2 being done in 2009. These changes reflected that minimal access surgery had become the standard operative approach in most of the gynaecological pelvic procedures for non-malignant conditions.

	1999		2004		2009	
Total hysterectomy*	3428	55.2%	3761	61.3%	2666	60.4%
Salpingo-oophorectomy/oophorectomy	497	8.0%	436	7.1%	1314	29.8%
Ovarian cystectomy	1141	18.4%	760	12.4%	530	12.0%
Myomectomy	888	14.3%	1142	18.6%	887	20.1%
Salpingectomy	271	4.4%	153	2.5%	138	3.1%
Tuboplasty/adhesiolysis	69	1.1%	59	1.0%	109	2.5%
Subtotal hysterectomy*	36	0.6%	66	1.1%	33	0.7%
Salpingotomy/Salpingostomy	48	0.8%	24	0.4%	24	0.5%
Surgery for genital prolapse	-	-	-	-	20	0.5%
Drainage of pelvic abscess	-	-	23	0.4%	13	0.3%
Extended hysterectomy	-	-	-	-	6	0.1%
Repair of fistula	3	0.05%	6	0.1%	7	0.2%
Bowel resection / anastomosis / stoma	-	-	-	-	3	0.07%
Ureteric repair	-	-	-	-	3	0.07%
Operations for stress incontinence	59	1.0%	31	0.5%	2	0.05%
Miscellaneous	177	2.9%	101	1.6%	108	2.5%
Total no. of admissions	***6210***	***(8.1%)***	***6137***	***(8.2%)***	***4413***	***(6.3%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

* *Total hysterectomy ± SO or* Subtotal hysterectomy* ± SO *in 1999*

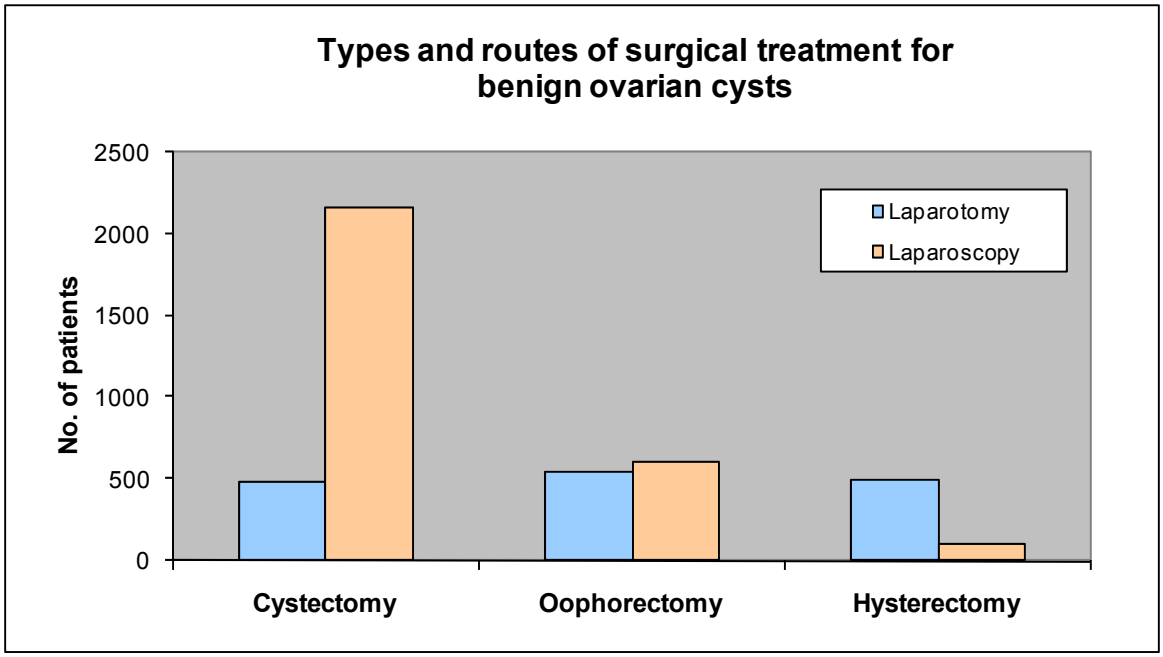

Figure G9 – Types and routes of surgical treatment for benign ovarian cysts

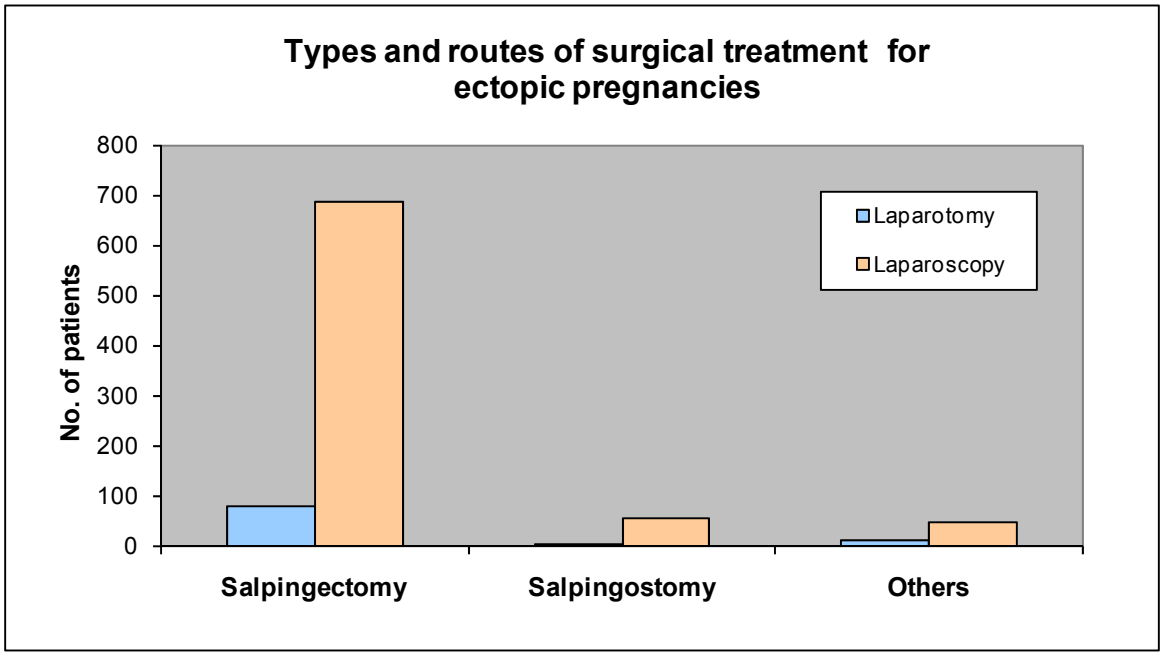

Figure G10 – Types and routes of surgical treatment for ectopic pregnancies

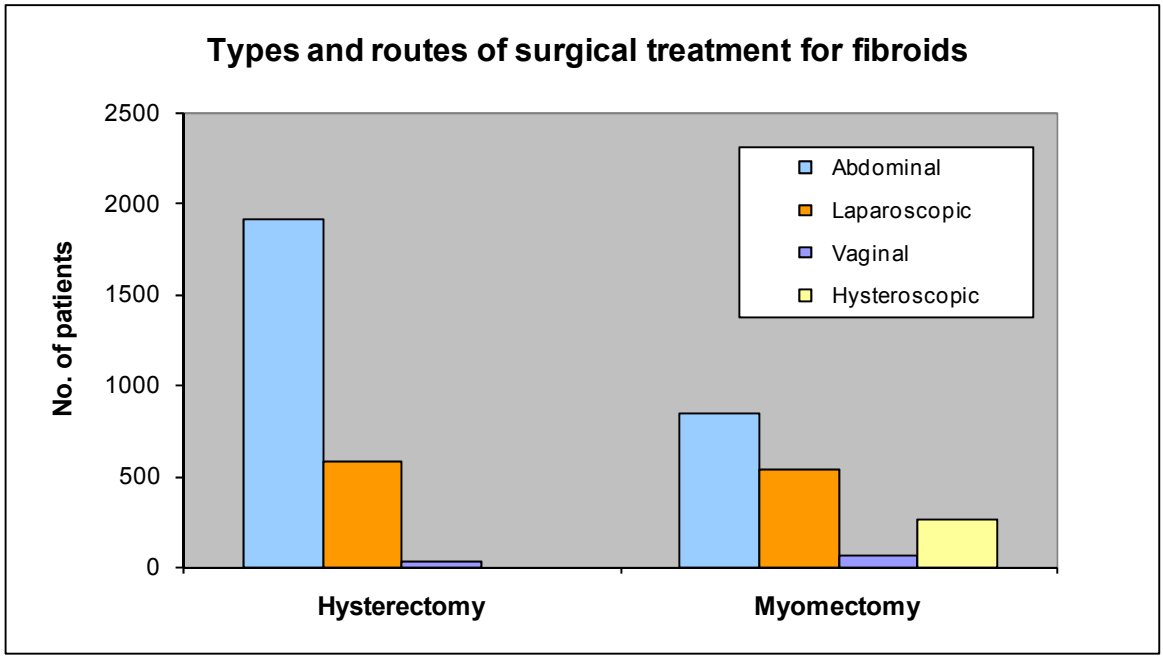

Figure G11 – Types and routes of surgical treatment for fibroids

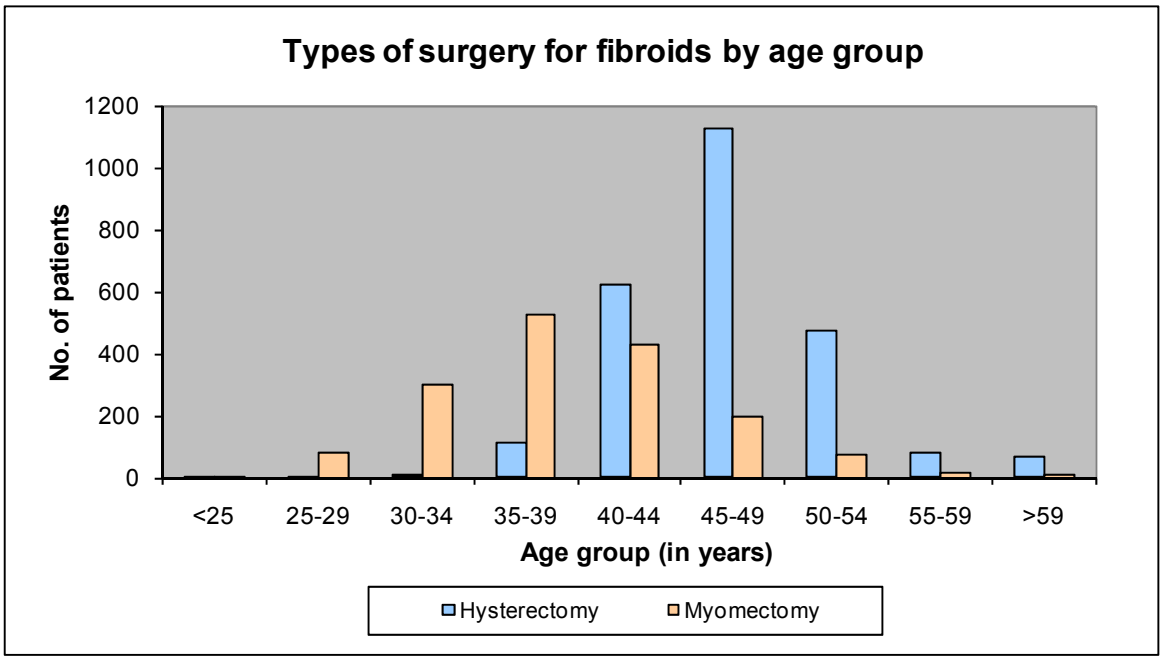

Figure G12 – Types of surgery for fibroids by age groups

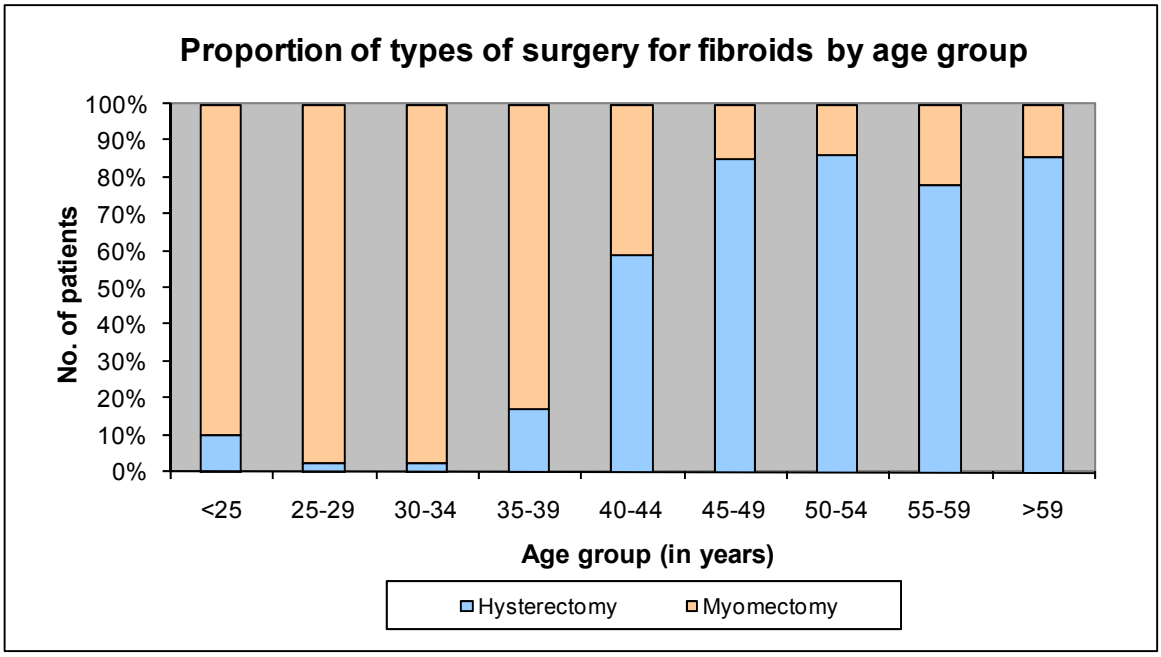

Figure G13 – Surgical treatment of uterine fibroid: age distribution in percentage

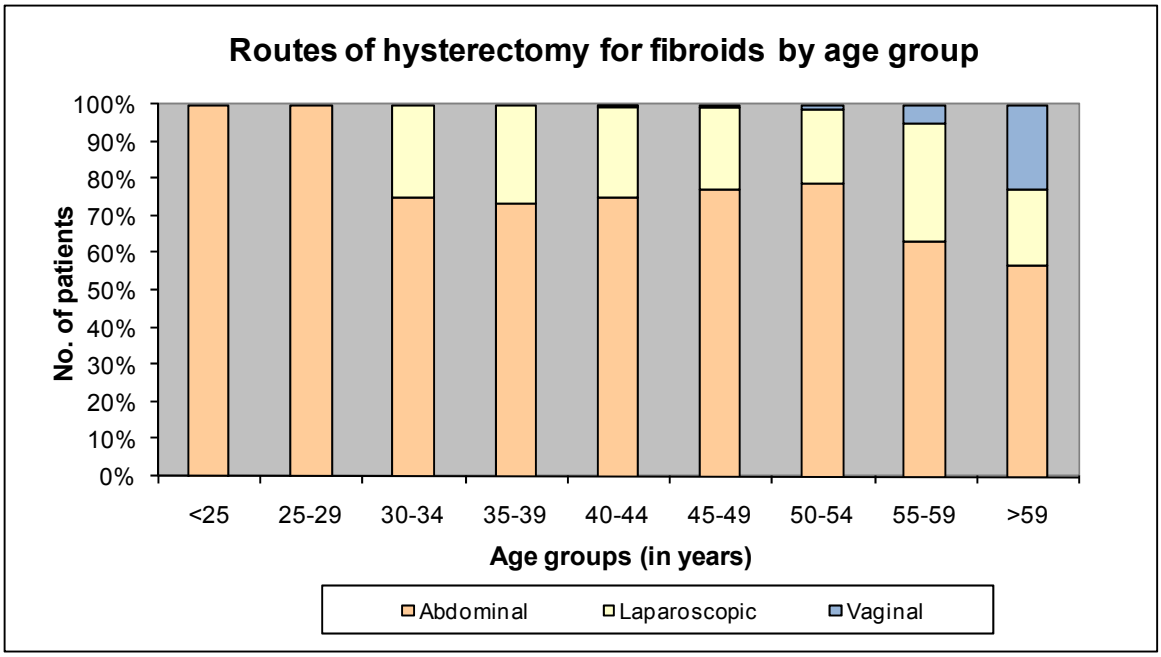

Figure G14 – Routes of hysterectomy for fibroids: age distribution in percentage

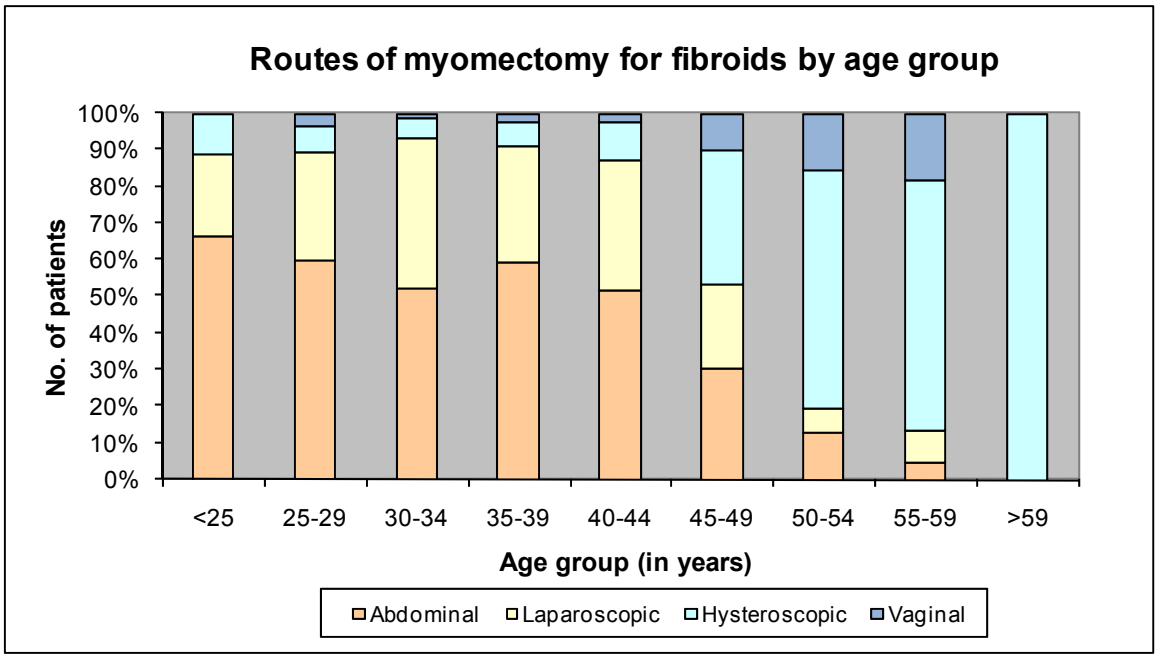

Figure G15 – Routes of myomectomy for fibroids: age distribution in percentage

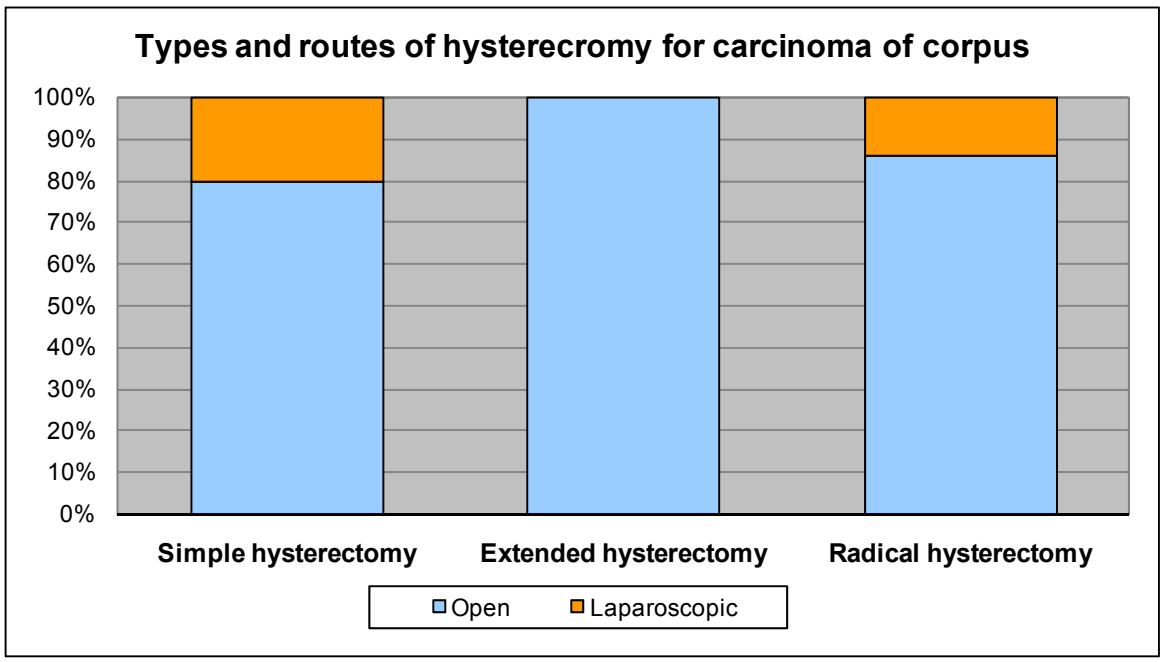

Figure G16 – Types and routes of hysterectomy for carcinoma of corpus

MAJOR ABDOMINAL OPERATIONS FOR MALIGNANT CONDITIONS

The number of admissions for this category of treatment increased from 796 in 1999 to 974 in 2004 and 1,266 in 2009. This represented an overall 59.0% increase over the 10 years period. The number of abdominal total hysterectomies increased by 37.5% while that of radical hysterectomies fluctuated between 99 to 130 cases per year, with an overall drop of 12.4%. The number of extended hysterectomies remained 21-24.

The number of debulking operations dramatically increased from 51 in 1999 to 177 in 2004 and this might be related to the absence of a standardized definition. In 2009, debulking operation was defined as "removal of gross tumour from sites other than uterus, tubes and ovaries (i.e. beyond a hysterectomy and salpingo-oophorectomy)", and the number decreased to 122. The number of pelvic lymph node dissection increased by 67.8% over the past 5 years while that of para-aortic lymph node dissection increased by 86.4%.

	1999		**2004**		**2009**	
Total hysterectomy*	534	67.1%	610	62.6%	734	61.7%
Salpingo-oophorectomy	-	-	-	-	734	61.7%
Pelvic lymphadenectomy / LN sampling	-	-	255	26.2%	428	36.0%
Omentectomy	-	-	-	-	303	25.5%
Debulking operation	51	6.4%	177	18.2%	122	10.3%
Para-aotic lymphadenectomy / LN sampling	-	-	59	6.1%	110	9.2%
Radical hysterectomy	113	14.2%	130	13.3%	99	8.3%
Bowel resection / anastomosis / stoma	-	-	-	-	38	3.2%
Laparotomy alone ± biopsy	-	-	31	3.2%	28	2.4%
Extended hysterectomy	24	3.0%	23	2.4%	21	1.8%
Subtotal hysterectomy*	7	0.9%	4	0.4%	4	0.3%
Pelvic exenteration	6	0.8%	10	1.0%	7	0.6%
Ureteric repair/ reimplantation	-	-	-	-	5	0.4%
Trachelectomy	-	-	-	-	2	0.2%
Repair of urinary fistulae	-	-	-	-	1	0.08%
Miscellaneous	58	7.3%	45	4.6%	69	5.8%
Total no. of admissions	***796***	***(1.1%)***	***974***	***(1.3%)***	***1266***	***(1.8%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

** Total hysterectomy ± SO or* Subtotal hysterectomy ± SO *in 1999*

MAJOR VAGINAL OPERATIONS

The number of admissions for this category of treatment increased from 648 in 1999 to 872 in 2004 and 899 in 2009. This represented an overall 38.7% increase over the 10 years period. The number of vaginal hysterectomies with or without pelvic floor repair fluctuated between 450 and 507 cases per year. Of the 460 vaginal hysterectomies reported in 2009, 28 (6.1%) were performed in the absence of genital prolapse (no coding for vaginal prolapse and/or genital prolapse under the diagnosis), compared to 7.7% in 2004. The number of admissions for vaginal operation for urinary incontinence increased by 3 folds, 90% of these procedures were performed using the tension-free-vaginal tape in 2009.

	1999		2004		2009	
Vaginal hysterectomy & pelvic floor repair	338	52.2%	420	48.2%	388	43.2%
TVT-O / TVT / TOT	-	-	-	-	219	24.4%
Pelvic floor repair	103	15.9%	133	15.3%	89	9.9%
Vaginal myomectomy	-	-	94	10.8%	81	9.0%
Vaginal hysterectomy	112	17.3%	87	10.0%	72	8.0%
Vaginal operation for urinary incontinence	60	9.3%	165	18.9%	24	2.7%
Repair of vault prolapse	-	-	-	-	23	2.6%
Vaginal stripping	-	-	-	-	13	1.4%
Vaginal reconstruction	-	-	-	-	3	0.3%
Repair of urinary fistula	3	0.5%	2	0.2%	2	0.2%
Miscellaneous	63	9.7%	66	7.6%	80	8.9%
Total no. of admissions	***648***	***(0.8%)***	***872***	***(1.2%)***	***899***	***(1.3%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

MAJOR VULVAL OPERATIONS

The number of admissions for this category of treatment increased from 94 in 1999 to 101 in 2004 and 116 in 2009. This represented a 23.4% increase over the 10 years period. The number of radical vulvectomies doubled over the 10 years period while that of wide local excisions and simple vulvectomies fluctuated between 15 and 23, and 9 and 13 cases per year respectively. Groin node dissection was a new entity in 2009 and there were 54 cases.

	1999		2004		2009	
Groin node dissection	-	-	-	-	54	46.6%
Wide local excision	23	24.5%	26	25.7%	15	12.9%
Radical vulvectomy	7	7.4%	14	13.9%	14	12.1%
Simple vulvectomy	13	13.8%	13	12.9%	9	7.8%
Miscellaneous	52	55.3%	50	49.5%	36	31.0%
Total no. of admissions	***94***	***(0.1%)***	***101***	***(0.1%)***	***116***	***(0.2%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

ENDOSCOPIC PROCEDURES

The number of admissions for all endoscopic procedures increased from 10,743 in 1999 to 11,765 in 2004 and 11,922 in 2009. This represented an overall 11.0% increase over the 10 years period. The number of hysteroscopic procedures stabilized at around 6,000 cases per year with the proportion of operative procedures increased from 9.7% in 1999 to 18.5% in 2004 and 24.1% in 2009. The number of laparoscopic procedures increased by 38.3% with the proportion of operative procedures (excluding sterilization/tubal occlusion) increased from 56.8% in 1999 to 82.0% in 2004 and 90.4% in 2009. The number of laparoscopic sterilization/tubal occlusion continued to drop dramatically from 1,521 to 222 cases per year in the 10 years period while that of diagnostic laparoscopy modestly decreased from 934 to 529.

	1999		2004		2009	
Diagnostic hysteroscopy	5418	50.4%	4847	41.2%	4673	39.2%
Diagnostic laparoscopy +/- Dye	934	8.7%	756	6.4%	529	4.4%
Cystoscopy	172	1.6%	210	1.8%	315	2.6%
Lap. sterilization/tubal occlusion	1521	14.2%	611	5.2%	222	1.9%
Endometrial resection/ablation	166	1.5%	187	1.7%	167	1.4%
Other laparoscopic operative procedures	3222	30.0%	6237	53.0%	7103	59.6%
Other hysteroscopic procedures	415	3.9%	915	7.8%	1315	11.0%
Miscellaneous	121	1.1%	78	0.7%	71	0.6%
Total no. of admissions	***10743***	***(14.1%)***	***11765***	***(15.7%)***	***11922***	***(17.0%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

HYSTEROSCOPIC PROCEDURES
(excluding diagnostic procedures)

The number of admissions for hysteroscopic procedures increased from 549 in 1999 to 1,017 in 2004 and 1,391 in 2009. This represented an overall 1.5 folds increase over the 10 years period. Polypectomy remained the most common procedure performed and the number increased by 5 folds. The number of myomectomy also increased by 3 folds while that of endometrial resection/ablation remained around 170 cases per year.

	1999		2004		2009	
Polypectomy	161	29.3%	514	50.5%	834	60.0%
Myomectomy	87	15.8%	236	23.2%	274	19.7%
Endometrial resection/ablation	166	30.2%	187	18.4%	167	12.0%
Miscellaneous	167	30.4%	165	16.2%	207	14.9%
Total no. of admissions	***549***	***(0.7%)***	***1017***	***(1.4%)***	***1391***	***(2.0%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

LAPAROSCOPIC PROCEDURES
(excluding diagnostic procedures and sterilization/tubal occlusion alone)

The number of admissions for operative laparoscopy increased from 2,484 in 1999 to 5,336 in 2004 and 6,088 in 2009. This represented an overall 2.5 folds increase over the 10 years period. Among all operative laparoscopies, ovarian cystectomy remained the most common procedure with the number increased by 2 folds. In general, the number of different procedures increased by 2-3 folds from 1999 to 2004 but remained roughly unchanged from 2004 to 2009 except for myomectomy, hysterectomy, lymphadenectomy, salpingostomy and colposuspension. The number of myomectomy increased by 8.5 folds while that of hysterectomy and lymphadenectomy increased by 4.2 folds and 11.4 folds respectively. The number of salpingotomy remained about 180 cases per year and that of colposuspension decreased from 9 to 5.

	1999		**2004**		**2009**	
Laparoscopic ovarian cystectomy	1130	45.5%	2313	43.3%	2296	37.7%
Laparoscopic salpingectomy	454	18.3%	872	16.3%	846	13.9%
Laparoscopic adhesiolysis	284	11.4%	462	8.7%	450	7.4%
Laparoscopic hysterectomy	255	10.3%	798	15.0%	1091	17.9%
Lap assisted vaginal hysterectomy (LAVH)	-	-	-	-	*524*	*8.6%*
Lap hysterectomy (LHa)	-	-	-	-	*79*	*1.3%*
Total lap hysterectomy (TLH)	-	-	-	-	*428*	*7.0%*
Lap assisted subtotal hysterectomy (LASH)	-	-	-	-	*60*	*1.0%*
Laparoscopic oophorectomy/SO	252	10.1%	720	13.5%	1060	17.4%
Laparoscopic salpingotomy	187	7.5%	183	3.4%	179	2.9%
Laparoscopic ablation of endometriosis	146	5.9%	176	3.3%	131	2.2%
Laparoscopic myomectomy	67	2.6%	355	6.7%	572	9.4%
Laparoscopic drainage of abscess	17	0.7%	39	0.7%	37	0.6%
Laparoscopic ovarian drilling	17	0.7%	54	1.0%	32	0.5%
Laparoscopic colposuspension	9	0.4%	4	0.1%	5	0.08%
Laparoscopic lymphadenectomy	9	0.4%	41	0.8%	103	1.7%
Pelvic lymphadenectomy	-	-	-	-	*78*	*1.3%*
Para-aortic lymphadenectomy	-	-	-	-	*25*	*0.4%*
Laparoscopic myolysis	6	0.2%	16	0.3%	28	0.5%
Laparoscopic radical hysterectomy	-	-	-	-	25	0.4%
Laparoscopic repair of prolapse	-	-	-	-	8	0.1%
Laparoscopic resection of endometriosis	-	-	-	-	77	1.3%
Robot-assisted surgery	-	-	-	-	41	0.7%
Miscellaneous	353	14.2%	198	3.7%	163	2.7%
Total no. of admissions	***2484***	***(3.3%)***	***5336***	***(8.3%)***	***6088***	***(8.7%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

Robot-assisted Procedures

The coding of robot-assisted surgery was introduced in 2009 and the number of admissions was 41, accounting for 0.7% of all laparoscopic procedures. Oophorectomy/salpingo-oophorectomy was the most common procedure and all except 2 were performed together with concurrent hysterectomy. Pelvic lymphadenectomy was the second most common procedure and 4 were performed without a concurrent hysterectomy. Simple hysterectomy and radical hysterectomy was the third and fourth most common procedure.

	2009	
Robotic oophorectomy/SO	24	58.5%
Robotic pelvic lymphadenectomy	20	48.8%
Robotic hysterectomy	16	39.0%
Robotic radical hysterectomy	15	36.6%
Robotic para-aortic lymphadenectomy	3	7.3%
Robotic adhesiolysis	1	2.4%
Robotic myomectomy	1	2.4%
Robotic repair of prolapse	1	2.4%
Other procedures	2	4.9%
Miscellaneous	2	4.9%
Total no. of admissions	***41***	***0.7%***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

COLPOSCOPIC RELATED PROCEDURES

The number of admissions for colposcopic procedures dropped from 3,387 in 1999 to 3,029 in 2004 and 2,415 in 2009. This represented an overall 28.7% decrease over the 10 years period. Loop diathermy excision remained the most common procedure with the number increased by 18.7%.

	1999		**2004**		**2009**	
Loop diathermy excision	1285	37.9%	2007	66.3%	1525	63.1%
Cone biopsy	298	8.8%	252	8.3%	161	6.7%
Cervical cautery	246	7.3%	283	9.3%	158	6.5%
Laser vaporization	55	0.4%	58	1.9%	34	1.4%
Laser cone	12	1.6%	24	0.8%	15	0.6%
Miscellaneous	1512	44.6%	478	15.8%	604	25.0%
Total no. of admissions	***3387***	***(4.4%)***	***3029***	***(4.0%)***	***2415***	***(3.4%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

ASSISTED REPRODUCTIVE PROCEDURES

The number of admissions for assisted reproductive procedures increased from 2,420 in 1999 to 3,184 in 2004 and 5,043 in 2009. This represented an overall 2 folds increase over the 10 years period. This was mostly related to oocyte retrieval and embryo transfer. The number of oocyte retrievals increased by 91.0%; most of them were performed under ultrasound guidance (99.9% in 2009). Gamete intra-fallopian transfer and pronuclear stage tubal transfer were seldom performed.

	1999		2004		2009	
Embryo transfer	1202	49.7%	1716	53.9%	2734	54.2%
USG guided oocyte retrieval	1001	41.4%	1356	42.6%	1913	37.9%
Intrauterine insemination	-	-	-	-	324	6.4%
Gamete intra-fallopian transfer	131	5.4%	3	0.1%	3	0.06%
Laparoscopic oocyte retrieval	124	5.1%	32	1.0%	1	0.02%
Pronuclear stage tubal transfer	1	0.04%	3	0.1%	2	0.04%
Miscellaneous	279	11.5%	354	11.1%	79	1.6%
Total no. of admissions	***2420***	***(3.6%)***	***3184***	***(4.2%)***	***5043***	***(7.2%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

MINOR ABDOMINAL OPERATIONS

The number of admissions for minor abdominal operations dropped from 854 in 1999 to 141 in 2004 and 139 in 2009. This represented an overall 86.7% decrease over the 10 years period. The number of open tubal ligation/occlusion decreased significantly by 95.9% with only 31 cases being performed in 2009. Of all the admissions for sterilization, laparoscopic sterilization/tubal occlusion was performed in 88%, compared with 83% in 2004 and 65% in 1999.

	1999		2004		2009	
Resuturing of gapped abdominal wound	59	6.9%	68	48.2%	79	56.8%
Tubal ligation/occlusion	758	88.8%	112	79.4%	31	22.3%
Miscellaneous	38	4.4%	30	21.3%	30	21.6%
Total no. of admissions	***854***	***(1.1%)***	***141***	***(0.2%)***	***139***	***(0.2%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

OTHER MINOR VAGINAL/VULVAL OPERATIONS

The number of admissions for this category of treatment dropped from 32,077 in 1999 to 28,008 in 2004 and 21,343 in 2009. This represented an overall 33.5% decrease over the 10 years period. The number of suction termination of pregnancy and evacuation of products of gestation dropped by 43% and 44.0% respectively in the 10 years period. Admission for D&C/polypectomy and endometrial biopsy fluctuated from 4,519 to 5,269 and 1,596 to 1,975 respectively. Insertion of Mirena for non-contraceptive purpose was a new item in 2009 and was performed in 118 cases.

	1999		2004		2009	
Suction termination of pregnancy	15165	47.3%	14589	52.1%	8640	40.5%
Evacuation of uterus after miscarriage	7024	21.9%	5139	18.3%	3930	18.4%
D&C/polypectomy	5269	16.4%	4519	16.1%	4775	22.4%
Endometrial biopsy	1649	5.1%	1975	7.1%	1596	7.5%
Marsupialisation	663	2.1%	711	2.5%	673	3.2%
Other vulval surgery	680	2.1%	589	2.1%	594	2.8%
Insertion / removal of IUCD	-	-	726	2.6%	539	2.5%
Examination under anaesthesia	173	0.5%	118	0.4%	150	0.7%
Insertion of Mirena (non-contraception)	-	-	-	-	118	0.6%
Cervical cerclage	35	0.1%	22	0.1%	43	0.2%
Miscellaneous	2180	6.8%	410	1.5%	852	4.0%
Total no. of admissions	***32077***	***(42.0%)***	***28008***	***(37.3%)***	***21343***	***(30.4%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

RADIOTHERAPY

The number of admissions for radiotherapy fluctuated between 181 and 133 in the 10 years period. The number remained low as most of these patients were mainly managed under the Department of Radiotherapy and Oncology instead of Gynaecology.

	1999		2004		2009	
External radiation therapy	81	60.9%	68	37.6%	123	83.7%
Intracavitary radiation therapy	31	23.3%	35	19.3%	17	11.6%
Miscellaneous	29	21.8%	79	43.6%	9	6.1%
Total no. of admissions	***133***	***(0.2%)***	***181***	***(0.2%)***	***147***	***(0.2%)***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

NON-OPERATIVE TREATMENT

The number of admissions for non-operative treatment increased from 24,461 in 1999 to 26,381 in 2004 and 28,377 in 2009. This represented an overall 16.0% increase over the 10 years period. Most of the management modalities increased over the 10 years period except for the use of antibiotics and other medication, which showed a drop of 10.9% and 47.7% respectively. The number of pre-anaesthetic assessment increased by 3.5 folds from 388 in 2004 to 1,354 in 2009. Uterine artery embolisation and MR guided focused ultrasound therapy were reported in 13 and 8 admissions These data were not captured in previous audits.

	1999		**2004**		**2009**	
Observation and investigations	16742	65.8%	18208	69.0%	19298	68.0%
Prostaglandins	1796	7.1%	1438	5.5%	2240	7.9%
Antibiotic (as primary treatment)	2165	8.5%	2042	7.7%	1930	6.8%
Hormones	1065	4.2%	1909	7.2%	1557	5.5%
Chemotherapy	554	2.2%	992	3.8%	1394	4.9%
Pre-anaesthetic assessment	-	-	388	1.5%	1354	4.8%
Other medications	889	3.5%	874	3.3%	465	1.6%
Uterine artery embolisation	-	-	-	-	13	0.05%
MR guided focused ultrasound therapy	-	-	-	-	8	0.03%
Miscellaneous	2224	8.7%	1415	5.4%	2083	7.3%
Total no. of admissions	***24461***	***33.7%***	***26381***	***35.1%***	***28377***	***40.4%***

The percentage of individual treatment refers to the percentage under this category while that of the total no. of admissions refers to the percentage of all admissions.

COMPLICATIONS

Complications were counted according to the intention to treat, not the actual procedure performed. Conversion from laparoscopic or vaginal to abdominal approach was counted as complication. There might be more than one complication for each admission, and there might be more than one complication for each operation performed. When the complication was associated with multiple procedures, it was considered to have occurred with each individual procedure.

The overall complication rate was 1.00% which was slightly lower than the 1.15% in 2004 and same as the 1.02% in 1999. Febrile morbidity, defined as fever >38^{o}C at least 4 hours apart 24 hours after operations with no identifiable cause, remained the most common complication and its rate fluctuated between 0.27% and 0.35%. Haemorrhage occurred in 0.23% which was similar to the 0.25% reported in 2004 and higher than the 0.16% reported in 1999. The incidence of inadvertent organ injury was 0.13%, similar to the 0.15% and 0.13% in 2004 and 1999 respectively, and there was no significant difference in the overall incidence among individual organ. The incidence of deep vein thrombosis was 0.03%, compared to 0.04% in 2004 and 0.01% in 1999. However, there were 2 additional cases of pulmonary embolism and 1 case of air embolism in 2009, giving an overall thrombo-embolic complication of 0.04%. Conversion occurred in 0.09% which was the same as in 2004 but higher than the 0.04% in 1999.

	1999		**2004**		**2009**	
Febrile morbidity*	204	0.27%	247	0.35%	211	0.30%
Operative blood loss with transfusion	87	0.11%	142	0.20%	128	0.18%
Urinary tract infection	208	0.27%	126	0.18%	106	0.15%
Wound complication	56	0.07%	153	0.22%	84	0.12%
Conversion of laparoscopy to laparotomy	31	0.04%	60	0.09%	62	0.09%
Injury of the urinary tract	47	0.06%	59	0.08%	38	0.05%
Injury to the uterus	36	0.05%	39	0.06%	38	0.05%
Postoperative blood loos with transfusion	38	0.05%	36	0.05%	36	0.05%
Deep vein thrombosis	8	0.01%	26	0.04%	22	0.03%
Injury to the bowels	15	0.01%	15	0.02%	18	0.03%
Unplanned re-operation before discharge	-	-	23	0.03%	16	0.02%
Chest infection	9	0.02%	7	0.01%	6	0.009%
Major vascular injury	4	0.01%	2	0.003%	2	0.003%
Intraoperative cardiopulmonary arrest	0	0	2	0.003%	0	0
Postoperative cardiopulmonary arrest			1	0.001%	2	0.003%
Others	132	0.17%	88	0.13%	73	0.10%
Total no. of admissions	***777***	***1.02%***	***862***	***1.15%***	***707***	***1.00%***

**Febrile morbidity - Fever >38^{o}C at least 4 hours apart 24 hours after operations with no cause identified to account for the fever*

COMPLICATION RATES IN RELATION WITH COMMON TYPES OF OPERATIONS

The percentage reflected the incidence of all complications of an individual operation. There could be more than one complication for each operation. Radical hysterectomy was associated with the highest morbidity and the risk was higher with the laparoscopic approach (13.6%) than laparotomy (10.9%). The complication rate of abdominal radical hysterectomy was lower in 2009 compared with previous years. The morbidity associated with simple hysterectomy for malignant conditions was higher than that for benign conditions (8.4% vs 6.2% for abdominal approach and 6.3% vs 5.4% for laparoscopic approach). The overall morbidity of vaginal hysterectomy reduced from 19.5% in 1994 to 6.9% in 2004 and 6.4% in 2009, but it was higher than the laparoscopic approach. Laparoscopic myomectomy (2.1%) was associated with the lowest complication rate compared with the vaginal (2.5%) and abdominal approach (3.6%).

	1999		**2004**		**2009**	
	N	%	N	%	N	%
Abdominal operations						
Total hysterectomy ± SO (benign)	3455	7.6	3840	7.7	2683	6.2
Ovarian cystectomy	1136	1.7	758	3.2	514	5.1
Salpingo-oohorectomy/oophorectomy	492	4.9	426	7.3	286	5.6
Myomectomy	889	3.6	1139	2.6	886	3.6
Salpingectomy	267	4.5	145	8.3	89	4.5
Total hysterectomy ± SO (malignant)	541	10.7	534	7.5	729	8.4
Radical hysterectomy	113	38.1	127	15.7	92	10.9
Vaginal operations						
Hysterectomy ± pelvic floor repair	451	8.2	507	6.9	456	6.4
Myomectomy	-	-	94	0	81	2.5
Laparoscopic operations						
Diagnostic laparoscopy	934	3.0	756	4.0	529	5.9
Laparoscopic sterilization	1521	0.8	611	0.8	222	1.4
Common laparoscopic procedure						
Ovarian cystectomy	*1139*	*2.4*	*2312*	*1.9*	*2242*	*1.7*
Salpingectomy	*458*	*3.3*	*880*	*2.3*	*848*	1.9
Salpingo-oophorectomy/oophorectomy	*258*	*5.0*	*720*	*3.2*	*585*	*3.1*
Hysterectomy (benign)	*233*	*10.3*	*724*	*5.7*	*970*	*5.4*
Hysterectomy (malignant)	*32*	*9.4*	*76*	*6.6*	*143*	*6.3*
Salpingotomy	*187*	*1.1*	*186*	*4.3*	*178*	*1.7*
Myomectomy	*67*	*4.5*	*358*	*2.0*	*573*	*2.1*
Radical hysterectomy					*22*	*13.6*
Hysteroscopic operations						
Diagnostic hysteroscopy	5418	0.5	4846	0.5	4673	0.8
Hysteroscopic procedure						
Endometrial resection	*166*	*0.5*	*187*	*1.1*	*167*	*0*
Polypectomy	*161*	*0*	*514*	*0.8*	*834*	*0.1*
Myomectomy	*87*	*0*	*236*	*2.5*	*274*	*2.2*
D&C/evacuation of uterus	27458	0.3	24122	0.2	17326	0.2

COMPLICATIONS OF TUBAL SURGERY

Tubal surgery was associated with very low morbidity with the risk higher with the open than laparoscopic approach. The conversion rate for laparoscopic approach was very low and less than 1%.

	Salpingectomy		Salpingostomy	
	Open (n=89)	Lap (n=848)	Open (n=20)	Lap (n=178)
Febrile morbidity	0(0.00%)	3(0.35%)	0(0.00%)	1(0.56%)
Urinary tract infection	2(2.25%)	2(0.24%)	1(5.00%)	1(0.56%)
Wound complication	1(1.12%)	0(0.00%)	0(0.00%)	0(0.00%)
Chest infection	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Intra-operative blood loss with transfusion	1(1.12%)	4(0.47%)	0(0.00%)	0(0.00%)
Post-operative haemorrhage with transfusion	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Injury to uterus	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Injury to urinary tract	1(1.12%)	0(0.00%)	0(0.00%)	0(0.00%)
Injury to bowels	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Major vascular injury	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Deep vein thrombosis	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Conversion	--	8(0.94%)	--	1(0.56%)
Unplanned-re-operation before discharge	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Cardiopulmonary arrest (Intra-operation)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Others	0(0.00%)	1(0.12%)	0(0.00%)	0(0.00%)
Total no. of admissions	***4(4.49%)***	***16(1.89%)***	***1(5.00%)***	***3(1.69%)***

COMPLICATIONS OF OVARIAN SURGERY

Ovarian cystectomy was associated with a lower complication rate than salpingo-oophorectomy irrespective of the operative approach. Laparoscopic ovarian cystectomy was associated with a lower complication rate than the open procedure. There were more bowel injury reported in salpingo-oophorectomy, especially with the laparoscopic approach. There was one urinary tract injury reported with the open salpingo-oophorectomy.

	Cystectomy		Salpingo-oophorectomy	
	Open (n=514)	Lap (n=2242)	Open (n=286)	Lap (n=585)
Febrile morbidity	12(2.33%)	9(0.40%)	3(1.05%)	3(0.51%)
Urinary tract infection	3(0.58%)	10(0.45%)	1(0.35%)	3(0.51%)
Wound complication	1(0.19%)	2(0.09%)	3(1.05%)	1(0.17%)
Chest infection	0(0.00%)	1(0.04%)	0(0.00%)	0(0.00%)
Intra-operative blood loss with transfusion	7(1.36%)	6(0.27%)	5(1.75%)	1(0.17%)
Post-operative haemorrhage with transfusion	0(0.00%)	1(0.04%)	1(0.35%)	0(0.00%)
Injury to uterus	0(0.00%)	3(0.13%)	0(0.00%)	0(0.00%)
Injury to urinary tract	0(0.00%)	0(0.00%)	1(0.35%)	0(0.00%)
Injury to bowels	1(0.19%)	0(0.00%)	1(0.35%)	3(0.51%)
Major vascular injury	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Deep vein thrombosis	1(0.19%)	1(0.04%)	3(1.05%)	0(0.00%)
Conversion	--	10(0.45%)	--	10(1.71%)
Unplanned-re-operation before discharge	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Cardiopulmonary arrest (Intra-operation)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Others	0(0.00%)	0(0.00%)	0(0.00%)	2(0.34%)
Total no. of admissions	***22(4.28%)***	***38(1.6.9%)***	***16(5.59%)***	***18(3.08%)***

COMPLICATIONS OF MYOMECTOMY

Laparoscopic myomectomy was associated with the lowest complication rate than the other approaches. Febrile morbidity was the most common complication after abdominal myomectomy. The risk of bleeding was 1.35%, 0.52% and 0.36% after abdominal, laparoscopic and hysteroscopic approach respectively. There were 3 cases of bowel injury, 2 associated with the laparoscopic and 1 with the abdominal approach. Three perforation of uterus occurred in hysteroscopic myomectomy with an overall risk of 1.09%.

There were 3 cases of hysterectomy associated with myomectomy, all because of malignancy. Two patients had abdominal hysterectomy, 1 after open myomectomy because of carcinoma of corpus and 1 after hysteroscopic myomectomy because of other uterine malignancy; the former had concurrent pelvic lymph node dissection and the latter required conversion from laparoscopic approach to laparotomy because of bleeding. One patient had re-operation with radical hysterectomy and bilateral pelvic lymph node dissection after laparoscopic myomectomy because of carcinoma of cervix on concurrent LEEP. The risk of hysterectomy for the abdominal, laparoscopic and hysteroscopic myomectomy was 0.11%, 0.17% and 0.36% respectively. The corresponding figures in previous audits were 0.2% in 2004 and 2% in 1999 for abdominal myomectomy, 0% in 2004 and 1.5% in 1999 for laparoscopic myomectomy and 0% in 2004 for hysteroscopic myomectomy.

	Open (n=886)	**Lap (n=573)**	**Hys (n=274)**	**Vaginal (n=81)**
Febrile morbidity	12(1.35%)	2(0.35%)	0(0.00%)	1(1.23%)
Urinary tract infection	7(0.79%)	0(0.00%)	0(0.00%)	0(0.00%)
Wound complication	1(0.11%)	0(0.00%)	0(0.00%)	0(0.00%)
Chest infection	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Intra-operative blood loss with transfusion	12(1.35%)	3(0.52%)	1 (0.36%)	0(0.00%)
Post-operative haemorrhage with transfusion	0(0.00%)	1(0.17%)	0(0.00%)	0(0.00%)
Injury to uterus	0(0.00%)	0(0.00%)	3 (1.09%)	1(1.23%)
Injury to urinary tract	2(0.23%)	0(0.00%)	0(0.00%)	0(0.00%)
Injury to bowels	1(0.11%)	2(0.35%)	0(0.00%)	0(0.00%)
Major vascular injury	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Deep vein thrombosis	2(0.23%)	0(0.00%)	0(0.00%)	0(0.00%)
Conversion to laparotomy	--	4(0.70%)	2(0.73%)	0(0.00%)
Unplanned re-operation before discharge	0(0.00%)	1(0.17%)	0(0.00%)	0(0.00%)
Cardiopulmonary arrest	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)
Others	0(0.00%)	1(0.17%)	4(1.46%)	0(0.00%)
Total no. of admissions	***32(3.61%)***	***12(2.09%)***	***6(2.19%)***	***2(2.47%)***

COMPLICATIONS OF HYSTERECTOMY (BENIGN CONDITIONS)

Among the 3 different routes of hysterectomy, laparoscopic hysterectomy was associated with the lowest complication rate. Intra-operative haemorrhage and febrile morbidity occurred more common in abdominal and vaginal approach. Inadvertent organ injury occurred in 0.41% after laparoscopic approach, 0.44% after vaginal hysterectomy, and 0.64% after abdominal hysterectomy. The corresponding figures in 2004 were 0.82%, 1.78% and 0.55% respectively.

	Abdominal (n=2683)	**Laparoscopic (n=970)**	**Vaginal (n=456)**
Febrile morbidity	51(1.90%)	16(1.65%)	12(2.63%)
Urinary tract infection	27(1.01%)	4(0.41%)	8(1.75%)
Wound complication	18(0.67%)	0(0.00%)	0(0.00%)
Chest infection	2(0.07%)	0(0.00%)	0(0.00%)
Intra-operative blood loss with transfusion	41(1.53%)	11(1.13%)	7(1.54%)
Post-operative haemorrhage with transfusion	14(0.52%)	2(0.21%)	2(0.44%)
Injury to urinary tract	14(0.52%)	3(0.31%)	1(0.22%)
Injury to bowels	3(0.11%)	1(0.10%)	1(0.22%)
Injury to uterus	0(0.00%)	0(0.00%)	0(0.00%)
Major vascular injury	0(0.00%)	0(0.00%)	0(0.00%)
Deep vein thrombosis	7(0.26%)	0(0.00%)	0(0.00%)
Conversion to laparotomy	--	19(1.96%)	1(0.22%)
Unplanned-re-operation before discharge	7(0.26%)	0(0.00%)	0(0.00%)
Cardiopulmonary arrest (Intra-operation)	0(0.00%)	0(0.00%)	0(0.00%)
Others	9(0.34%)	3(0.31%)	3(0.66%)
Total no. of admissions	***165(6.15%)***	***52(5.36%)***	***29(6.36%)***

**Figures include subtotal hysterectomy.*

COMPLICATIONS OF HYSTERECTOMY (MALIGNANT CONDITIONS)

Simple abdominal hysterectomy for malignant conditions was associated with a higher complication rate with intra-operative haemorrhage and febrile morbidity being the most common complications. Inadvertent organ injury occurred in 0.70% after laparoscopic approach and 0.96% after abdominal approach.

Laparoscopic radical hysterectomy was associated with a higher complication rate than abdominal radical hysterectomy. Urinary tract infection and deep vein thrombosis appeared to be more frequent in the laparoscopic approach and haemorrhage was more common in the abdominal approach.

	Simple Hysterectomy		**Radical Hysterectomy**	
	Open (n=729)	**Lap (n=143)**	**Open (n=92)**	**Lap (n=22)**
Febrile morbidity	13(1.78%)	0(0.00%)	3(3.26%)	1(4.55%)
Urinary tract infection	9(1.23%)	1(0.70%)	2(2.17%)	2(9.09%)
Wound complication	11(1.51%)	1(0.70%)	1(1.09%)	0(0.00%)
Chest infection	1(0.14%)	0(0.00%)	0(0.00%)	0(0.00%)
Intra-operative blood loss with transfusion	18(2.47%)	2(1.40%)	1(1.09%)	0(0.00%)
Post-operative haemorrhage with transfusion	3(0.41%)	0(0.00%)	1(1.09%)	0(0.00%)
Injury to uterus	4(0.55%)	1(0.70%)	0(0.00%)	0(0.00%)
Injury to urinary tract	3(0.41%)	0(0.00%)	1(1.09%)	0(0.00%)
Injury to bowels	1(0.14%)	0(0.00%)	0(0.00%)	0(0.00%)
Major vascular injury	2(0.27%)	0(0.00%)	0(0.00%)	0(0.00%)
Deep vein thrombosis	4(0.55%)	0(0.00%)	0(0.00%)	1(4.55%)
Conversion	--	4(2.80%)	--	0(0.00%)
Unplanned-re-operation before discharge	1(0.14%)	0(0.00%)	1(1.09%)	0(0.00%)
Cardiopulmonary arrest (Post-operation)	1(0.14%)	0(0.00%)	1(1.09%)	0(0.00%)
Others	8(1.10%)	1(0.70%)	0(0.00%)	0(0.00%)
Total no. of admissions	***61(8.37%)***	***9(6.29%)***	***10(10.87%)***	***3(13.64%)***

ANALYSIS ON HYSTERECTOMY

MODES AND TYPES OF HYSTERECTOMY

Abdominal route was still the main approach for hysterectomies with laparoscopic approach being employed in 23.5% (14% in 2004 and 5.6% in 1999) and 16.9% (9% in 2004 and 4.7% in 1999) of benign and malignant conditions respectively. Vaginal route was used in about 10-11% of benign conditions and 0.2-0.4% of malignant conditions.

	By Intention		
	1999	**2004**	**2009**
Benign condition	4146	5058	4136*
Simple abdominal hysterectomy	*3455 (83.3%)*	*3819 (75.5%)*	*2696 (65.2%)#*
Vaginal hysterectomy	*451 (10.9%)*	*505 (10.0%)*	*456 (11.0%)*
Laparoscopic hysterectomy	*233 (5.6%)*	*724 (14.3%)*	*970 (23.5%)*
Extended hysterectomy	*7 (0.2%)*	*10 (0.2%)*	*9 (0.2%)‡*
Malignant condition	701	834	975
Simple abdominal hysterectomy	*539 (76.9%)*	*613 (72.7%)*	*716 (73.4%)*
Extended hysterectomy	*17 (2.4%)*	*13 (1.6%)*	*19 (1.9%)*
Radical hysterectomy	*113 (16.1%)*	*130 (15.6%)*	*92 (9.4%)*
Laparoscopic hysterectomy	*32 (4.7%)*	*76 (9.1%)*	*143 (14.7%)*
Lap radical hysterectomy	*0 (0.0%)*	*0 (0.0%)*	*22 (2.3%)*
Vaginal hysterectomy	*0 (0.0%)*	*2 (0.2%)*	*4 (0.4%)*

	By outcome		
	1999	**2004**	**2009**
Benign condition	4146	5058	4136*
Simple abdominal hysterectomy	*3464 (83.6%)*	*3830 (75.7%)*	*2716 (65.7%)#*
Vaginal hysterectomy	*450 (10.9%)*	*503 (9.9%)*	*454 (11.0%)*
Laparoscopic hysterectomy	*225 (5.4%)*	*715 (14.1%)*	*952 (23.0%)*
Extended hysterectomy	*7 (0.2%)*	*10 (0.2%)*	*9 (0.2%)‡*
Malignant condition	701	834	975
Simple abdominal hysterectomy	*541 (77.2%)*	*614 (73.6%)*	*724 (74.3%)*
Extended hysterectomy	*17 (2.4%)*	*13 (1.6%)*	*19 (1.9%)*
Radical hysterectomy	*113 (16.1%)*	*130 (15.6%)*	*92 (9.4%)*
Laparoscopic hysterectomy	*30 (4.3%)*	*75 (9.0%)*	*135 (13.8%)*
Lap radical hysterectomy	*0 (0.0%)*	*0 (0.0%)*	*22 (2.3%)*
Vaginal hysterectomy	*0 (0.0%)*	*2 (0.2%)*	*4 (0.4%)*

**5 radical hysterectomies and 3 LRH were reported to be performed for benign diseases and not listed*
#13 were coded for malignant disease
‡ 3 were coded as malignant procedure but for benign diseases

CONDITIONS ASSOCIATED WITH SIMPLE HYSTERECTOMY

Of the top 10 most common conditions associated with simple abdominal and laparoscopic hysterectomy, fibroid and adenomyosis were the 2 commonest conditions in both groups. There were 552 malignancies being managed by laparotomy, of which 370 were for carcinoma of corpus and 182 for carcinoma of ovary (epithelial). In contrast, only 145 malignancies were managed by laparoscopy; of which 99 were for carcinoma of corpus, 24 for cervical malignancy, 16 for ovarian malignancy (6 were borderline malignancy), 2 for tubal malignancy and 4 for other uterine malignancy.

Abdominal hysterectomy	**No. (%)**	**Laparoscopic hysterectomy**	**No. (%)**
Fibromyoma	2037 (59.7%)	Fibromyoma	591 (51.9%)
Adenomyosis	416 (12.2%)	Adenomyosis	166 (14.6%)
Carcinoma of corpus	370 (10.8%)	Endometrial hyperplasia	100 (8.8%)
Benign ovarian tumour	256 (7.5%)	Carcinoma of corpus	99 (8.7%)
Endometriotic cyst	215 (6.3%)	Menorrhagia / DUB	107 (9.4%)
Carcinoma of ovary (epithelial)	182 (5.3%)	Endometriotic cyst	77 (6.8%)
CIN	115 (3.4%)	CIN	53 (4.7%)
Menorrhagia/DUB	104 (3.0%)	Benign ovarian tumour	48 (4.2%)
Endometrial hyperplasia	102 (300%)	Pelvic endometriosis	44 (3.9%)
Pelvic endometriosis	81 (2.4%)	Post-menopausal bleeding	43 (3.8%)

LENGTH OF HOSPITAL STAY

The length of hospital stay was calculated from the time of admission till discharge. Pre-operative assessment, in principle, would have been included. The length of hospital stay was divided into 3 groups and the grouping varies according to different types of procedure. About 42% of the admissions were discharged on the same day, and 54% were discharged within 7 days. Only 3.0% of all the admissions had length of stay longer than 1 week and this was lower than the 3.8% in 2004, 5.4% in 1999 and 7.4% in 1994. For those who stayed in hospital overnight, the mean duration of stay was 2.7 day and this was again shorter than that in 2004, 1999 and 1994.

	Mean* (days)	S.D. (days)	Day 0	Day 1-7	Day 8-14	>14 days
1994	4.0	4.8	40.0%	52.6%	6.0%	1.4%
1999	3.4	4.3	39.0%	55.6%	4.5%	0.9%
2004	3.0	3.5	42.4%	53.8%	3.1%	0.7%
2009	2.7	3.1	42.6%	54.4%	2.4%	0.6%

** Excluding those with no information and day patients.*

LENGTH OF STAY FOR MAJOR ABDOMINAL SURGERY

The length of stay after major abdominal surgery was shorter than that in 2004. The length of stay for simple, subtotal and extended hysterectomy were shorter when performed for malignant conditions than benign conditions. The mean length of stay following radical hysterectomy and debulking operation were shorter than that in 2004. The mean length of stay following pelvic exenteration remained about 12 days. Overall 82% of all major abdominal surgeries for benign conditions were discharged within 7 days, compared to only 49% of the malignant counterpart.

Benign Conditions	Total no. of admissions	Mean (days)	S.D. (days)	1-7 days	8-14 days	>14 days
TAH (benign)	2588	5.7	3.3	2124	418	46
Subtotal hysterectomy ± BSO (benign)	32	4.6	1.6	31	1	0
Extended hysterectomy (benign)	8	6.0	1.5	6	2	0
Myomectomy	844	4.5	1.8	799	42	3
Salpingo-oophorectomy/oophorectomy	1282	6.4	4.0	934	312	36
- excluding concurrent hysterectomy	278	6.0	3.5	212	58	8
Ovarian cystectomy	517	5.0	2.9	458	54	5
Salpingectomy	130	4.8	2.8	19	20	1
Salpingotomy	24	5.0	3.4	19	5	0
Tuboplasty/adhesiolysis	105	4.7	5.0	94	8	3
Drainage of abscess	11	11.7	11.1	5	3	3
Operation for urinary fistula	6	5.5	7.4	5	0	1
Bowel resection / anastomosis / stoma	3	14.0	6.1	0	2	1
Abdominal surgery for stress incontinence	2	3.0	0.0	2	0	0
Ureteric repair	3	4.0	2.6	3	0	0
Miscellaneous (benign)	109	5.7	5.1	90	13	6

Malignant Conditions	Total no. of admissions	Mean (days)	S.D. (days)	1-7 days	8-14 days	>14 days
TAH (malignant)	713	8.4	5.3	387	260	66
Salpingo-oophorectomy/oophorectomy	709	8.5	5.2	367	271	71
- excluding concurrent hysterectomy	*103*	*7.3*	*4.1*	*65*	*30*	*8*
Subtotal hysterectomy (malignant)	4	9.0	2.2	1	3	0
Extended hysterectomy	17	10.6	6.1	4	9	4
Radical hysterectomy	92	9.3	4.3	35	48	9
Debulking	116	9.7	5.7	48	50	18
Pelvic LND	392	8.5	5.0	191	167	34
Para-aortic LND	104	10.3	6.9	36	53	15
Omentectomy	291	9.2	5.7	122	132	37
Bowel resection / anastomosis / stoma	38	13.7	8.2	8	14	16
Laparotomy alone ± biopsy	27	12.2	8.1	9	13	5
Pelvic exenteration	7	11.9	9.0	3	0	4
Trachelectomy	2	3.0	1.4	2	0	0
Ureteric repair / reimplantation	5	13.0	7.6	1	2	2
Miscellaneous (malignant)	68	9.2	5.9	31	23	14

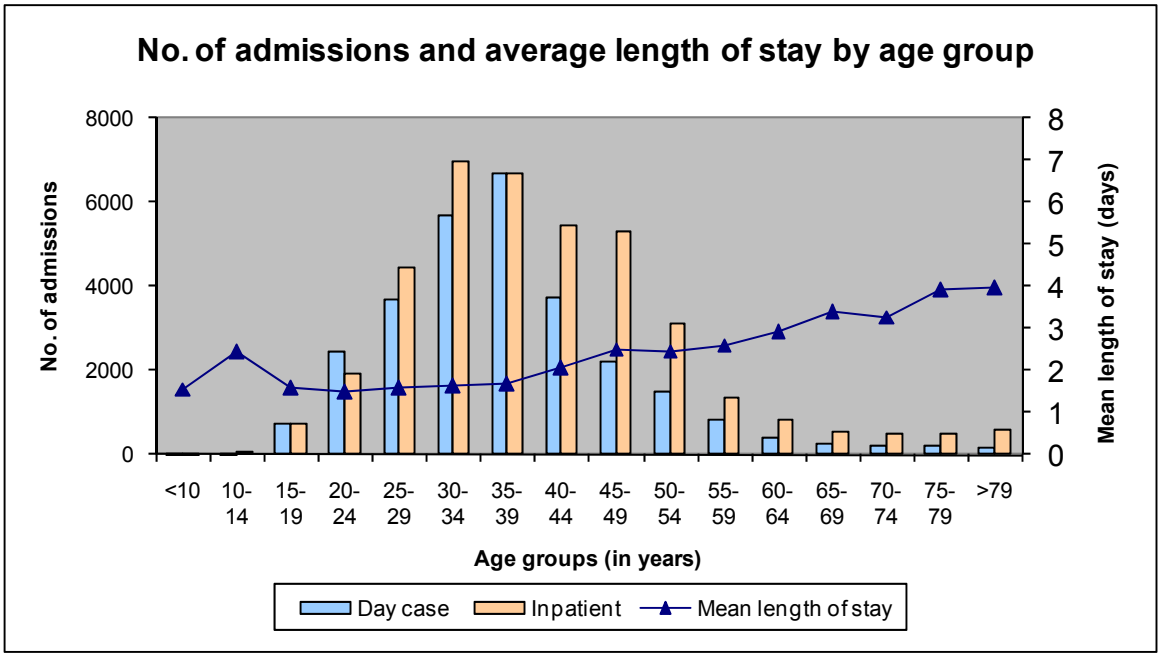

Figure G17 – No. of admissions and average length of stay by age groups

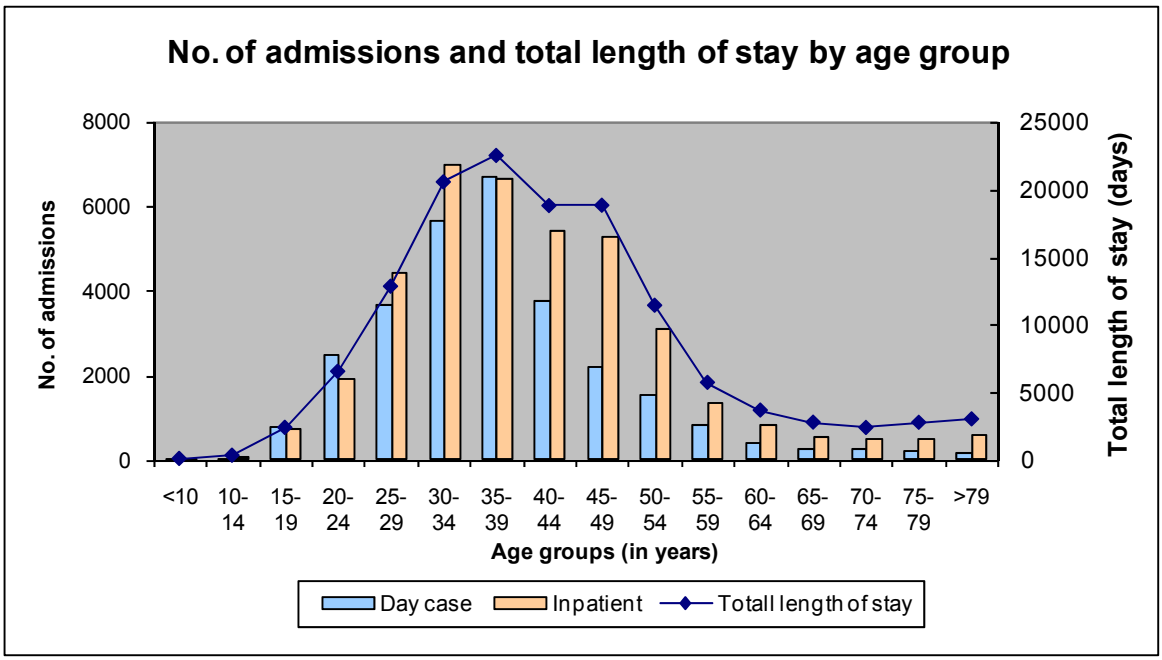

Figure G18 – No. of admissions and total length of stay by age groups

LENGTH OF STAY FOR MAJOR VAGINAL AND VUVLAL SURGERY

About 90% of the vaginal procedures were discharged within 7 days, compared with about 80% in 2004 and 60% in 1999. Pelvic floor repair with or without vaginal hysterectomy was associated with longer hospital stay than vaginal hysterectomy alone. This is contrasted to 2004 where vaginal hysterectomy with pelvic floor repair was associated with longer hospital stay than pelvic floor repair, which in turn was longer than vaginal hysterectomy alone. About 66% of the vulval procedures were discharged within 7 days, compared to over 70% in 2004. Similar to 2004, wide local excision was associated with a much shorter hospital stay than radical vulvectomy.

	Total no. of admissions	Mean (days)	S.D. (days)	1-7 days	8-14 days	>14 days
Vaginal hysterectomy with PFR	381	5.0	2.7	331	45	6
TVT-O / TVT / TOT	218	3.8	2.6	204	13	1
Pelvic floor repair	86	5.1	4.0	77	5	4
Vaginal hysterectomy	72	4.4	2.9	63	8	1
Vaginal myomectomy	80	2.0	1.5	78	2	0
Vaginal surgery for SI	25	3.7	1.8	25	0	0
Vault prolapse repair	23	6.4	5.3	17	4	2
Vaginectomy	14	7.4	6.7	9	3	2
Vaginal stripping	13	3.0	1.6	13	0	0
VAGINAL reconstruction	3	2.3	1.5	3	0	0
Repair of urinary fistula	2	7.0	8.5	1	0	1
Miscellaneous vaginal surgery	78	3.5	4.0	73	2	3
Wide local excision	15	9.3	8.3	7	5	3
Simple vulvectomy	9	10.9	8.5	4	3	2
Radical vulvectomy	14	16.3	10.3	4	3	8
Groin node dissection	51	6.8	9.1	38	3	10
Miscellaneous vulval surgery	34	2.8	3.8	30	3	1

LENGTH OF STAY FOR MINOR VAGINAL AND VULVAL SURGERY

The length of stay under this category was similar to that reported in previous audits. Suction termination of pregnancy was mainly performed (94%) as a day procedure. Evacuation of uterus following abortion however was associated with a longer length of stay with 63% discharged between 1 to 3 days.

	Total no. of admissions	Mean (days)	S.D. (days)	Same day discharge	1-3 days	>3 days
Suction termination of pregnancy	8105	1.1	0.6	7597	449	59
Evacuation of uterus	3817	1.6	1.7	1226	2399	192
D&C	4645	1.4	1.3	1662	2813	170
Marsupialisation	656	1.4	1.1	156	484	16
Other vulval surgery	591	1.9	2.5	255	273	63
Insertion/Removal IUCD/Mirena	636	1.5	1.3	382	218	36
Cervical cerclage	43	4.7	9.2	4	27	12
Miscellaneous	846	1.8	3.4	590	178	78

LENGTH OF STAY FOR HYSTEROSCOPIC SURGERY

Only 56% of the diagnostic hysteroscopy were performed as a day procedure, compared with 60% in 2004 and 90% in 1999. The mean length of hospital stay for all other hysteroscopic procedures was 1.5 (SD 1.3) days. The hospital stay was within 3 days in over 95% of the case as in 2004, and it was higher than the 75% in 1999.

	Total no. of admissions	Mean (days)	S.D. (days)	Same day discharge	1-3 days	>3 days
Diagnostic hysteroscopy	4601	1.4	1.3	2592	1841	168
Endometrial resection/ablation	157	1.6	1.4	32	119	6
Hysteroscopic polypectomy	822	1.4	1.0	348	447	27
Hysteroscopic myomectomy	270	1.7	1.3	48	205	17
Miscellaneous	196	1.9	2.1	64	116	16

LENGTH OF STAY FOR LAPAROSCOPIC SURGERY

Overall, 72.5% of the hospital stay was within 3 days, compared to 70% in 2004 and 64% in 1999. The exception included salpingo-oophorectomy (63.5% vs 56.9% in 2004), hysterectomy (61.1% vs 20.7% in 2004 for subtotal and 60.0% vs 47.6% in 2004 for total), drainage of abscess (24.3% vs 20.5% in 2004), radical hysterectomy (16.0%) and lymphadenectomy (36.6%). Length of stay following laparoscopic total hysterectomy was within 3 days in 60%, and it was longest for LH(a) and similar for LAVH and TLH.

	Total no. of admissions	**Mean (days)**	**S.D. (days)**	**≤3 days**	**4-7 days**	**>7 days**
Laparoscopic total hysterectomy	1020	3.5	2.5	612	367	41
LAVH	*515*	*3.4*	*2.6*	*323*	*171*	*21*
LH(a)	*79*	*3.9*	*2.1*	*38*	*37*	*4*
TLH	*426*	*3.6*	*2.3*	*251*	*159*	*16*
Laparoscopic subtotal hysterectomy	54	3.5	2.4	33	19	2
Laparoscopic radical hysterectomy	25	5.5	3.0	4	14	7
Laparoscopic myomectomy	563	3.1	2.2	417	138	8
Laparoscopic (para) ovarian cystectomy	2217	2.8	1.8	1761	429	27
Laparoscopic SO/oophorectomy	1038	3.5	2.6	659	325	54
Laparoscopic salpingectomy	836	2.8	2.0	642	173	21
Laparoscopic salpingotomy	176	2.8	*1.9*	135	36	5
Laparoscopic lymphadenectomy	89	5.2	3.0	23	50	16
Laparoscopic pelvic lymphadenectomy	*78*	*5.2*	*3.1*	*20*	*43*	*15*
Laparoscopic paraaortic lymphadenectomy	*25*	*4.5*	*2.5*	*10*	*12*	*3*
Laparoscopic adhesiolysis	439	2.9	2.1	330	92	17
Laparoscopic ablation of endometriosis	125	2.3	1.3	109	15	1
Laparoscopic resection of endometriosis	75	2.5	4.0	67	6	2
Laparoscopic drainage of abscess	37	5.9	3.0	9	18	10
Laparoscopic ovarian drilling	32	2.1	0.9	29	3	0
Laparoscopic myolysis	21	3.6	2.5	13	7	1
Laparoscopic repair of genital prolapse	8	4.6	2.3	2	5	1
Laparoscopic colposuspension	4	5.3	3.8	1	2	1
Laparoscopic sterilization/tubal occlusion	217	1.5	1.1	202	14	1
Diagnostic laparoscopy ± Dye	524	2.8	2.5	404	103	17
Robot-assisted surgery	41	5.4	2.9	9	22	10
Robotic hysterectomy	*17*	*4.7*	*2.7*	*6*	*9*	*2*
Robotic radical hysterectomy	*15*	*6.7*	*3.2*	*0*	*8*	*7*
Robotic pelvic lymphadenectomy	*20*	*6.2*	*3.2*	*2*	*10*	*8*
Robotic paraaortic lymphadenectomy	*3*	*6.3*	*4.0*	*0*	*2*	*1*
Miscellaneous	160	3.6	3.8	108	42	10

LENGTH OF STAY FOR LAPAROTOMY VERSUS LAPAROSCOPY

Irrespective of the magnitude of the procedure, laparoscopic surgery was associated with a shorter hospital stay than open surgery, with a mean difference of 2.1 days (range 1.0-2.9 days), compared to 2.3 days (range 1.3-4.3 days) in 2004.

	Laparotomy Days ± SD	**Laparoscopy Days ± SD**
Total hysterectomy ± salpingo-oophorectomy (malignant)	8.0 ± 5.2	5.1 ± 3.6
Total hysterectomy ± salpingo-oophorectomy (benign)	5.8 ± 3.3	3.3 ± 2.2
Subtotal hysterectomy ± salpingo-oophorectomy (benign)	4.5 ± 1.7	3.5 ± 2.4
Myomectomy	5.1 ± 2.3	3.1 ± 2.2
Salpingo-oophorectomy/oophorectomy	5.9 ± 3.5	3.5 ± 2.6
Ovarian cystectomy	5.0 ± 2.9	2.8 ± 1.8
Salpingotomy	4.8 ± 3.1	2.8 ± 2.0
Salpingectomy	4.8 ± 2.8	2.9 ± 2.0

Appendix 1. List of Participating Hospitals/Institutes and Co-ordinators

Hospital / Institute	Coordinator
Alice Ho Miu Ling Nethersole Hospital	Dr LEUNG Pui Ling / Ms LAI Chit Ying
Canossa Hospital (Caritas)	Dr Eric LEE / Sr Virginia IP
Caritas Medical Centre	Dr HUI Sze Ki / Ms Sita LAU
Evangel Hospital	Dr KWOK Chi Yeung / Ms KWOK Yan Yin
Family Planning Association of Hong Kong	Dr WONG Ching Yin Grace / Ms Maggie LAU
Hong Kong Adventist Hospital	Dr Stephanie CHOW / Ms Angela CHAN
Hong Kong Baptist Hospital	Dr Nancy FOK / Ms AU Tak Ling
Hong Kong Sanatorium & Hospital Ltd.	Dr YUEN Pong Mo
Kwong Wah Hospital	Dr LAM Siu Keung / Dr LEUNG Tsin Wah
Matilda International Hospital	Ms Wendy O'BRIEN / Ms Lily TANG
North District Hospital	Dr LEUNG Pui Ling / Ms LAI Chit Ying
Our Lady of Maryknoll Hospital	Dr LAM Siu Keung / Dr LEUNG Tsin Wah
Pamela Youde Nethersole Eastern Hospital	Dr TANG Kwok Keung
Pok Oi Hospital	Dr LI Kit
Precious Blood Hospital	Ms Tammy TAM
Prince of Wales Hospital	Dr LEUNG Pui Ling / Ms LAI Chit Ying
Princess Margaret Hospital	Dr HUI Sze Ki / Ms SIN Wai Ha
Queen Elizabeth Hospital	Dr CHAN Chung Sum / Ms TSANG Siu Ling
Queen Mary Hospital	Dr PUN Ting Chung / Ms Grace MA
St. Paul's Hospital	Dr CHAN Kuen Ting / Ms Joanna LAM
St. Teresa's Hospital	Dr LAU Woon Chung / Ms LEE Ching Hung
The Hong Kong Central Hospital Ltd.	Dr Stephen LEE / Ms CHIN Yau Lai
Tseung Kwan O Hospital	Dr TSANG Sing Wing / Ms TSE Ching Han
Tsuen Wan Adventist Hospital	Dr SO Kon Ping / Ms Candy FUNG
Tuen Mun Hospital	Dr PANG Chung Pui / Dr CHEUNG Yiu Cheong
Union Hospital	Dr YIP Shing Kai / Ms Pauline KEE
United Christian Hospital	Dr LIANG Hui Xin Helen

Appendix 2. Lists of Committee and Subcommittee

Task Force on HKCOG Territory-wide Audit 2009

	Year of membership	Remarks
Dr LEUNG Wing Cheong	2009	
Dr NG Pui Shan	2009	
Dr PUN Ting Chung	2009	
Dr SUM Tak Keung	2009	
Dr TO Wing Kee William	2009	
Dr YUEN Pong Mo	2009	Co-ordinator

Clinical Audit Subcommittee 2013

	Year of membership	Remarks
Dr CHEUK Kwan Yiu	2013	
Dr LAW Lai Wa	2013	
Dr MA Wai Sze Paulin	2013	
Dr NG Pui Shan	2013	
Dr PUN Ting Chung	2013	
Dr YUEN Pong Mo	2013	Chairman (2004 – 2012)

Clinical Audit Subcommittee 2004-2012

	Year of membership	Remarks
Dr CHAN Yuk May, May	2004 – 2005	
Dr FAN Tak Chung	2010 – 2012	
Dr LAW Lai Wa	2011 – 2012	
Dr LEUNG Wing Cheong	2006 – 2009	
Dr NG Pui Shan	2008 – 2012	
Dr PUN Ting Chung	2003 – 2012	
Dr SUM Tak Keung	2008 – 2009	
Dr TO Wing Kee, William	2006 – 2012	
Dr TSANG Sing Wing	2004 – 2007	
Dr TSE Hei Yee, Lowina	2004 – 2005	
Dr WONG Shu Pong	2004 – 2007	
Dr YUEN Pong Mo	2004 – 2012	Chairman (2004 – 2012)

Quality Assurance Committee 2004 – 2012

	Year of membership	Remarks
Dr CHAN Chong Pun	2010 – 2012	
Dr CHAN Chung Sum, Sammy	2004 – 2006	
Dr CHAN Lin Wai, Daniel	2010 – 2012	
Dr CHAN Kuen Ting	2008 – 2012	
Dr CHAN Woon Tong, Joseph	2004 – 2010	
Dr CHAN Yuk May, May	2004 – 2007	
Dr CHEON Willy, Cecilia	2008 – 2009	
Dr CHEUNG Kai Bun	2004 – 2010	
Dr CHEUNG Tak Hong	2004 – 2010	
Dr CHU Wai Yee	2004 – 2010	
Prof CHUNG Kwok Hung, Tony	2004 – 2009	Chairman (2004 - 2006)
Dr FOK Lai Ling, Nancy	2004 – 2009	
Prof LAO Tzu Hsi, Terence	2004 – 2006	
Dr LAU Woon Chung	2010 – 2012	
Dr LAW Chiu Fung	2004 – 2009	
Dr LO Wing Kit, Keith	2010 – 2012	
Dr LI Fuk Him, Dominic	2004 – 2006	
Dr LI Wai Hon	2009	
Dr LEUNG Kwok Ling, Ares	2007 – 2012	Chairman (2010 - 2012)
Dr LEUNG Kwok Yin	2004 – 2009	
Dr LEUNG Wing Cheong	2007 – 2010	
Dr MOK Ka Ming, Charles	2004 – 2009	
Dr NG Tai Keung	2004 – 2008	
Prof NGAN Yuen Sheung, Hextan	2004 – 2012	Chairman (2007- 2009)
Dr TANG Chang Hung, Lawrence	2004 – 2006	
Dr WONG Shu Pong	2004 – 2006	
Dr YU Kai Man	2004 – 2008	
Prof YIP Shing Kai Alexander	2007	
Dr YEUNG Po Chi, Anita	2009	
Dr YUEN Pong Mo	2004 – 2012	

Appendix 3. Obstetric Audit Form

OBSTETRICS AUDIT FORM - HKCOG 2009

Hospital _____

NAME :	*(initials)*	Date of Delivery :	(dd/mm/yy)
AGE :		Status :	* HK Resident / Non-HK Resident
ID. NO :	X(X) *(at least 5 digits)*	Maternal Death :	* No / Yes

ANTENATAL COMPLICATIONS

Cardiac Disease *1. No
2. Rheumatic heart disease
3. Congenital heart disease
4. MVP
5. Arrhythmia
6. Others

Diabetes *1. No
2. Pre-existing DM
3. Gestational DM
4. Impaired glucose tolerance (IGT)

Anaemia * No / Yes
Renal Disease * No / Yes
Liver Disease * No / Yes
Respiratory Disease * No / Yes
GI / Biliary Disease * No / Yes
Epilepsy * No / Yes
Psychiatric Disease * No / Yes
Immunological Disease * No / Yes
Thyroid Disease * No / Yes
Surgical Disease * No / Yes

INFORMATION ABOUT LABOUR

Onset of Labour * Spontaneous / Induced / No Labour
Duration of Labour _____
Indication for Induction (at most 3)
* 1. No / irrelevant
2. DM / GDM / IGT
3. Maternal disease
4. Bad Obstetrical history
5. Prolonged pregnancy / Post- date (≧ 41 weeks)
6. Hypertension
7. PROM ± intraut. Infestion
8. APH
9. Multiple pregnancy
10. Suspected IUGR / IUGR
11. IUD
12. Fetal anomaly
13. Suboptimal CTG / fetal distress
14. Others _____

Syntocinon Augmentation * No / Yes
Epidural Anaesthesia * No / Yes
Episiotomy * No / Yes

OBSTETRIC HISTORY & COMPLICATIONS

Parity * 0 / 1 / 2 / 3 / 4 / 5 / 5+
Multiple Pregnancy * Singleton/Twins/Triplets/Higher
Previous Uterine Scar * No / Yes
Hypertension Severity Classification * No / Mild / Severe
* 1. Irrelevant
2. Eclampsia
3. Gestational hypertension
4. Gestational proteinuria
5. Gest. Proteinuric HT (PET)
6. Chr. HT - no proteinuria
7. Chr. HT - with PET
8. Unclassified

Antepartum Haemorrhage * 1. No
2. APH of ? origin
3. Placenta praevia
4. Placental abruption
5. Others

ECV * 1. Irrelevant
2. No ECV
3. Successful ECV
4. Failed ECV

Threatened Preterm Labour * No / Yes
Use of tocolytic * No / Yes
Use of steroid * No / Yes
Down's screening * No / 1st Trimester / 2nd Trimester / Both

POSTNATAL COMPLICATIONS

Postpartum Haemorrhage
* 1. <=500 ml
2. 501 - 1000 ml
3. > 1000 ml

PPH requiring transfusion * No / Yes
PPH Causes (at most 3)
* 1. No
2. Uterine atony
3. Retained POG
4. Rupture of uterus
5. Cervical tear
6. Vaginal tear
7. Perineal wound
8. Genital haematoma
9. Acute inversion of uterus
10. DIC
11. Others

Puerperal Pyrexia * No / Yes
Mastitis / Breast Abscess * No / Yes
UTI * No / Yes
Genital Tract Infection * No / Yes
Wound Problem requiring Intervention * No / Yes
Third Degree Tear * No / Yes
Uterine Rupture / Scar Dehiscence * No / Yes
MROP * No / Yes
Hysterectomy * No / Yes
Internal iliac artery ligation * No / Yes
Uterine artery embolisation * No / Yes

** represents the default value*

INFORMATION ABOUT DELIVERY - BABY *1 / 2 / 3

Mode of Delivery
* 1. NSD
2. V/E
3. Forceps
4. Breech
5. LSCS
6. Classical CS
7. Others
8. Unknown

Second stage CS * No / Yes

Presentation / Lie at Birth
* 1. Vertex
2. Breech
3. Brow
4. Face
5. Oblique
6. Transverse
7. Compound
8. Others _____

BBA * No / Yes

Indication for VE / Forcepts (ast most 3)
* 1. No / irrelevant
2. Maternal disease
3. Maternal distress
4. Previous CS
5. Obs complication
6. Fetal distress
7. Cord prolapse
8. Prolonged 2nd stage
9. Others _____

Indication for C/S (at most 3)
* 1. No / irrelevant
2. DM / GDM / IGT
3. Maternal disease
4. Previous uterine scar
5. Bad obs. History
6. APH / placenta praevia
7. Hypertension
8. Multiple pregnancy
9. Fetal distress
10. Cord prolapse / presentation
11. Suspected IUGR / IUGR
12. Malpresentation / lie
13. No progress
14. CPD
15. Contracted / unfavourable pelvis
16. Failed instrumental delivery
17. Genital tumour / anomaly
18. Failed induction
19. Elderly / infertility
20. Suspected macrosomia
21. Social reason
22. Others

INFORMATION ABOUT BABY - BABY *1 / 2 / 3

Gestation _____weeks

Birth Weight _____ gm

Apgar Score at 1 min _____
Apgar Score at 5 min _____

Admission to NICU * No / Yes
Congenital Anomalies * No / Yes

Birth Trauma (at most 3)
* 1. No
2. Cephalhaematoma
3. Soft tissue trauma
4. Subaponeurotic haemorrhage
5. Intracranial haemorrhage
6. Fractures
7. Nerve injury
8. Visceral injury

Gestational / Congenital Infection * No / Yes
Major Infections * No / Yes
RDS * No / Yes
IVH * No / Yes
NEC * No / Yes

Fetal Outcome
* 1. Alive
2. SB - antepartum
3. SB - intrapartum
4. SB - unknown
5. NND - first week
6. NND - 2 to 4 week

Cause of *Stillbirth (circle 1 only)
* 1. Irrelevant
2. Congenital anomaly
3. Isoimmunisation
4. PIH
5. APH
6. Mechanical
7. Maternal disorder
8. Others
9. Unexplained
10. Uninvestigated

Cause of NND (circle 1 only)
* 1. Irrelevant
2. Congenital anomaly
3. Isoimmunisation
4. PIH
5. APH
6. Mechanical
7. Maternal disorder
8. Others
9. Unexplained
10. Uninvestigated

Contributory Factor to NND
Congenital anomaly * None / major / attributable
Haemolytic disease * None / major / attributable
Hypoxia * None / major / attributable
Birth trauma * None / major / attributable
RDS * None / major / attributable
Intracranial haemorrhage * None / major / attributable
Infection * None / major / attributable
Miscellaneous * None / major / attributable
Unclassifiable * None / major / attributable

** represents the default value*

Appendix 4. Gynaecology Audit Form

GYNAECOLOGY AUDIT FORM – HKCOG 2009

Hospital _____

Name: _____ *(initials)*

Age: _____

ID No. _____ ( )

(at least 5 digits)

Afflix Label

Date of Admission:

Date of Discharge:

Status at Admission
(1) Transfer in
(2) Emergency
(3) Routine
(4) Unplanned readmission (within 28 days of last admission)
(5) Day case

Status at Discharge
(1) Home
(2) Transfer for convalescence
(3) Transfer (referral)
(4) DAMA
(5) Death

DIAGNOSIS (in code) _____

For ONCOLOGY cases (circle as appropriate)
Old case / New case
Stage of Disease : Recurrent / Unstaged / Stage I / Stage II / Stage III / Stage IV

TREATMENT (in code) _____

COMPLICATIONS *(Defaults are 'No')*

1.	Fever >38°C after first 24 hours (readings at least 4 hours apart; ONLY if no cause to account for the fever)	*No / Yes
2.	Bowel injury (ONLY if mucosa was involved)	*No / Yes
3.	Urinary tract injury (ONLY if mucosa was involved)	*No / Yes
4.	Perforation of uterus	*No / Yes
5.	Chest infection (there SHOULD be radiological OR bacteriological evidence)	*No / Yes
6.	Urinary tract infection (ONLY with positive culture IN ADDITION to fever or symptoms)	*No / Yes
7.	Wound complications (ONLY if presence of pus or gapping that required resuturing or burst abdomen)	*No / Yes
8.	Deep vein thrombosis (ONLY if anticoagulant therapy was required)	*No / Yes
9.	Cardiopulmonary arrest (Intra-operation)	*No / Yes
10.	Operative blood loss requiring transfusion (not for treatment of anaemia)	*No / Yes
11.	Postoperative haemorrhage requiring re-operation or transfusion	*No / Yes
12.	Major vascular injury	*No / Yes
13.	Conversion of laparoscopic procedure to laparotomy	*No / Yes
14.	Unplanned re-operation before discharge (specify) _____	*No / Yes
15.	Cardiopulmonary arrest (Post-operation)	*No / Yes
16.	Others (specify)_____	*No / Yes

Appendix 5. HKCOG Audit Guidelines For Coding (2009 Version)

GENERAL INSTRUCTIONS

Study period for 2009 audit: 1 January 2009 to 31 December 2009.
Cases for audit:

OBSTETRICS – all deliveries with date of delivery within the study period
GYNAECOLOGY – all episodes of hospitalization with date of admission within the study period

IMPORTANT : Patient's I.D. number must be entered. The last two characters may be omitted e.g. A12345X(X).

OBSTETRICS AUDIT FORM - HKCOG 2009

EXPLANATORY NOTES ON DATA ENTRY

Patient Identification

Name	
I.D. No	
Date of Delivery	dd/mm/yy
Age	Number with 2 digits in completed years
Status	Resident / Non-Resident
Maternal death	From conception up to 1 year after delivery

Antenatal, Medical / Surgical Complications

Cardiac disease	1. No disease 2. Rheumatic valvular disease 3. Congenital heart disease 4. Mitral valve prolapse 5. Arrhythmia requiring treatment or regular cardiac treatment 6. Others
Diabetes mellitus	1. No disease 2. Pre-existing DM – known DM before the indexed pregnancy disregarding treatment was instituted or not 3. Gestational DM – DM diagnosed during pregnancy or postpartum by an OGTT 4. Impaired glucose tolerance – IGT diagnosed during pregnancy or postpartum according to OGTT criteria used
Anaemia	Hb level <10g/dl at any time of gestation (thalassaemia without anaemia is EXCLUDED)
Renal disease	Disease of the urinary tract during pregnancy either a. with symptoms or b. with impaired renal function or c. requiring treatment

	d. asymptomatic bacteriuria is EXCLUDED
Liver disease	Liver diseases during pregnancy with impaired liver function
Respiratory disease	Only those requiring treatment during pregnancy or with impaired respiratory function Upper respiratory tract infection is EXCLUDED
Gastrointestinal biliary disease	Include only those requiring hospitalization and treatment
Epilepsy	Only those requiring treatment during pregnancy
Psychiatric disease	Only those requiring treatment during pregnancy
Immunological disease	Only those requiring treatment during pregnancy
Thyroid disease	Only those requiring treatment during pregnancy
Surgical disease	Major surgical conditions / laparotomy or major operations that require general anaesthesia during pregnancy or puerperium (except PPS)

Obstetric History & Complications

Parity	Including liveborns and stillbirths after 24 weeks or over 500gm	
Previous scar	Including previous Caesarean section / myomectomy / hysterotomy / plastic operation / perforation of uterus requiring repair	
Hypertension / eclampsia	Severity :	1. No 2. Mild-DBP < 110mmHg AND no proteinuria 3. Severe-DBP >= 110 mmHg AND / OR proteinuria
	Classification :	1. Irrelevant 2. Eclampsia 3. Gestational hypertension - BP normal before 20 weeks and no previous history of hypertension - DBP >=110mmHg on any 1 occasion or >=90mmHg on 2 or more occasions at 4 hours apart 4. Gestational proteinuria (proteinuria >=300 mg/24 hours; or 2 MSU / CSU collected >=4 hours apart with 1 g/1; or 2+ or more on reagent strips
	Classification :	5. Gestational proteinuric hypertension 6. Chronic hypertension with proteinuria 7. Chronic hypertension with superimposed preeclampsia – proteinuria developing for the first time during pregnancy 8. Unclassified – BP unknown before 20 weeks
Antepartum haemorrhage	Bleeding per vaginum from the 24th week to the time of delivery	1. No

2. APH of unknown origin – including those with “show” but not going into labour within 72 hours
3. Placenta praevia – including those who do not bleed
4. Accidental haemorrhage – including those with no revealed bleeding
5. Other causes

ECV	Performance of external cephalic version
Threatened preterm labour	Diagnosed or suspected to have labour before 37 weeks of gestation which does not proceed to delivery either spontaneously or after tocolytic therapy
Use of tocolytics	Use of tocolytic agent(s) to suppress preterm labour
Use of steroid	Use of antenatal steroid to enhance fetal lung maturity

Information About Labour

Onset of labour	Definition - a retrospective diagnosis - regular contractions with cervix at least 3cm dilated or there is progressive cervical effacement or dilatation over 4 hours
Induction of labour	An obstetric procedure designed to pre-empt the natural process of labour by initiating its onset artificially before this occurs spontaneously Indications : 1. Maternal diseases / conditions (I) DM / GDM / IGT (II) Maternal medical / surgical condition 2. Bad obstetric history 3. Antenatal / obstetric complications (I) Prolonged pregnancy (II) Hypertensive disease (III) PROM / intrauterine infection (IV) Antepartum haemorrhage (V) Multiple pregnancy 4. Fetal and cord conditions (I) Suspected IUGR / IUGR (II) Intrauterine death (III) Severe fetal abnormality (IV) Suboptimal antepartum cardiotocography 5. Others
Augmentation of labour	The use of synthetic oxytocin to accelerate labour process after it is already begun and that its quality of progress is unsatisfactory – use of amniotomy is NOT counted as augmentation
Duration of labour	Summation of first stage and second stage (if any) of labour to the closest number of hours. Enter 1 if duration <1 hour

Postnatal Complications

PPH (choose at most 3)	Bleeding over 500ml within 24 hours of delivery Causes 1. Uterine atony 2. Retained POG 3. Injuries to genital tract - ruptured uterus - cervical tear - vaginal tear - perineal wound 4. Genital haematoma 5. Uterine inversion 6. DIC 7. Others
Uterine rupture / scar dehiscence	Includes dehiscence of previous scar with no PPH
Hysterectomy	Include those performed up to 6 weeks postpartum
Puerperal pyrexia	Temperature >38 degree C within 14 days of delivery

Information About Delivery

Mode of delivery	1. Spontaneous vertex delivery 2. Ventouse extraction 3. Forceps delivery 4. Breech delivery 5. Lower segment Caesarean section 6. Classical Caesarean section 7. Unknown 8. Others
BBA	Birth before arrival
Presentation / lie at delivery	1. Vertex 2. Breech 3. Brow 4. Face 5. Oblique lie 6. Transverse lie 7. Compound presentation 8. Others
Indications for instrumental delivery (maximum 3 indications)	2. Maternal diseases / conditions - maternal disease complicating pregnancy - maternal distress 3. Past obstetrical history - previous Caesarean section 4. Antenatal / obstetric complications e.g. hypertension 5. Fetal and cord conditions - fetal distress (except cord prolapse)

- cord prolapse / presentation

6. Labour and delivery problems
   - prolonged second stage
   - after-coming head of breech is EXCLUDED
7. Others

Indications for Caesarean section (maximum 3 indications)

1. Maternal disease / conditions
   - GDM / DM / IGT
   - maternal disorders
2. Past obstetrical history
   - previous sections / uterine scar
   - bad obstetrical history
3. Antenatal / obstetric complications
   - antepartum haemorrhage
   - hypertensive disorders
   - multiple pregnancy
4. Fetal and cord conditions
   - fetal distress
   - cord prolapse / presentation
   - suspected IUGR / IUGR
   - suspected macrosomia
5. Labour and delivery problems
   - abnormal lie / presentation
   - failure to progress
   - cephalopelvic disproportion
   - contracted / unfavourable pelvis
   - failed instrumental delivery
   - tumour / congenital anomaly of genital tract
   - failed induction – cervix fails to reach 3cm
6. Others
   - elderly mother / infertility
   - social reason
   - others

Information About the Baby

Gestation	In completed weeks according to best estimate
Birth weight	Weight in grams
Apgar score	Range 0 – 10, or unknown
Fetal outcome	1. Alive and no neonatal death 2. Stillbirth (fetus born without sign of life at or after 24 weeks of gestation, or with birth weight over 500 gm when gestation is uncertain) - antepartum - intrapartum - undetermined – mother is already in labour on admission and fetal heart not detected (evidence of fetal viability is accepted

	only if obtained by a medical / midwifery staff) 3. Neonatal death - early (up to 6 days 23 hours 59 minutes) - later (form 7 days to 27 days 23 hours 59 minutes)
Cause of stillbirth / NND	Choose only one of the following 1. Congenital anomaly 2. Isoimmunisation 3. Pregnancy-induced hypertension 4. Antepartum haemorrhage 5. Mechanical 6. Maternal disorder 7. Others 8. Unexplained 9. Uninvestigated
Contributory factor to NND	1. Congenial anomaly 2. Haemolytic disease of newborn 3. Intrauterine hypoxia / birth asphyxia 4. Birth trauma 5. Respiratory distress / conditions 6. Intracranial haemorrhage 7. Infection 8. Miscellaneous 9. Unclassifiable
Congenital anomalies	Only include those significant ones detected before discharge
Birth trauma (choose at most 3)	1. Cephalhaematoma 2. Soft tissue trauma e.g. laceration 3. Subaponeurotic haemorrhage 4. Intracranial haemorrhage 5. Fractures 6. Nerve injuries 7. Visceral injuries
Major infections	1. Meningitis 2. Pneumonia 3. Septicaemia 4. Other major infections
RDS	Respiratory distress syndrome
IVH	Intraventricular haemorrhage
NEC	Necrotising enterocolitis

GYNAECOLOGY AUDIT FORM 2009

I. Principles in coding diagnosis

1. If an operation was performed on the patient, the pathological diagnosis should be coded. If an operation was not performed, the MOST PROBABLE clinical diagnosis should be coded.
2. Significant changes in the diagnosis noted after the audit form had been filled can be amended by submitting a second audit form marked with the patient's name, I.D. number, date of admission, the correct diagnosis code and remark" AMENDED FORM'
3. Minor incidental finding which was asymptomatic and did not require treatment SHOULD NOT be coded.
4. Non-gynaecological conditions which were not related to the cause of admission SHOULD NOT be coded.
5. Cases of malignancy should be denoted as NEW or OLD case for each episode of hospitalization.
6. Complications which occurred as a result of treatment in the same unit should be coded separately from complications of treatment performed in another unit.

II. Definition of diagnosis

1. Disseminated malignancies and the primary site could not be confirmed, the diagnosis would be coded as L2.
2. For diagnoses under Disorders of Menstruation, known causes should be coded as well if found.
3. Primary amenorrhoea should be coded as I3 and secondary amenorrhoea (duration of amenorrhoea more than 6 months) as I4 irrespective of the cause. If there was a known cause, it should also be coded e.g. primary amenorrhoea due to vaginal atresia should be coded as I3 and B3; secondary amenorrhoea due to tuberculous endometritis should be coded as I4 and D5.
4. Postmenopausal bleeding is defined as genital tract bleeding occurred 1 year after the last menstrual period. If there is an organic cause, it should also be coded as well, e.g. post-menopausal bleeding with endometrial polyp should be coded as I6 and D10.
5. Genital warts should be quoted as infection of the organ involved, e.g. vulval warts should be coded as A5 and cervical warts as C5
6. Dysfunctional uterine bleeding is defined as heavy, prolonged or frequent bleeding of uterine origin in the absence of demonstrable pelvic disease, complications of pregnancy or systematic disease. Menorrhagia is defined as heavy and prolonged menstruation at regular intervals.

Diagnosis

A. Diseases of Vulva, Perineum and Urethra
   2. Miscellaneous
   3. Congenital abnormality

4. Trauma
5. Infection (including Bartholin's abscess)
6. Benign neoplasm
7. Malignant neoplasm
8. Retention cyst
9. Vulval dystrophy (hypertrophic or non-hypertrophic dystrophy, intraepithelial neoplasia)
10. Urethral lesions

B. Diseases of Vagina
   2. Miscellaneous
   3. Congenital abnormality
   4. Trauma (excluding fistula)
   5. Infection
   6. Benign neoplasm
   7. Malignant neoplasm
   8. Retention cyst
   9. Fistula
   10. Intraepithelial neoplasia
   11. Atrophic vaginitis

C. Diseases of Uterine Cervix
   2. Miscellaneous
   3. Congenital abnormality
   4. Trauma
   5. Infection
   6. Benign neoplasm including polyp
   7. Carcinoma of cervix
   8. Other malignant neoplasm
   9. Intraepithelial neoplasia

D. Diseases of Uterine Body
   2. Miscellaneous
   3. Congenital abnormality
   4. Trauma including perforation of uterus
   5. Infection
   6. Fibromyoma
   7. Carcinoma of corpus uteri
   8. Other malignant neoplasm
   9. Myohyperplasia of uterus
   10. Endometrial polyp
   11. Adenomyosis
   12. Hyperplasia of endometrium
   13. Atrophic endometritis

E. Diseases of Fallopian Tubes
   2. Miscellaneous

3. Acute pelvic inflammatory disease (acute salpingitis, acute salpingo-oophoritis, pyosalpinx and tubo-ovarian abscess)
4. Chronic pelvic inflammatory disease (chronic salpingitis, chronic salpingo-oophoritis, hydrosalpinx and tubo-ovarian cyst)
5. Tuberculous salpingitis
6. Benign neoplasm
7. Malignant neoplasm

F. Diseases of Ovary
   2. Miscellaneous
   3. Retention cysts, follicular / corpus luteal cyst
   4. Endometriotic cyst
   5. Benign ovarian tumour / cyst
   6. Primary malignant neoplasm – epithelial
   7. Primary malignant neoplasm – non-epithelial
   8. Secondary malignant neoplasm
   9. Borderline malignant neoplasm
   10. Dermoid cyst
   11. Polycystic ovarian disease / syndrome

G. Diseases of Broad Ligaments and Pelvic Peritoneum
   2. Miscellaneous
   3. Pelvic endometriosis
   4. Paraovarian/paratubal cyst
   5. Peritoneal carcinoma
   6. Recto-vaginal endometriosis

H. Genital displacement / Urinary Disorders
   2. Miscellaneous
   3. Prolapse of uterus
   4. Anterior vaginal wall prolapse (Cystocoele, urethrocele, paravaginal defect)
   5. Genuine stress incontinence
   6. Detrusor instability
   7. Vault prolapse
   8. Detrusor hyperreflexia
   9. Sensory urgency
   10. Voiding difficulty
   11. Other urinary disorders
   12. Posterior vaginal wall prolapse (enterocele, rectocele perineal deficiency)

I. Disorders of Menstruation *(Causes should be coded as well if found)*
   2. Miscellaneous
   3. Primary amenorrhoea
   4. Secondary amenorrhoea
   5. Dysfunctional uterine bleeding
   6. Postmenopausal bleeding
   7. Dysmenorrhoea
   8. Menorrhagia

J. Disorders of Pregnancy & Reproduction
   2. Miscellaneous
   3. Subfertility
   4. Vomiting in pregnancy
   5. Threatened miscarriage
   6. Spontaneous / Silent miscarriage
   7. Complete hydatidiform mole
   8. Partial hydatidiform mole
   9. Residual trophoblastic disease
   10. Metastatic malignant trophoblastic neoplasia, chorioepithelioma, placental site trophoblastic tumour
   11. Secondary postpartum haemorrhage
   12. Other postpartum complications
   13. Ectopic pregnancy
   14. Conditions leading to termination of pregnancy – 1st trimester (≤12 weeks)
   15. Conditions leading to termination of pregnancy – 2nd trimester (>12 weeks)
   16. Condition leading to sterilization/tubal occlusion
   17. Pregnancy after sterilization/tubal occlusion

K. Disease Complications in Pregnancy
   2. Benign neoplasm of genital tract
   3. Malignant neoplasm of genital tract
   4. Medical disease
   5. Surgical disease
   6. Non-specific abdominal pain complicating pregnancy

L. Miscellaneous Gynaecological Conditions
   2. Miscellaneous
   3. Retained IUCD
   4. Abdominal or pelvic pain of unknown cause
   5. Complication of previous treatment / procedure performed in the same unit (outpatient or inpatient)
   6. Complication of previous treatment / procedure performed outside the unit
   7. Translocated IUCD

M. Miscellaneous Conditions
   1. No disease identified
   2. Miscellaneous
   3. Diseases of breasts
   4. Diseases of urinary tract
   5. Diseases of gastrointestinal tract
   6. Diseases of cardiovascular system
   7. Diseases of respiratory system
   8. Diseases of central nervous system
   9. Diseases of endocrine
   10. Diseases of blood
   11. Diseases of skin / musculoskeletal system

III. Coding for operations / treatment

1. All operative procedures should be coded e.g. salpingectomy after diagnostic laparoscopy should be coded as E3 and A9.
2. Medical treatment for ectopic pregnancy using methotrexate should be coded as K7. If subsequent surgery (e.g. laparoscopic salpingectomy) is also required, the exact procedure should also be quoted (K7 and E17).
3. Medical treatment for miscarriage using prostaglandins should be coded as K5. If subsequent evacuation of uterus is also required, the treatment should be quoted as K5 and I5.
4. Dilatation and Curettage (D&C) or obtaining endometrium with a curette should be quoted as I3. Any other form of endometrial biopsy using special designed device such as endometrial sampler or Vabra aspirator should be quoted as I10.
5. Surgery for pre-malignant conditions should be quoted under “Benign and Pre-Malignant Conditions”, not under “Malignant Conditions”.
6. Salpingo-oophorectomy, oophorectomy or salpingectomy performed at the time of hysterectomy should be quoted separately.
7. Debulking operation (B7) is defined as removal of gross tumour from sites other than uterus, tubes and ovaries (i.e. beyond a hysterectomy and salpingo-oophorectomy). Removal of tumour bulk in POD in addition to a TAHBSO should be coded as B7, B3 & B9. Omentectomy (B13) for gross tumour in the omentum however should be coded as both B7 & B13.
8. For laparoscopic surgery for endometriosis, if the disease, including ovarian cyst wall, is cauterised with electrosurgery or vapourised with laser, it should be coded as laparoscopic ablation of endometriosis (E21). If the disease is excised, it should be coded as laparoscopic resection of endometriosis (E31) or laparoscopic ovarian cystectomy in case of endometriotic cyst (E14).
9. For laparoscopic hysterectomy, **LAVH (E10)** (Laparoscopic-assisted vaginal hysterectomy) refers to a combined laparoscopic and vaginal approach with division of uterine artery performed vaginally. **LH (E29)** (Laparoscopic hysterectomy) refers to a combined laparoscopic and vaginal approach with laparoscopic division of the uterine artery; the remainder of the procedure is completed vaginally. **TLH (E30)** (Total laparoscopic hysterectomy) refers to entire operation performed laparoscopically, including suturing of the vaginal vault.
10. Robotic assisted surgery is considered as laparoscopic surgery and should be coded as E32 together with the exact procedure performed. For example, robotic assisted radical hysterectomy and pelvic lymph node dissection should be coded as E32, E27, E23.
11. If LNG-LUS is inserted for treatment of menorrhagia, adenomyosis or endometriosis, i.e., for non-contraceptive purpose, it should be coded as I12. However, if LNG-LUS is inserted for contraceptive purpose, it should be coded as I11.

Treatment

A. Benign and Pre-Malignant Conditions – Major Abdominal Operations
   2. Miscellaneous

3. Total hysterectomy
4. Subtotal hysterectomy
5. Repair of urinary fistulae
6. Myomectomy
7. Ovarian cystectomy
8. Oophorectomy / salpingo-oophorectomy
9. Salpingectomy
10. Salpingotomy / Salpingostomy
11. Surgery for stress incontinence
12. Adhesiolysis / tuboplasty
13. Drainage of pelvic abscess
14. Surgery for genital prolapse
15. Extended hysterectomy
16. Ureteric repair / reimplantation
17. Bowel resection /anastomosis / stoma

B. Malignant Conditions – Major Abdominal Operations
   2. Miscellaneous
   3. Total hysterectomy
   4. Subtotal hysterectomy
   5. Radical hysterectomy
   6. Pelvic exenteration
   7. Debulking operation
   8. Extended hysterectomy
   9. Oophorectomy / salpingo-oophorectomy
   10. Pelvic lymphadenectomy / lymph node sampling
   11. Para-aortic lymphadenectomy / lymph node sampling
   12. Laparotomy alone ± biopsy
   13. Omentectomy
   14. Trachelectomy
   15. Ureteric repair / reimplantation
   16. Bowel resection /anastomosis / stoma

C. Major Vaginal Operations
   2. Miscellaneous
   3. Surgery for urinary incontinence
   4. Vaginal hysterectomy
   5. Vaginal hysterectomy with repair of prolapse
   6. Repair of vaginal prolapse
   7. Repair of urinary fistulae
   8. Vaginal myomectomy
   9. Vaginectomy
   10. Vaginal stripping
   11. Vaginal reconstruction
   12. Repair of vault prolapse
   13. TVT-O/TVT/TOT

D. Major Vulval Operations
   2. Miscellaneous
   3. Radical vulvectomy
   4. Simple vulvectomy
   5. Wide local excision
   6. Groin node dissection

E. Endoscopic Procedures
   2. Miscellaneous
   3. Diagnostic laparoscopy ± chromotubation
   4. Laparoscopic sterilization / tubal occlusion
   5. Other laparoscopic procedures
   6. Diagnostic hysteroscopy
   7. Endometrial resection / ablation
   8. Other hysteroscopic procedures
   9. Cystoscopy
   10. Laparoscopic assisted vaginal hysterectomy (LAVH)
   11. Laparoscopic assisted subtotal hysterectomy (LASH)
   12. Laparoscopic myomectomy
   13. Laparoscopic myolysis
   14. Laparoscopic ovarian / paraovarian cystectomy
   15. Laparoscopic oophorectomy / salpingo-oophorectomy
   16. Laparoscopic ovarian drilling
   17. Laparoscopic salpingectomy
   18. Laparoscopic salpingotomy / salpingostomy
   19. Laparoscopic colposuspension
   20. Laparoscopic adhesiolysis
   21. Laparoscopic ablation of endometriosis
   22. Laparoscopic drainage of abscess
   23. Laparoscopic pelvic lymph node dissection
   24. Hysteroscopic polypectomy
   25. Hysteroscopic myomectomy
   26. Laparoscopic repair of genital prolapse
   27. Laparoscopic radical hysterectomy
   28. Laparoscopic para-aortic lymph node dissection
   29. Laparoscopic hysterectomy (LH)
   30. Total laparoscopic hysterectomy (TLH)
   31. Laparoscopic resection of endometriosis
   32. Robotic assisted surgery (the exact procedures need to be coded as well)

F. Colposcopy Related Procedures
   2. Miscellaneous (including cervical biopsy)
   3. Cervical cautery / cryotherapy / cold coagulation
   4. Laser vaporization of cervical / vaginal / vulval lesions
   5. Laser cone
   6. Loop diathermy excision
   7. Cone biopsy

G. Assisted Reproduction Procedures
   2. Miscellaneous
   3. Ultrasound guided oocyte retrieval
   4. Laparoscopic oocyte retrieval
   5. Gamete intrafallopian transfer
   6. Pronuclear stage tubal transfer
   7. Embryo transfer
   8. Controlled ovarian hyperstimulation
   9. Intrauterine insemination
   10. Intra-cytoplasmic sperm injection

H. Minor Abdominal Operation
   2. Miscellaneous
   3. Tubal ligation /occlusion
   4. Resuturing of abdominal wound

I. Other Minor Operations
   2. Miscellaneous
   3. Diagnostic curettage (including avulsion of polyp)
   4. Therapeutic abortions (suction evacuation)
   5. Evacuation of retained products of conception (including suction evacuation of silent / incomplete miscarriage, post-medical evacuation)
   6. Marsupialization
   7. Cervical cerclage
   8. Other minor vulval operations (including evacuation of vulval haematoma, vulval biopsy)
   9. E.U.A.
   10. Endometrial biopsy
   11. Insertion / Removal of IUCD
   12. Insertion of LNG-IUS for non-contraceptive purpose

J. Radiotherapy
   2. Miscellaneous
   3. Intracavitary radium / cesium
   4. External irradiation

K. Other Forms of Treatment
   2. Miscellaneous
   3. Observation and investigation
   4. Antibiotic as primary treatment
   5. Prostaglandins
   6. Hormones (O.C. progestogens, danazol, GnRHa)
   7. Chemotherapy
   8. Other medication
   9. Pre-anaesthetic assessment
   10. Uterine artery embolisation
   11. MR guided focused ultrasound therapy