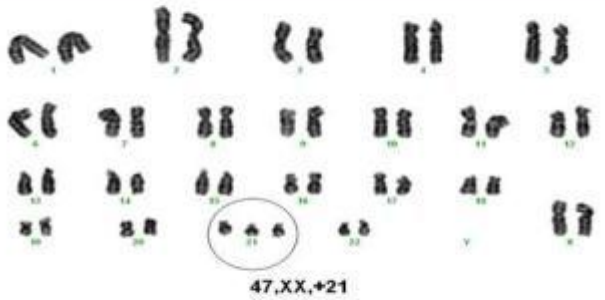
FIRST TRIMESTER SCREENING IN VIETNAM

Pham Viet Thanh
Ha To Nguyen

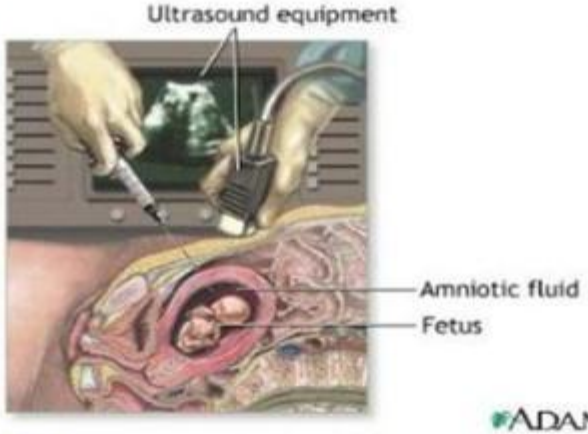
Tu Du Hospital, Ho Chi Minh City, Vietnam

In 1866, Langdon Down firstly described an idiot.

In 1909 Shuttleworth reported the relationship between Down syndrome and maternal age.



In 1959, Lejeune&Jacobs determined an extra chromosome in Down syndrome.



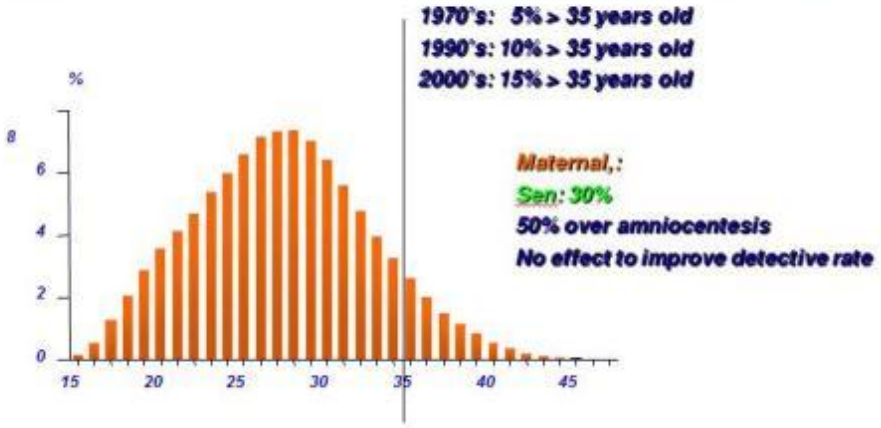
In 1966, Down syndrome diagnosed prenatally by amniocentesis.

In 1976, American Obs and Gyn association recommended to screen prenatally for all women >35 years old

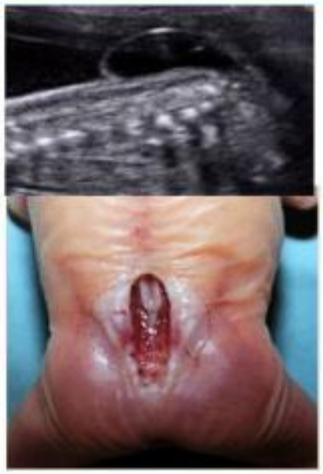
- Down syndrome
- Spina bifida

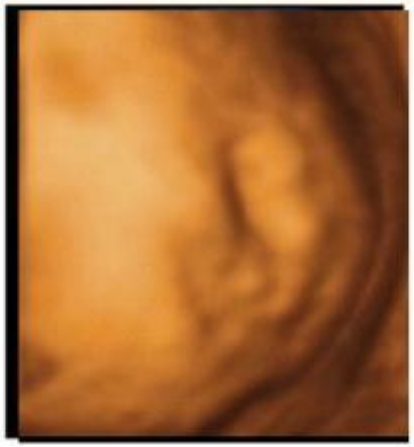
Maternal age	Risk of DS	Risk of aneuploidy	Risk of DS in 2nd
20			1/1231
30	1/185	1/384	1/685
33	1/592	1/285	1/452
34	1/465	1/243	1/352
35	1/385	1/178	1/274
36	1/287	1/149	1/213
37	1/225	1/123	1/166
38	1/177	1/105	1/129
39	1/139	1/80	1/100
40	1/109	1/63	1/80
41	1/85	1/48	1/61

Screening DS by maternal age



Spina bifida: AFP increase

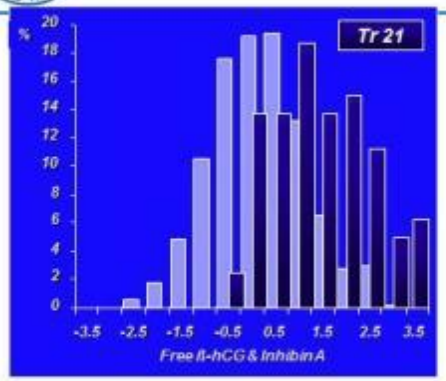


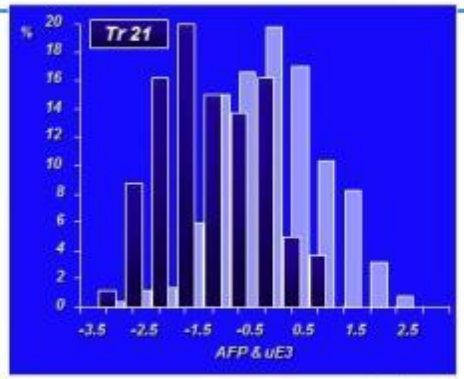


In 1980's , screening DS by biochemistry: triple test for all women.

Screening DS by biometrics

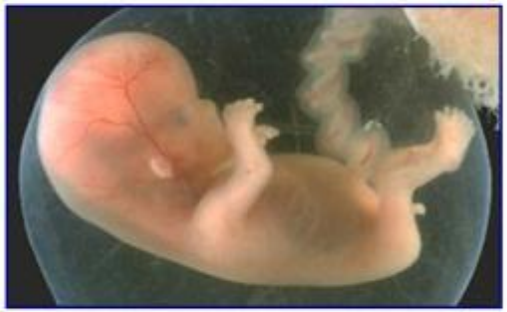
Free beta HCG- AFP- uE 3- Inhibin A





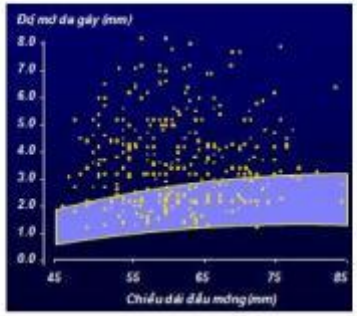
Cuckle2591

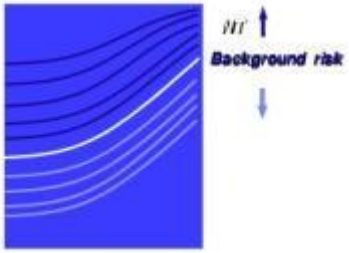
FPR 5%		DR 65%
	MA and AFP & hCG	59%
	MA and AFP & hCG & uE3	63%
	MA and AFP & ß-hCG	63%
	MA and AFP & ß-hCG & uE3	67%
	MA and AFP & ß-hCG & uE3 & IA	72%



In 1990's screening DS by Nuchal translucency measurement at 11-13 weeks 6 days.

Screening DS by NT measurement



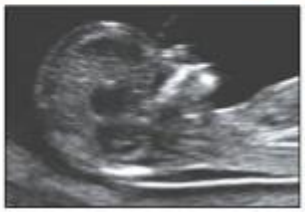


- *In euploidy, NT increase according with gestational age.*
- *75% Trisomy 21 NT measurement>95th*
- *Sen: 80%*

COMBINED TEST

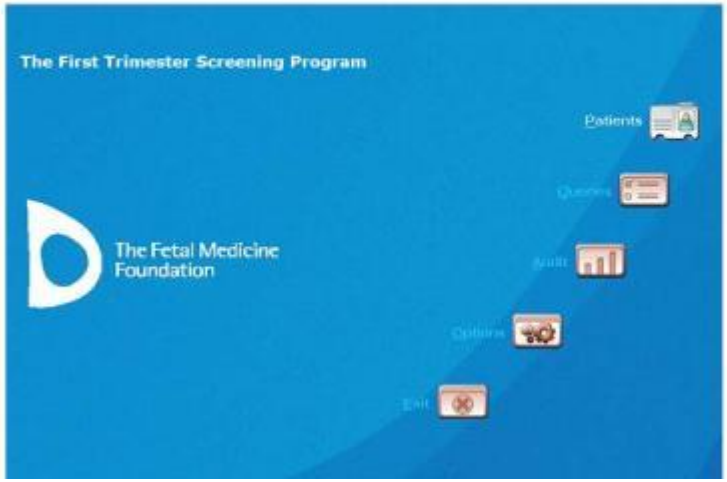
NT measurement and free β-hCG&PAPP-A at 11-13 weeks 6

Single pregnancy n=85,696



	Risk>1 in 300
Euploidy	4,437/85,15((5.2%)
Trisomy 21	291/31((92.1%)
Trisomy 18	77/84 (91.7%)
Others	127/140 (90.7%)

Screening aneuploidy by FMF software



NT thick, risk increase

First Trimester Ultrasound:

US machine: GE Visualisation: good
Gestational age: 12 weeks + 6 days from CRL EDD by scan: 12 March 2010
Findings: Alive fetus - Fetal heart activity present
Fetal heart rate 160 bpm
Crown-rump length (CRL) 65.0 mm
Nuchal translucency (NT) 4.0 mm
Placenta: anterior high
Amniotic fluid: normal

Chromosomal markers:

Nasal bone: can not examine; Facial angle: not examined; Tricuspid Doppler: normal; Ductus venosus Doppler: normal;

Fetal anatomy:

Skull/brain: appears normal; Spine: appears normal; Abdomen: appears normal; Stomach: visible; Bladder: visible; Hands: both visible; Feet: both visible;

Estimated risk for Trisomy 21 (Down's syndrome), 18 (Edward's syndrome) + 13 (Patau's syndrome):

Patient counselled and consent given - Maternal age: 23 years

	Trisomy 21	Trisomy 18	Trisomy 13
Background risk:	1: 1023	1: 2511	1: 7874
Adjusted risk:	1: 24	1: 231	1: 2099

NT normal, risk decrease

First Trimester Ultrasound:

US machine: GE. Visualisation: good.
Gestational age: 12 weeks + 6 days from CRL. EDD by scan: 12 March 2010
Findings: Alive fetus - Fetal heart activity present
Fetal heart rate: 160 bpm
Crown-rump length (CRL): 65.0 mm
Nuchal translucency (NT): 1.5 mm
Placenta: anterior high
Amniotic fluid: normal

Chromosomal markers:

Nasal bone: can not examine; Facial angle: not examined; Tricuspid Doppler: normal; Ductus venosus Doppler: normal;

Fetal anatomy:

Skull/brain: appears normal; Spine: appears normal; Abdomen: appears normal; Stomach: visible; Bladder: visible; Hands: both visible; Feet: both visible;

Estimated risk for Trisomy 21 (Down's syndrome), 18 (Edward's syndrome) + 13 (Patau's syndrome):

Patient counselled and consent given - Maternal age: 40 years

	Trisomy 21	Trisomy 18	Trisomy 13
Background risk:	1: 68	1: 167	1: 523
Adjusted risk:	1: 1358	1: 1247	1: 10456

Combined test

First Trimester Ultrasound:

US machine: GE. Visualisation: good.
Gestational age: 12 weeks + 6 days from CRL. EDD by scan: 12 March 2010
Findings: Alive fetus - Fetal heart activity present
Fetal heart rate: 160 bpm
Crown-rump length (CRL): 65.0 mm
Nuchal translucency (NT): 3.5 mm
Placenta: anterior high
Amniotic fluid: normal

Chromosomal markers:

Nasal bone: can not examine; Facial angle: not examined; Tricuspid Doppler: normal; Ductus venosus Doppler: normal;

Fetal anatomy:

Skull/brain: appears normal; Spine: appears normal; Abdomen: appears normal; Stomach: visible; Bladder: visible; Hands: both visible; Feet: both visible;

Estimated risk for Trisomy 21 (Down's syndrome), 18 (Edward's syndrome) + 13 (Patau's syndrome):

Patient counselled and consent given - Maternal age: 23 years

	Trisomy 21	Trisomy 18	Trisomy 13
Background risk:	1: 1023	1: 2511	1: 7674
Adjusted risk:	1: 39	1: 544	1: 3629

First Trimester Ultrasound:

US machine: GE. Visualisation: good.
Gestational age: 12 weeks + 6 days from CRL. EDD by scan: 12 March 2010
Findings: Alive fetus - Fetal heart activity present
Fetal heart rate: 160 bpm
Crown-rump length (CRL): 65.0 mm
Nuchal translucency (NT): 3.5 mm
Placenta: anterior high
Amniotic fluid: normal

Chromosomal markers:

Nasal bone: can not examine; Facial angle: not examined; Tricuspid Doppler: normal; Ductus venosus Doppler: normal;

Fetal anatomy:

Skull/brain: appears normal; Spine: appears normal; Abdomen: appears normal; Stomach: visible; Bladder: visible; Hands: both visible; Feet: both visible;

Maternal Serum Biochemistry:

Sample taken on 03 September 2009.
Free ß-hCG: equivalent to 0.700 MoM
PAPP-A: equivalent to 1.000 MoM

Estimated risk for Trisomy 21 (Down's syndrome), 18 (Edward's syndrome) + 13 (Patau's syndrome):

Patient counselled and consent given - Maternal age: 23 years

	Trisomy 21	Trisomy 18	Trisomy 13
Background risk:	1: 1023	1: 2511	1: 7674
Adjusted risk:	1: 1809	1: 3861	1: 20783

Maternal / Pregnancy Characteristics:

Previous chromosomally abnormal child or fetus: trisomy 21

First Trimester Ultrasound:

Gestational age: 12 weeks + 6 days from CRL. EDD by scan: 14 July 2010

Crown-rump length (CRL): 65.0 mm
Nuchal translucency (NT): 1.2 mm

Maternal Serum Biochemistry:

Sample taken on 04 January 2010.
Free ß-hCG: equivalent to 1.000 MoM
PAPP-A: equivalent to 1.000 MoM

Estimated risk for Trisomy 21 (Down's syndrome), 18 (Edward's syndrome) + 13 (Patau's syndrome):

Patient counselled and consent given - Maternal age: 24 years

	Trisomy 21	Trisomy 18	Trisomy 13
Background risk:	1: 146	1: 2429	1: 7615
Adjusted risk::	1: 2923	1: 48571	1: 152299

Strategy of screening Down syndrome

1. Maternal age

- ☑ Highly accurate for all chromosome abnormalities

- ☒ Miscarriage risk
- ☒ Poor sensitivity (40% detection)
- ☒ 100+ tests to detect one DS fetus

2. Second trimester biochemistry

- ☑ Available to entire pregnant population
- ☑ Non-invasive
- ☑ Improved detection rate for DS

- ☒ Late diagnosis of abnormality
- ☒ Poor predictive value (40 invasive tests to detect one DS fetus)

3. Mid trimester ultrasound

- ↗ Detects many *but not all* fetal structural abnormalities
- ↗ Placental position / cervix status
- ↗ Detects multiple pregnancy
- ↗ Identifies markers of aneuploidy

10 % of NORMAL fetuses have an isolated marker

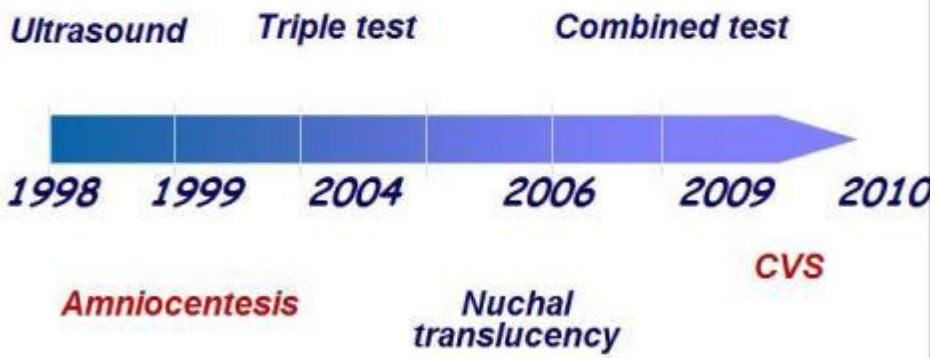
Only 50% of DS fetuses have an identifiable abnormality at 18 – 20w

"A second trimester fetal morphology ultrasound scan is not recommended as the primary screening test for Trisomy 21 and Trisomy 18"
HQSA / RANZCOG, July 2007

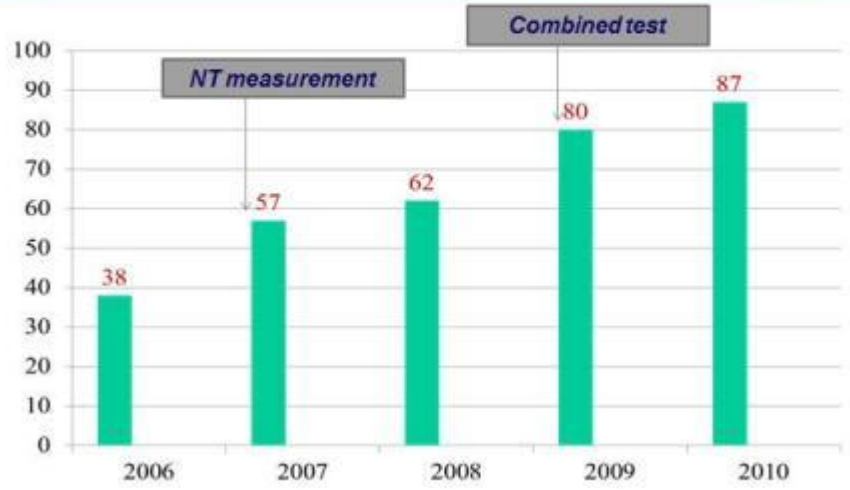
Screening strategies for Down syndrome

Strategy	Detection rate (%)	False positive rate (%)	# Invasive tests to detect one case DS
Maternal age (≥ 35 y)	40	8	185
T2: Biochemical screening	65	5	39
T2: Ultrasound	50	10	102
T1: NT + biochemistry + new markers	92	3	16

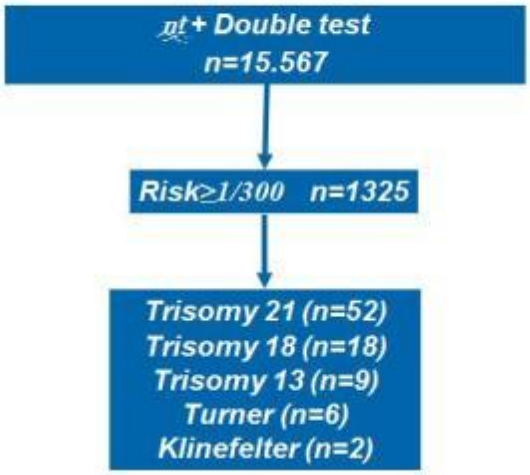
Screening DS at Tudu hospital



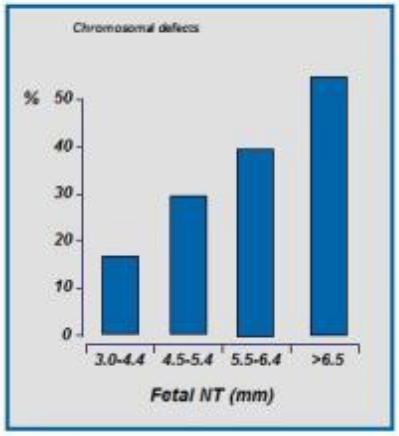
Aneuploidy detected in last 5 years

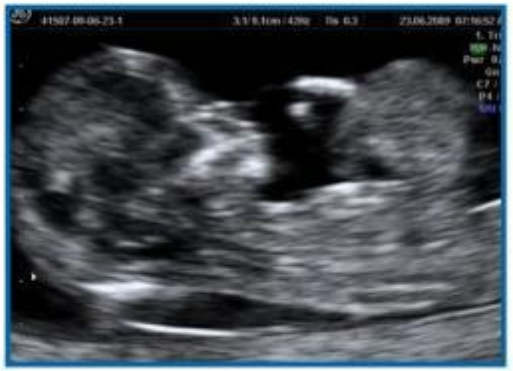


In 2010

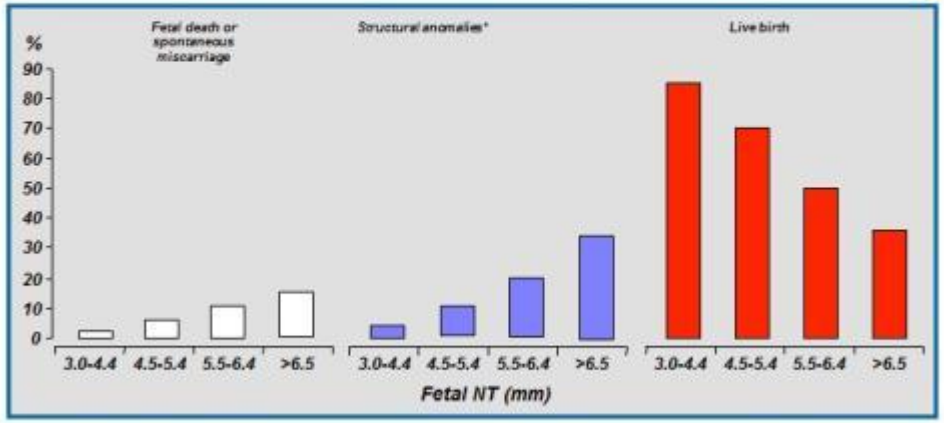


Thick NT and aneuploidy





Thick NT and Fetal death, structural anomalies and live birth



* *Cardiac defect (14), Hydrops fetalis (n=13) Exomphalos (n=8), Diaphragmatic hernia (n=6), Dandy-Walker malformation (n=4), Polydefects: 17. Total 62*

Thank you for your attention