

Comparing Annual VTE Impact (estimated) across 2nd - 4th Generation Combination Hormonal Contraceptives in the U.S. 2013 - All Users

Analysis calculates the risk for each generation of CHC based on prescription data from IMS Health & CHC Contraception Use Report 2013 - Women (aged 15-44)

Data Points - Risk Fundamentals	
Total Women in US aged 15-44 ³	61,000,000
Total Women in US aged 15-44 using contraception ³	37,500,000
Women NOT USING a combined hormonal pill/patch/ring and are not pregnant ³	23,500,000
Women (aged 15 - 44) in US using either Pill / Patch / Ring during 2013 per CDC - All CHC users ^{3,4}	10,800,000
1st & 2nd Generation CHC users in 2013 ^{3,4}	7,800,000
3rd Generation CHC users in 2013 ^{3,4}	1,000,000
4th Generation CHC users in 2013 ^{3,4}	2,000,000
Women using IUD ³	4,000,000
All other methods (condoms, withdrawal, periodic abstinence, implant, injectable, diaphragm) ³	10,200,000
Male & Female Sterilization ³	12,500,000
Unit of measure - per 10,000 woman years	10,000
2/3 of VTE cases are Deep Vein Thrombosis (DVT's) ²	0.6667
1/3 of VTE cases are Pulmonary Embolism's (PE's) ³	0.3333
DVT Mortality Rate - 6% ²	6%
PE Mortality Rate - 12% ³	12%

Exposure Category by Generation of CHC ¹	EMA Estimated Blood Clot incidence per 10,000 women ¹	Number of Women Users	VTE Blood Clot Cases			DVT 2/3 of VTE cases are DVT			DVT Deaths 6% Mortality Rate			DVT Deaths "Per 100,000 Users" Based on 2013 CDC Data			Pulmonary Embolisms 1/3 of VTE Cases are PE			PE Deaths 12% Mortality Rate			PE Deaths "Per 100,000 Users" Based on 2013 CDC Data			DVT & PE Related Deaths Combined "Per 10,000 Users" Based on 2013 CDC Data		
			Low ¹	High ¹	Average	Low ¹	High ¹	Average	Low ¹	High ¹	Average	Low ¹	High ¹	Average	Low ¹	High ¹	Average	Low ¹	High ¹	Average	Low ¹	High ¹	Average	Low ¹	High ¹	Average
Women not using a combined hormonal pill/patch/ring and are not pregnant	1-2 out of 10,000	23,500,000	2,350	4,700	3,525	1,567	3,133	2,350	94	188	141	0.4	0.8	0.6	783	1,567	1,175	94	188	141	0.4	0.8	0.6	0.8	1.6	1.2
IUD (Intrauterine Device)	1-2 out of 10,000	4,000,000	400	800	600	267	533	400	16	32	24	0.4	0.8	0.6	133	267	200	16	32	24	0.4	0.8	0.6	0.8	1.6	1.2
1st & 2nd Gen CHC - Progestin Levonorgestrel, Norethisterone, Norgestrel or Norgestimate	5-7 out of 10,000	7,800,000	3,900	5,460	4,680	2,600	3,640	3,120	156	218	187	2.0	2.8	2.4	1,300	1,820	1,560	156	218	187	2.0	2.8	2.4	4.0	5.6	4.8
3rd Gen. CHC - Progestin Etonogestrel (Ring) or Norelgestromin (Patch)	6 - 12 out of 10,000	1,000,000	600	1,200	900	400	800	600	24	48	36	2.4	4.8	3.6	200	400	300	24	48	36	2.4	4.8	3.6	4.8	9.6	7.2
4th Gen. CHC - Progestin Drospirenone (i.e. Yasmin, Yaz) or Desogestrel	9 - 12 out of 10,000	2,000,000	1,800	2,400	2,100	1,200	1,600	1,400	72	96	84	3.6	4.8	4.2	600	800	700	72	96	84	3.6	4.8	4.2	7.2	9.6	8.4
Total Generation 1, 2, 3 & 4 CHC's (Pills, Patch & Ring)			6,300	9,060	7,680	4,200	6,040	5,120	252	362	307	8.8	14.0	11.4	2,100	3,020	2,560	252	362	307	8.8	14.0	11.4	17.6	28.0	22.8

References

- European Medicines Agency. 2013. *Benefits of combined hormonal contraceptives (CHCs) continue to outweigh risks – CHMP endorses PRAC recommendation.*, Press Release dated 11/22/2013. Retrieved from: http://www.ema.europa.eu/ema/index.jsp?curl=pages/news_and_events/news/2013/11/news_detail_001969.jsp&mid=WC0b01ac058004d5c1
- A. L. Nelson, MD & C. Cwiak, MD, MPH, (2011). Combined Oral Contraceptives (COCs). In Hatcher, R. D., MD, Trussell, J., PhD., Nelson, A. L., M.D., Cates Jr., W., M.D., MPH, Kowal D., M.A., P.A., Policar, & M. S., MD, MPH. *Contraception Technology* (20th Edition). Chapter 11, (pp.249-275). Bridging the Gap Communications.
- NCHS Data Brief, Number 173, December, 2014 Retrieved from <http://www.cdc.gov/nchs/data/databriefs/db173.pdf>. CDC Survey NCHS Data Brief, No. 173, December 2014
- Individual pill, patch and ring data was sourced from IMS Health's National Prescription Audit, Hormonal Birth Control Products, May 2001 - Dec 2014, Measures include NRx, TRx, Layout: USC5, Mol, Brand/Generic, Product, Form1 and Strength

NOTE: DVT deaths that don't include a PE are not included in final totals for discussion as we do not yet have a source for this data. The final total of VTE related deaths will likely increase from what is currently shown for PE deaths.

Calculations used to establish risk of VTE, DVT & PE

Venous Thromboembolism (VTE) Impact:

Calculation used to estimate the number of women that will develop a VTE due to the increased estrogenic effects of a particular generation of Combined Hormonal Contraceptive (CHC).

$$\text{VTEs from a particular generation of CHC} = \text{Number of Users of that CHC} * (\text{EMA Estimated VTE Incidence Rate}^1 \text{ for that CHC Generation}) / 10,000$$

Deep Vein Thrombosis (DVT) Impact:

Calculation used to estimate the number of women that will develop DVT due to the increased estrogenic effects of a particular generation of Combined Hormonal Contraceptive (CHC).

2/3 of VTEs are DVT.² So (using the previously calculated "VTE's from a particular CHC")

$$\text{DVT from a particular CHC} = (2/3) * \text{VTEs from a particular CHC}$$

Calculation used to estimate the number of women who will DIE annually due to a DVT caused by the increased estrogenic effects of a particular generation of CHC.

The Mortality rate of DVT is 6%.² So for each CHC (using previously calculated "DVTs from a particular CHC")

$$\text{Deaths from DVTs for a particular CHC} = \text{DVTs from a particular CHC} * 0.06$$

Pulmonary Embolism (PE) Impact:

Calculation used to estimate the number of women that will develop PE due to the increased estrogenic effects of a particular generation of Combined Hormonal Contraceptive (CHC).

1/3 of VTEs are PEs.² So (again, using the previously calculated "VTEs from a particular CHC")

$$\text{PEs from a particular CHC} = 1/3 * \text{VTE's from a particular CHC}$$

Calculation used to estimate the number of women who will die annually due to a PE caused by the increased estrogenic effects of a particular generation of CHC.

Mortality rate from PEs is 12%.² So for each CHC (using previously calculated "PEs from a particular CHC"),

$$\text{Deaths from PEs for a particular CHC} = \text{PEs from a particular CHC} * 0.12$$