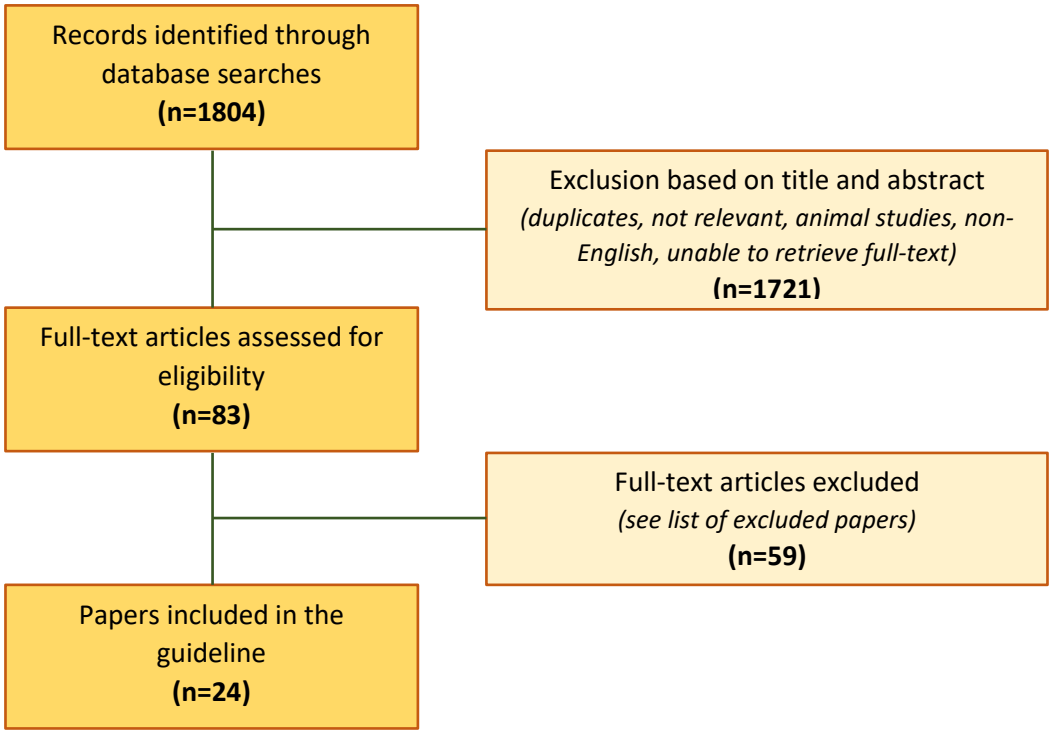
Annex 7: Literature study: flowcharts, list of excluded studies

1. Pre-stimulation management

Flowchart



List of excluded papers

	Exclusion criterion
Addy, D. M., Whitman-Elia, G. F. and Queenan, J. T., Jr. Age and resting follicle number predict response to gonadotropin stimulation in in vitro fertilization cycles. Am J Obstet Gynecol. 2002; 187 (2): 285-7; discussion 287-8.	Retrospective chart review.
Broer, S. L., Dolleman, M., Opmeer, B. C., Fauser, B. C., Mol, B. W. and Broekmans, F. J. AMH and AFC as predictors of excessive response in controlled ovarian hyperstimulation: a meta-analysis. Hum Reprod Update. 2011; 17 (1): 46-54.	Replaced by a more recent IPD meta-analysis: Broer 2013
Broer SL, Mol BWJ, Hendriks D, Broekmans FJM. The role of antimullerian hormone in prediction of outcome after IVF: comparison with the antral follicle count. Fertil Steril 2009; 91:705–714.	Replaced by a more recent IPD meta-analysis: Broer 2013
Burks, H. R., Ross, L., Opper, N., Paulson, E., Stanczyk, F. Z. and Chung, K. Can highly sensitive antimullerian hormone testing predict failed response to ovarian stimulation? Fertil Steril. 2015; 104 (3): 643-8.	Retrospective, small number of patients.
Chang, M. Y., Chiang, C. H., Hsieh, T. T., Soong, Y. K. and Hsu, K. H. Use of the antral follicle count to predict the outcome of assisted reproductive technologies. Fertil Steril. 1998; 69 (3): 505-10.	No calculation of accuracy
Develioglu, Oh, Cox, B, Toner, Jp, Oehninger, S and Muasher, Sj. The value of basal serum follicle stimulating hormone, luteinizing hormone and oestradiol concentrations following pituitary down-regulation in predicting ovarian response to stimulation with highly purified follicle stimulating hormone. Human reproduction (Oxford, England). 1999; 14 (5): 1168-74.	Small number of patients, including oocyte donors.
Eldar-Geva, T., Ben-Chetrit, A., Spitz, I. M., Rabinowitz, R., Markowitz, E., Mimoni, T., Gal, M., Zylber-Haran, E. and Margalioth, E. J. Dynamic assays of inhibin B, anti-Mullerian hormone and estradiol following FSH stimulation and ovarian ultrasonography as predictors of IVF outcome. Hum Reprod. 2005; 20 (11): 3178-83.	Included in meta-analysis: Broer 2013
Eldar-Geva, T., Robertson, D. M., Cahir, N., Groome, N., Gabbe, M. P., Maclachlan, V. and Healy, D. L. Relationship between serum inhibin A and B and ovarian follicle development after a daily fixed dose administration of recombinant follicle-stimulating hormone. J Clin Endocrinol Metab. 2000; 85 (2): 607-13.	No calculation of accuracy
Erdem, M., Erdem, A., Gursoy, R. and Biberoglu, K. Comparison of basal and clomiphene citrate induced FSH and inhibin B, ovarian volume and antral follicle counts as ovarian reserve tests and predictors of poor ovarian response in IVF. J Assist Reprod Genet. 2004; 21 (2): 37-45.	No calculation of accuracy
Ersahin, A. A., Arpaci, H., Ersahin, S. S., Celik, N. and Acet, M. AFC vs. AMH: prediction of ovarian response in women with endometrioma undergoing controlled ovarian stimulation. Eur Rev Med Pharmacol Sci. 2017; 21 (10): 2499-2503.	No calculation of accuracy
Fanchin, R., Schonauer, L. M., Righini, C., Frydman, N., Frydman, R. and Taieb, J. Serum anti-Müllerian hormone dynamics during controlled ovarian hyperstimulation. Hum Reprod. 2003; 18 (2): 328-32.	No calculation of accuracy
Fang, T., Su, Z., Wang, L., Yuan, P., Li, R., Ouyang, N., Zheng, L. and Wang, W. Predictive value of age-specific FSH levels for IVF-ET outcome in women with normal ovarian function. Reprod Biol Endocrinol. 2015; 13 63.	Retrospective study
Ficicioglu, C., Cenksoy, P. O., Yildirim, G. and Kaspar, C. Which cut-off value of serum anti-Müllerian hormone level can predict poor ovarian reserve, poor ovarian response to stimulation and in vitro fertilization success? A prospective data analysis. Gynecol Endocrinol. 2014; 30 (5): 372-6.	No calculation of accuracy
Ficicioglu, C., Kutlu, T., Demirbasoglu, S. and Mulayim, B. The role of inhibin B as a basal determinant of ovarian reserve. Gynecol Endocrinol. 2003; 17 (4): 287-93.	Included in meta-analysis: Broekmans 2006, and no specific analysis on basal oestradiol, BMI or age

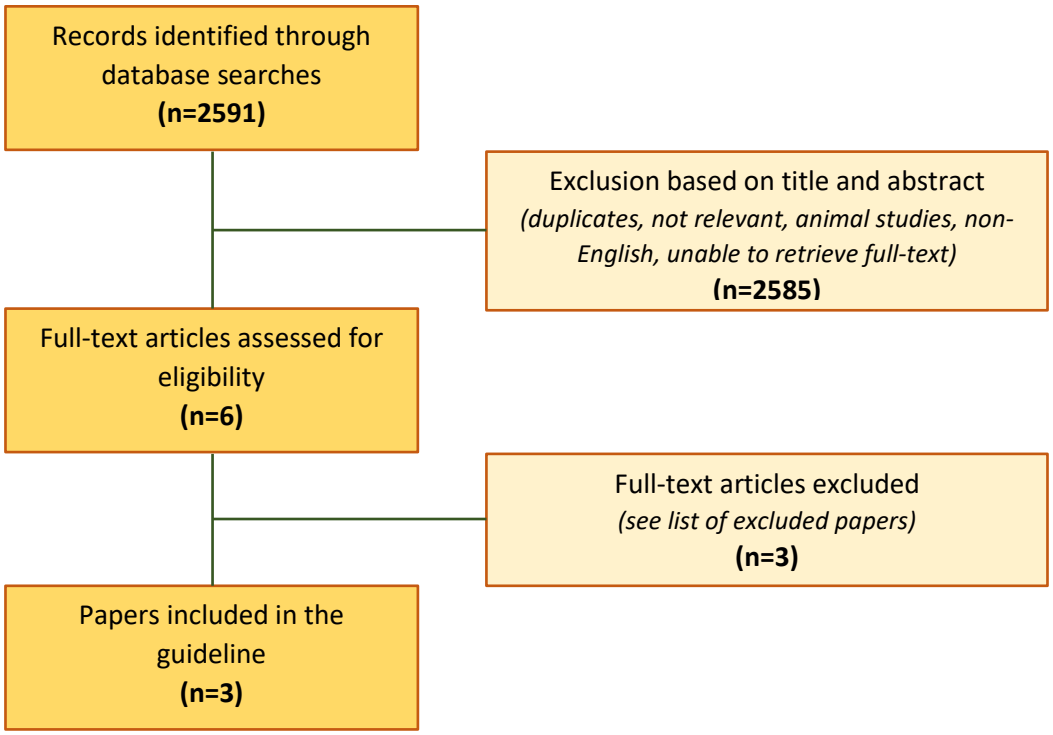
Frattarelli, J. L. and Kodama, C. L. Impact of body mass index on in vitro fertilization outcomes. J Assist Reprod Genet. 2004; 21 (6): 211-5.	Retrospective study
Frattarelli, J. L., Lauria-Costab, D. F., Miller, B. T., Bergh, P. A. and Scott, R. T. Basal antral follicle number and mean ovarian diameter predict cycle cancellation and ovarian responsiveness in assisted reproductive technology cycles. Fertil Steril. 2000; 74 (3): 512-7.	Included in meta-analysis: Broekmans 2006
Frattarelli, J. L., Levi, A. J., Miller, B. T. and Segars, J. H. A prospective assessment of the predictive value of basal antral follicles in in vitro fertilization cycles. Fertil Steril. 2003; 80 (2): 350-5.	No calculation of accuracy
Fried, G., Remaeus, K., Harlin, J., Krog, E., Csemiczky, G., Aanesen, A. and Tally, M. Inhibin B predicts oocyte number and the ratio IGF-I/IGFBP-1 may indicate oocyte quality during ovarian hyperstimulation for in vitro fertilization. J Assist Reprod Genet. 2003; 20 (5): 167-76.	Retrospective study
Galey-Fontaine, J., Cedrin-Durnerin, I., Chaibi, R., Massin, N. and Hugues, J. N. Age and ovarian reserve are distinct predictive factors of cycle outcome in low responders. Reprod Biomed Online. 2005; 10 (1): 94-9.	Retrospective study
Gallot, V., Berwanger da Silva, A. L., Genro, V., Grynberg, M., Frydman, N. and Fanchin, R. Antral follicle responsiveness to follicle-stimulating hormone administration assessed by the Follicular Output RaTe (FORT) may predict in vitro fertilization-embryo transfer outcome. Hum Reprod. 2012; 27 (4): 1066-72.	No calculation of accuracy
Ganidou, M. A., Kolibianakis, E. M., Venetis, C. A., Gerou, S., Makedos, G. A., Klearchou, N. and Tarlatzis, B. C. Is assessment of anti-Müllerian hormone and/or antral follicle count useful in the prediction of ovarian response in expected normal responders treated with a fixed dose of recombinant FSH and GnRH antagonists? A prospective observational study. Gynecol Endocrinol. 2014; 30 (11): 817-21.	No calculation of accuracy
Gingold, J. A., Lee, J. A., Whitehouse, M. C., Rodriguez-Purata, J., Sandler, B., Grunfeld, L., Mukherjee, T. and Copperman, A. B. Maximum basal FSH predicts reproductive outcome better than cycle-specific basal FSH levels: waiting for a "better" month conveys limited retrieval benefits. Reprod Biol Endocrinol. 2015; 13 91.	Retrospective study.
Gizzo, S., Andrisani, A., Esposito, F., Oliva, A., Zicchina, C., Capuzzo, D., Gangemi, M. and Nardelli, G. B. Ovarian reserve test: an impartial means to resolve the mismatch between chronological and biological age in the assessment of female reproductive chances. Reprod Sci. 2014; 21 (5): 632-9.	Retrospective study
Goverde, Aj, McDonnell, J, Schats, R, Vermeiden, Jp, Homburg, R and Lambalk, Cb. Ovarian response to standard gonadotrophin stimulation for IVF is decreased not only in older but also in younger women in couples with idiopathic and male subfertility. Human reproduction (Oxford, England). 2005; 20 (6): 1573-7	Mainly retrospective study.
Greenwood, E. A., Cedars, M. I., Santoro, N., Eisenberg, E., Kao, C. N., Haisenleder, D. J., Diamond, M. P. and Huddleston, H. G. Antimüllerian hormone levels and antral follicle counts are not reduced compared with community controls in patients with rigorously defined unexplained infertility. Fertil Steril. 2017; 108 (6): 1070-1077.	No calculation of accuracy
Gulekli, B., Bulbul, Y., Onvural, A., Yorukoglu, K., Posaci, C., Demir, N. and Erten, O. Accuracy of ovarian reserve tests. Hum Reprod. 1999; 14 (11): 2822-6.	Small number of patients
Hendriks, D. J., Broekmans, F. J., Bancsi, L. F., Looman, C. W., de Jong, F. H. and te Velde, E. R. Single and repeated GnRH agonist stimulation tests compared with basal markers of ovarian reserve in the prediction of outcome in IVF. J Assist Reprod Genet. 2005; 22 (2): 65-73.	Included in meta-analysis: Broer 2013
Hendriks, D. J., Kwee, J., Mol, B. W., te Velde, E. R. and Broekmans, F. J. Ultrasonography as a tool for the prediction of outcome in IVF patients: a comparative meta-analysis of ovarian volume and antral follicle count. Fertil Steril. 2007; 87 (4): 764-75.	No calculation of accuracy
Huang, F. J., Chang, S. Y., Tsai, M. Y., Kung, F. T., Wu, J. F. and Chang, H. W. Determination of the efficiency of controlled ovarian hyperstimulation in the gonadotropin-releasing hormone agonist-suppression cycle using the initial follicle count during gonadotropin stimulation. J Assist Reprod Genet. 2001; 18 (2): 91-6.	No calculation of accuracy

Hughes, E. G., King, C. and Wood, E. C. A prospective study of prognostic factors in in vitro fertilization and embryo transfer. Fertil Steril. 1989; 51 (5): 838-44.	Old study
Kamel, H. M., Amin, A. H. and Al-Adawy, A. R. Basal serum anti-Mullerian hormone (AMH) is a promising test in prediction of occurrence of pregnancy rate in infertile women undergoing ICSI cycles. Clin Lab. 2014; 60 (10): 1717-23.	Insufficient data, inadequate/poor response not defined
Knez, J., Kovacic, B., Medved, M. and Vlaisavljevic, V. What is the value of anti-Mullerian hormone in predicting the response to ovarian stimulation with GnRH agonist and antagonist protocols? Reprod Biol Endocrinol. 2015; 13 58.	Retrospective study
Kotanidis, L., Nikolettos, K., Petousis, S., Asimakopoulos, B., Chatzimitrou, E., Kolios, G. and Nikolettos, N. The use of serum anti-Mullerian hormone (AMH) levels and antral follicle count (AFC) to predict the number of oocytes collected and availability of embryos for cryopreservation in IVF. J Endocrinol Invest. 2016; 39 (12): 1459-1464.	No calculation of accuracy
Kunt, C., Ozaksit, G., Keskin Kurt, R., Cakir Gungor, A. N., Kanat-Pektas, M., Kilic, S. and Dede, A. Anti-Mullerian hormone is a better marker than inhibin B, follicle stimulating hormone, estradiol or antral follicle count in predicting the outcome of in vitro fertilization. Arch Gynecol Obstet. 2011; 283 (6): 1415-21.	No calculation of accuracy
Kwee, J, Schats, R, McDonnell, J, Schoemaker, J and Lambalk, Cb. The clomiphene citrate challenge test versus the exogenous follicle-stimulating hormone ovarian reserve test as a single test for identification of low responders and hyperresponders to in vitro fertilization. Fertility and sterility. 2006; 85 (6): 1714-22.	Same study population as Kwee et al., 2007
Kwee, J, Schats, R, McDonnell, J, Themmen, A, Jong, F and Lambalk, C. Evaluation of anti-Müllerian hormone as a test for the prediction of ovarian reserve. Fertil steril. 2008; 90 (3): 737-43.	Same study population as Kwee et al., 2007
la Cour Freiesleben, N., Gerds, T. A., Forman, J. L., Silver, J. D., Nyboe Andersen, A. and Popovic-Todorovic, B. Risk charts to identify low and excessive responders among first-cycle IVF/ICSI standard patients. Reprod Biomed Online. 2011; 22 (1): 50-8.	No calculation of accuracy
Lai, Q., Chen, C., Zhang, Z., Zhang, S., Yu, Q., Yang, P., Hu, J. and Wang, C. Y. The significance of antral follicle size prior to stimulation in predicting ovarian response in a multiple dose GnRH antagonist protocol. Int J Clin Exp Pathol. 2013; 6 (2): 258-66.	No calculation of accuracy
Lee, Y., Kim, T. H., Park, J. K., Eum, J. H., Lee, H. J., Kim, J., Lyu, S. W., Kim, Y. S., Lee, W. S. and Yoon, T. K. Predictive value of antral follicle count and serum anti-Müllerian hormone: Which is better for live birth prediction in patients aged over 40 with their first IVF treatment? Eur J Obstet Gynecol Reprod Biol. 2018; 221 151-155.	Prediction of clinical pregnancy rate and live birth rate, not ovarian response
Li, H. W., Lee, V. C., Lau, E. Y., Yeung, W. S., Ho, P. C. and Ng, E. H. Ovarian response and cumulative live birth rate of women undergoing in-vitro fertilisation who had discordant anti-Mullerian hormone and antral follicle count measurements: a retrospective study. PLoS One. 2014; 9 (10): e108493.	Retrospective study
Lorusso, F., Vicino, M., Lamanna, G., Trerotoli, P., Serio, G. and Depalo, R. Performance of different ovarian reserve markers for predicting the numbers of oocytes retrieved and mature oocytes. Maturitas. 2007; 56 (4): 429-35.	Retrospective study
Majumder, K., Gelbaya, T. A., Laing, I. and Nardo, L. G. The use of anti-Müllerian hormone and antral follicle count to predict the potential of oocytes and embryos. Eur J Obstet Gynecol Reprod Biol. 2010; 150 (2): 166-70.	No calculation of accuracy
Maseelall, P. B., Hernandez-Rey, A. E., Oh, C., Maagdenberg, T., McCulloh, D. H. and McGovern, P. G. Antral follicle count is a significant predictor of livebirth in in vitro fertilization cycles. Fertil Steril. 2009; 91 (4 Suppl): 1595-7.	Retrospective study
McIlveen, M., Skull, J. D. and Ledger, W. L. Evaluation of the utility of multiple endocrine and ultrasound measures of ovarian reserve in the prediction of cycle cancellation in a high-risk IVF population. Hum Reprod. 2007; 22 (3): 778-85.	Included in meta-analysis: Broer 2013
Merce, L. T., Barco, M. J., Bau, S. and Troyano, J. M. Prediction of ovarian response and IVF/ICSI outcome by three-dimensional ultrasonography and power Doppler angiography. Eur J Obstet Gynecol Reprod Biol. 2007; 132 (1): 93-100.	No definition of poor/excessive response.
Miao, M. F. and Huang, H. F. Dynamic measurements of serum inhibin B and estradiol: a predictive evaluation of ovarian response to gonadotrophin stimulation in the early stage of IVF treatment. J Zhejiang Univ Sci B. 2009; 10 (1): 35-45.	Small number of patients, only 7>35 years

Muttukrishna, S., McGarrigle, H., Wakim, R., Khadum, I., Ranieri, D. M. and Serhal, P. Antral follicle count, anti-mullerian hormone and inhibin B: predictors of ovarian response in assisted reproductive technology? Bjog. 2005; 112 (10): 1384-90.	Retrospective study
Nardo, L. G., Gelbaya, T. A., Wilkinson, H., Roberts, S. A., Yates, A., Pemberton, P. and Laing, I. Circulating basal anti-Müllerian hormone levels as predictor of ovarian response in women undergoing ovarian stimulation for in vitro fertilization. Fertil Steril. 2009; 92 (5): 1586-93.	Included in meta-analysis: Broer 2013
Ng, E. H., Chan, C. C., Tang, O. S. and Ho, P. C. Antral follicle count and FSH concentration after clomiphene citrate challenge test in the prediction of ovarian response during IVF treatment. Hum Reprod. 2005; 20 (6): 1647-54.	Included in meta-analysis: Broer 2013
Ng, E. H., Tang, O. S. and Ho, P. C. The significance of the number of antral follicles prior to stimulation in predicting ovarian responses in an IVF programme. Hum Reprod. 2000; 15 (9): 1937-42.	Included in meta-analysis: Broer 2013
Penarrubia, J., Fabregues, F., Manau, D., Creus, M., Carmona, F., Casamitjana, R., Vanrell, J. A. and Balasch, J. Previous cycle cancellation due to poor follicular development as a predictor of ovarian response in cycles stimulated with gonadotrophin-releasing hormone agonist-gonadotrophin treatment. Hum Reprod. 2005; 20 (3): 622-8.	No calculation of accuracy
Popovic-Todorovic, B., Loft, A., Lindhard, A., Bangsboll, S., Andersson, A. M. and Andersen, A. N. A prospective study of predictive factors of ovarian response in 'standard' IVF/ICSI patients treated with recombinant FSH. A suggestion for a recombinant FSH dosage normogram. Hum Reprod. 2003; 18 (4): 781-7.	Included in meta-analysis: Broer 2013
Ravhon, A., Lavery, S., Michael, S., Donaldson, M., Margara, R., Trew, G. and Winston, R. Dynamic assays of inhibin B and oestradiol following buserelin acetate administration as predictors of ovarian response in IVF. Hum Reprod. 2000; 15 (11): 2297-301.	Uncontrolled, small number of patients.
Segal, S. and Casper, R. F. The response to ovarian hyperstimulation and in-vitro fertilization in women older than 35 years. Hum Reprod. 1990; 5 (3): 255-7.	Small number of patients, old study.
Shaban, M. M. and Abdel Moety, G. A. Role of ultrasonographic markers of ovarian reserve in prediction of IVF and ICSI outcome. Gynecol Endocrinol. 2014; 30 (4): 290-3	No calculation of accuracy
Sun, B., Wang, F., Sun, J., Yu, W. and Sun, Y. Basal serum testosterone levels correlate with ovarian response but do not predict pregnancy outcome in non-PCOS women undergoing IVF. J Assist Reprod Genet. 2014; 31 (7): 829-35.	Retrospective study
van der Stege, J. G. and van der Linden, P. J. Useful predictors of ovarian stimulation response in women undergoing in vitro fertilization. Gynecol Obstet Invest. 2001; 52 (1): 43-6.	Small number of patients.
Vural, B., Cakiroglu, Y., Vural, F. and Filiz, S. Hormonal and functional biomarkers in ovarian response. Arch Gynecol Obstet. 2014; 289 (6): 1355-61.	Retrospective study
Yong, P. Y., Baird, D. T., Thong, K. J., McNeilly, A. S. and Anderson, R. Prospective analysis of the relationships between the ovarian follicle cohort and basal FSH concentration, the inhibin response to exogenous FSH and ovarian follicle number at different stages of the normal menstrual cycle and after pituitary down-regulation. Hum Reprod. 2003; 18 (1): 35-44.	Included in meta-analysis: Broer 2013

2. Additional hormonal assessment at baseline

Flowchart

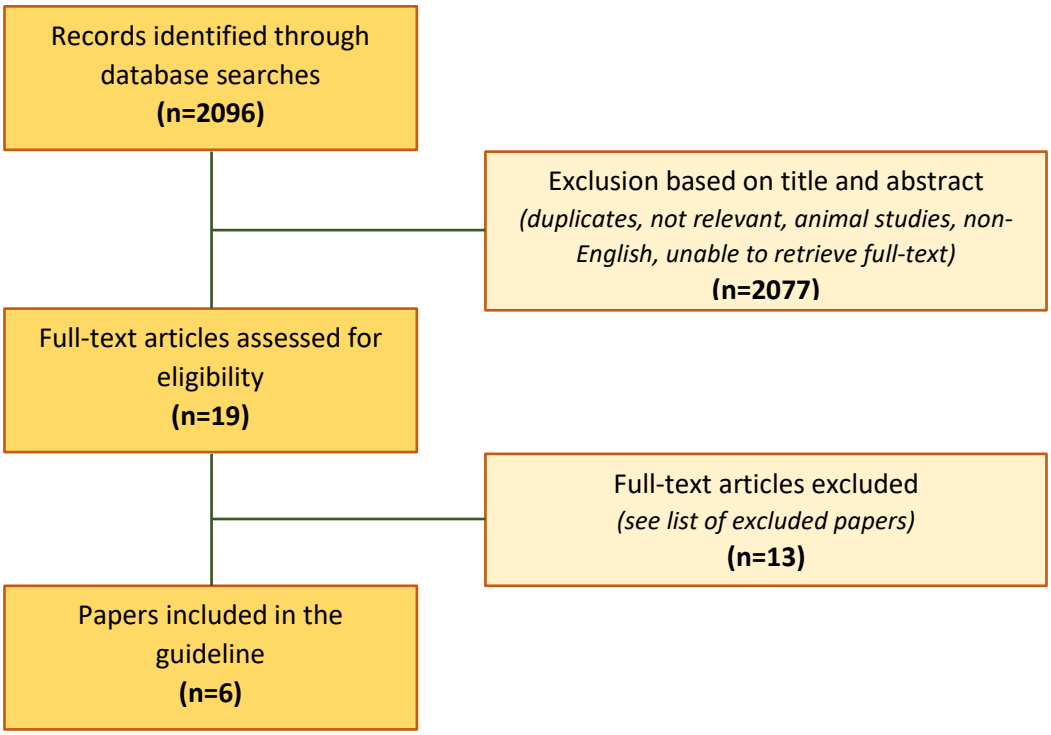


List of excluded papers

	Exclusion criterion
Blockeel, C., Baumgarten, M., De Vos, M., Verheyen, G. and Devroey, P.. Curr Pharm Biotechnol. 2011; 12 (3): 423-8.	Included in systematic review (Hamdine, 2014)
Kolibianakis, E. M., Zikopoulos, K., Smitz, J., Camus, M., Tournaye, H., Van Steirteghem, A. C. and Devroey, P. Hum Reprod. 2004; 19 (7): 1525-9.	Included in systematic review (Hamdine, 2014)
Hamdine, O., Macklon, N. S., Eijkemans, M. J., Laven, J. S., Cohlen, B. J., Verhoeff, A., van Dop, P. A., Bernardus, R. E., Lambalk, C. B., Oosterhuis, G. J., Holleboom, C. A., van den Dool-Maasland, G. C., Verburg, H. J., van der Heijden, P. F., Blankhart, A., Fauser, B. C. and Broekmans, F. J. Fertil Steril. 2014; 102 (2): 448-454.e1.	Included in systematic review (Hamdine, 2014)

3. Pre-treatment therapies

Flowchart



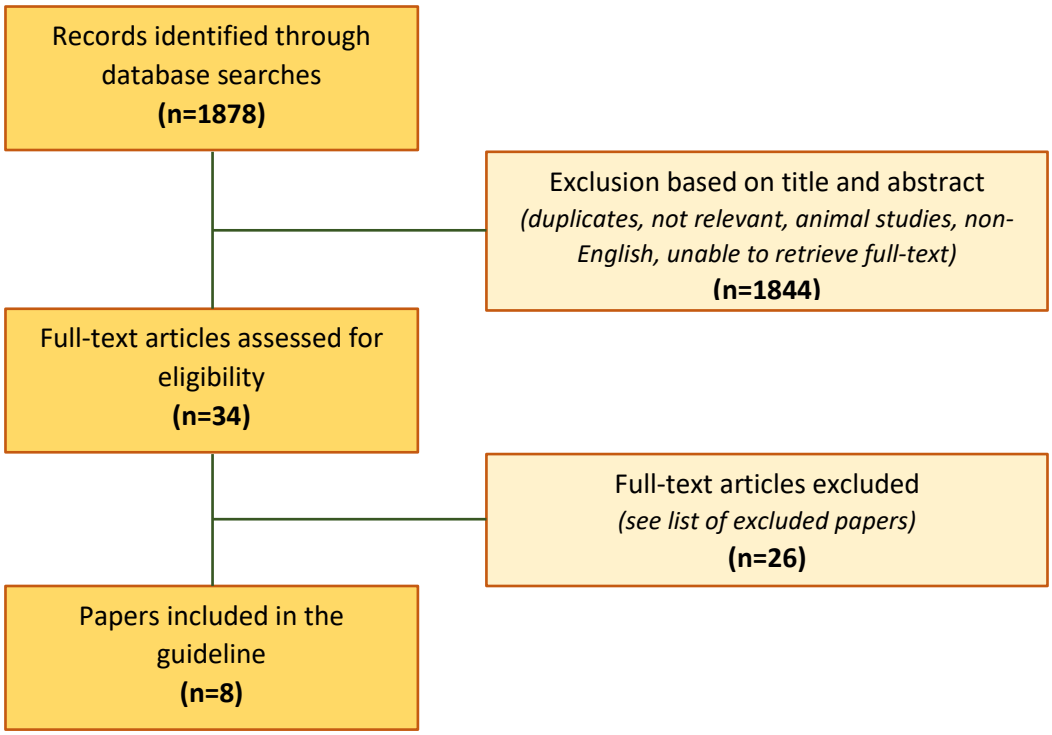
List of excluded papers

	Exclusion criterion
Blockeel, C., Engels, S., De Vos, M., Haentjens, P., Polyzos, N. P., Stoop, D., Camus, M. and Devroey, P. Oestradiol valerate pretreatment in GnRH-antagonist cycles: a randomized controlled trial. Reprod Biomed Online. 2012; 24 (3): 272-80.	Included in meta-analysis Farquhar 2017
Cédrin-Durnerin I, Bständig B, Parneix I, Bied-Damon V, Avril C, Decanter C, Hugues JN. Effects of oral contraceptive, synthetic progestogen or natural estrogen pre-treatments on the hormonal profile and the antral follicle cohort before GnRH antagonist protocol. Hum Reprod. 2007 Jan;22(1):109-16.	Included in meta-analysis Farquhar 2017
Cedrin-Durnerin, I., Guivarc'h-Leveque, A. and Hugues, J. N. Pretreatment with estrogen does not affect IVF-ICSI cycle outcome compared with no pretreatment in GnRH antagonist protocol: a prospective randomized trial. Fertil Steril. 2012; 97 (6): 1359-64.e1.	Included in meta-analysis Farquhar 2017
Chang, X. and Wu, J. Effects of luteal estradiol pre-treatment on the outcome of IVF in poor ovarian responders. Gynecol Endocrinol. 2013; 29 (3): 196-200.	Retrospective studies were included and results pooled with not comparable control groups
Griesinger, G., Kolibianakis, E. M., Venetis, C., Diedrich, K. and Tarlatzis, B. Oral contraceptive pretreatment significantly reduces ongoing pregnancy likelihood in gonadotropin-releasing hormone antagonist cycles: an updated meta-analysis. Fertil Steril. 2010; 94 (6): 2382-4.	Replaced by a more recent meta-analysis: Farquhar 2017
Huirne, J. A., van Loenen, A. C., Donnez, J., Pirard, C., Homburg, R., Schats, R., McDonnell, J. and Lambalk, C. B. Effect of an oral contraceptive pill on follicular development in IVF/ICSI patients receiving a GnRH antagonist: a randomized study. Reprod Biomed Online. 2006; 13 (2): 235-45.	Included in meta-analysis Farquhar 2017
Kim, C. H., Jeon, G. H., Cheon, Y. P., Jeon, I., Kim, S. H., Chae, H. D. and Kang, B. M. Comparison of GnRH antagonist protocol with or without oral contraceptive pill pretreatment and GnRH agonist low-dose long protocol in low responders undergoing IVF/intracytoplasmic sperm injection. Fertil Steril. 2009; 92 (5): 1758-60.	Included in meta-analysis Farquhar 2017
Kim, C. H., You, R. M., Kang, H. J., Ahn, J. W., Jeon, I., Lee, J. W., Kim, S. H., Chae, H. D. and Kang, B. M. GnRH antagonist multiple dose protocol with oral contraceptive pill pretreatment in poor responders undergoing IVF/ICSI. Clin Exp Reprod Med. 2011; 38 (4): 228-33.	Included in meta-analysis Farquhar 2017
Kolibianakis, E. M., Papanikolaou, E. G., Camus, M., Tournaye, H., Van Steirteghem, A. C. and Devroey, P. Effect of oral contraceptive pill pretreatment on ongoing pregnancy rates in patients stimulated with GnRH antagonists and recombinant FSH for IVF. A randomized controlled trial. Hum Reprod. 2006; 21 (2): 352-7.	Included in meta-analysis Farquhar 2017
Liu, K. E., Alhajri, M. and Greenblatt, E. A randomized controlled trial of NuvaRing versus combined oral contraceptive pills for pretreatment in in vitro fertilization cycles. Fertil Steril. 2011; 96 (3): 605-8.	Different LH suppression protocols in both arms
Reynolds, K. A., Omurtag, K. R., Jimenez, P. T., Rhee, J. S., Tuuli, M. G. and Jungheim, E. S. Cycle cancellation and pregnancy after luteal estradiol priming in women defined as poor responders: a systematic review and meta-analysis. Hum Reprod. 2013; 28 (11): 2981-9.	Retrospective studies included and only 2 studies with E2 alone, others with E2+ GnRH antagonist
Rombauts, L., Healy, D. and Norman, R. J. A comparative randomized trial to assess the impact of oral contraceptive pretreatment on follicular growth and hormone profiles in GnRH antagonist-treated patients. Hum Reprod. 2006; 21 (1): 95-103.	Included in meta-analysis Farquhar 2017
Smulders, B., van Oirschot, S. M., Farquhar, C., Rombauts, L. and Kremer, J. A. Oral contraceptive pill, progestogen or estrogen pre-treatment for ovarian stimulation protocols for women undergoing assisted reproductive techniques. Cochrane Database Syst Rev. 2010; (1): Cd006109.	Replaced by the updated meta-analysis Farquhar 2017

4. Ovarian stimulation protocols

A. High responder

Flowchart



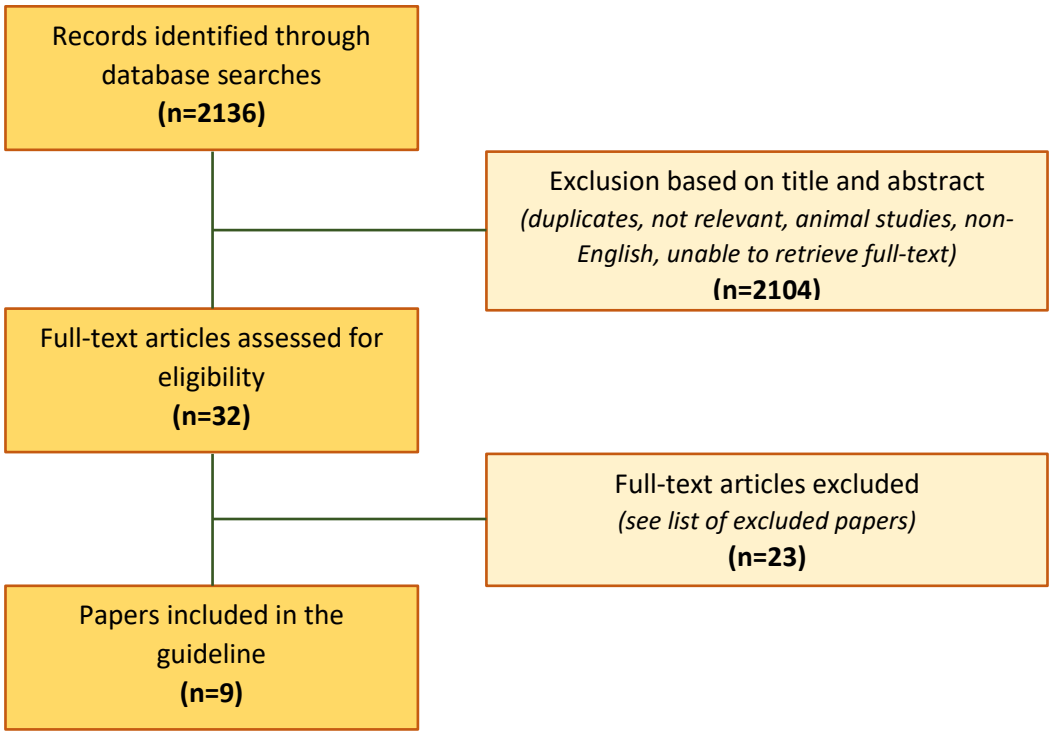
List of excluded papers

	Exclusion criterion
Abuzeid, M. I., Mitwally, M., Abuzeid, Y. M., Bokhari, H. A., Ashraf, M. and Diamond, M. P. Early initiation of gonadotropin-releasing hormone antagonist in polycystic ovarian syndrome patients undergoing assisted reproduction: randomized controlled trial ISRCTN69937179. J Assist Reprod Genet. 2012; 29 (11): 1193-202.	Comparison of 2 different GnRH antagonist initiation protocols
Casano, S, Guidetti, D, Patriarca, A, Pittatore, G, Gennarelli, G and Revelli, A. MILD ovarian stimulation with GnRH-antagonist vs. long protocol with low dose FSH for non-PCO high responders undergoing IVF: a prospective, randomized study including thawing cycles. J assist reprod genet. 2012; 29 (12): 1343-51.	Not a reduced daily dose. Different LH suppression protocols in study and control group
Dal Prato, L., Borini, A., Coticchio, G., Cattoli, M. and Flamigni, C. Half-dose depot triptorelin in pituitary suppression for multiple ovarian stimulation in assisted reproduction technology: a randomized study. Hum Reprod. 2004; 19 (10): 2200-5.	Comparing dosages in GnRH agonist protocol
D'Amato, G., Caringella, A. M., Stanziano, A., Cantatore, C., Palini, S. and Caroppo, E. Mild ovarian stimulation with letrozole plus fixed dose human menopausal gonadotropin prior to IVF/ICSI for infertile non-obese women with polycystic ovarian syndrome being pre-treated with metformin: a pilot study. Reprod Biol Endocrinol. 2018; 16 (1): 89	Prerquisite was Use of Metformin across three months: this does not fulfill the criterion of Expected High responder.
Eftekhar, M., Bagheri, R. B., Neghab, N. and Hosseinisadat, R. Evaluation of pretreatment with Cetrotide in an antagonist protocol for patients with PCOS undergoing IVF/ICSI cycles: a randomized clinical trial. JBRA Assist Reprod. 2018;	Standard GnRH antagonist protocol vs GnRH antagonist protocol with 3 days GnRH antagonist pretreatment
Fatemi, H. M., Doody, K., Griesinger, G., Witjes, H. and Mannaerts, B. High ovarian response does not jeopardize ongoing pregnancy rates and increases cumulative pregnancy rates in a GnRH-antagonist protocol. Hum Reprod. 2013; 28 (2): 442-52.	Post hoc analysis of RCT, patients not high responders at inclusion
Garcia-Velasco, J. A., Coelingh Bennink, H. J., Epifanio, R., Escudero, E., Pellicer, A. and Simon, C. High-dose recombinant LH add-back strategy using high-dose GnRH antagonist is an innovative protocol compared with standard GnRH antagonist. Reprod Biomed Online. 2007; 15 (3): 280-7.	Standard GnRH antagonist vs high dose GnRH antagonist with different gonadotropins
Griesinger, G., Diedrich, K., Tarlatzis, B. C., Kolibianakis, E. M. GnRH-antagonists in ovarian stimulation for IVF in patients with poor response to gonadotrophins, polycystic ovary syndrome, and risk of ovarian hyperstimulation: a meta-analysis. Reprod Biomed Online 2006; 13(5): 628-38	Replaced by meta-analysis: Lambalk 2017
Haydardedeoglu, B., Kilicdag, E. B., Parlakgumus, A. H. and Zeyneloglu, H. B. IVF/ICSI outcomes of the OCP plus GnRH agonist protocol versus the OCP plus GnRH antagonist fixed protocol in women with PCOS: a randomized trial. Arch Gynecol Obstet. 2012; 286 (3): 763-9.	Included in meta-analysis: Lambalk 2017
He, Q., Liang, L., Zhang, C., Li, H., Ge, Z., Wang, L. and Cui, S. Effects of different doses of letrozole on the incidence of early-onset ovarian hyperstimulation syndrome after oocyte retrieval. Syst Biol Reprod Med. 2014; 60 (6): 355-60.	Very high incidence of OHSS in placebo group, contrary to available literature.
Hosseini, Ma, Aleyasin, A, Saeedi, H and Mahdavi, A. Comparison of gonadotropin-releasing hormone agonists and antagonists in assisted reproduction cycles of polycystic ovarian syndrome patients. The journal of obstetrics and gynaecology research. 2010; 36 (3): 605-10.	Included in meta-analysis: Lambalk 2017
Hwang, J. L., Seow, K. M., Lin, Y. H., Huang, L. W., Hsieh, B. C., Tsai, Y. L., Wu, G. J., Huang, S. C., Chen, C. Y., Chen, P. H. and Tzeng, C. R. Ovarian stimulation by	Included in meta-analysis: Lambalk 2017

concomitant administration of cetrorelix acetate and HMG following Diane-35 pre-treatment for patients with polycystic ovary syndrome: a prospective randomized study. Hum Reprod. 2004; 19 (9): 1993-2000.	
Kim, C. H., Moon, J. W., Kang, H. J., Ahn, J. W., Kim, S. H., Chae, H. D. and Kang, B. M. Effectiveness of GnRH antagonist multiple dose protocol applied during early and late follicular phase compared with GnRH agonist long protocol in non-obese and obese patients with polycystic ovary syndrome undergoing IVF/ICSI. Clin Exp Reprod Med. 2012; 39 (1): 22-7.	Included in meta-analysis: Lambalk 2017
Kurzawa, R., Ciepiela, P., Baczkowski, T., Safranow, K. and Brelik, P. Comparison of embryological and clinical outcome in GnRH antagonist vs. GnRH agonist protocols for in vitro fertilization in PCOS non-obese patients. A prospective randomized study. J Assist Reprod Genet. 2008; 25 (8): 365-74.	Included in meta-analysis: Lambalk 2017
Lainas, T. G., Sfontouris, I. A., Zorzovilis, I. Z., Petsas, G. K., Lainas, G. T., Alexopoulou, E. and Kolibianakis, E. M. Flexible GnRH antagonist protocol versus GnRH agonist long protocol in patients with polycystic ovary syndrome treated for IVF: a prospective randomised controlled trial (RCT). Hum Reprod. 2010; 25 (3): 683-9.	Included in meta-analysis: Lambalk 2017
Lin, H., Li, Y., Li, L., Wang, W., Yang, D. and Zhang, Q. Is a GnRH antagonist protocol better in PCOS patients? A meta-analysis of RCTs. PLoS One. 2014; 9 (3): e91796.	Replaced by meta-analysis: Lambalk 2017
Lin, Y. H., Seow, K. M., Hsieh, B. C., Huang, L. W., Chen, H. J., Huang, S. C., Chen, C. Y., Chen, P. H., Hwang, J. L. and Tzeng, C. R. Application of GnRH antagonist in combination with clomiphene citrate and hMG for patients with exaggerated ovarian response in previous IVF/ICSI cycles. J Assist Reprod Genet. 2007; 24 (8): 331-6.	Unclear study design, high risk of selection and attrition bias
Mancini, F., Tur, R., Martinez, F., Coroleu, B., Rodriguez, I. and Barri, P. N. Gonadotrophin-releasing hormone-antagonists vs long agonist in in-vitro fertilization patients with polycystic ovary syndrome: a meta-analysis. Gynecol Endocrinol. 2011; 27 (3): 150-5.	Replaced by meta-analysis: Lambalk 2017
Mokhtar, S., Sadeghi, M. R., Akhondi, M. M., Zafardoust, S., Badenush, B., Fatemi, F., Nazari, F., Kamali, K. and Mohammadzade, A. ART Outcomes in GnRH Antagonist Protocol (Flexible) and Long GnRH Agonist Protocol during Early Follicular Phase in Patients with Polycystic Ovary Syndrome: A Randomized Clinical Trial. J Reprod Infertil. 2015; 16 (3): 148-54.	Included in meta-analysis: Lambalk 2017
Mourad, Selma, Brown, Julie and Farquhar, Cindy. Interventions for the prevention of OHSS in ART cycles: an overview of Cochrane reviews. Cochrane Database of Systematic Reviews. 2017; (1):	Replaced by meta-analysis: Lambalk 2017
Papanikolaou, E. G., Polyzos, N. P., Humaidan, P., Pados, G., Bosch, E., Tournaye, H. and Tarlatzis, B. Aromatase inhibitors in stimulated IVF cycles. Reprod Biol Endocrinol. 2011; 9 85.	Not high responders
Pundir, J., Sunkara, S. K., El-Toukhy, T. and Khalaf, Y. Meta-analysis of GnRH antagonist protocols: do they reduce the risk of OHSS in PCOS? Reprod Biomed Online. 2012; 24 (1): 6-22.	Replaced by meta-analysis: Lambalk 2017
Safdarian, L, Soltani-Mohammadi, F, Alleyassin, A, Aghahosseini, M, Meysamie, A and Rahimi, E. Half-dose depot triptorelin comparable to reduced daily buserelin: a randomized clinical trial. Acta medica Iranica. 2007; 45 (6): 449-56.	Comparing dosages in GnRH agonist protocol
Saleh, Se, Ismail, Mt and Elshmaa, Ns. The efficacy of converting high response - Ovulation induction cycles to in vitro fertilization in patients with PCOS. Middle East Fertility Society Journal. 2014; 19 (1): 51-6.	Prospective cohort study without control group
Tehraninejad, E. S., Nasiri, R., Rashidi, B., Haghollahi, F. and Ataie, M. Comparison of GnRH antagonist with long GnRH agonist protocol after OCP pretreatment in PCOs patients. Arch Gynecol Obstet. 2010; 282 (3): 319-25.	Included in meta-analysis: Lambalk 2017
Xiao, J., Chen, S., Zhang, C. and Chang, S. Effectiveness of GnRH antagonist in the treatment of patients with polycystic ovary syndrome undergoing IVF: a systematic review and meta analysis. Gynecol Endocrinol. 2013; 29 (3): 187-91.	Replaced by meta-analysis: Lambalk 2017

B. Normal responder

Flowchart



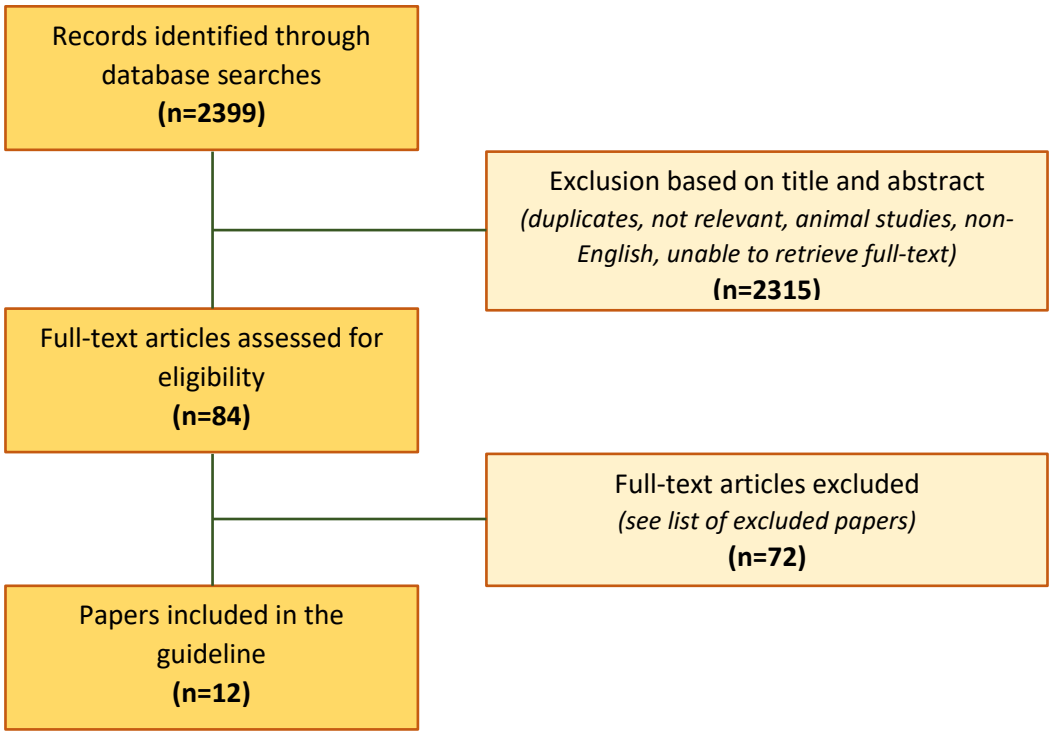
List of excluded papers

	Exclusion criterion
A double-blind, randomized, dose-finding study to assess the efficacy of the gonadotrophin-releasing hormone antagonist ganirelix (Org 37462) to prevent premature luteinizing hormone surges in women undergoing ovarian stimulation with recombinant follicle stimulating hormone (Puregon). The ganirelix dose-finding study group. Hum Reprod. 1998; 13 (11): 3023-31.	Dose-finding study
Comparable clinical outcome using the GnRH antagonist ganirelix or a long protocol of the GnRH agonist triptorelin for the prevention of premature LH surges in women undergoing ovarian stimulation. Hum Reprod. 2001; 16 (4): 644-51.	Included in meta-analysis: Lambalk 2017
Al-Inany, Hesham G, Youssef, Mohamed A, Ayeleke, Reuben Olugbenga, Brown, Julie, Lam, Wai Sun and Broekmans, Frank J. Gonadotrophin-releasing hormone antagonists for assisted reproductive technology. Cochrane Database of Systematic Reviews. 2016; (4): CD001750	Included for Chapter 5 – excluded here
Antoine, Jm, Salat-Baroux, J, Alvarez, S, Cornet, D, Tibi, C, Mandelbaum, J and Plachot, M. Ovarian stimulation using human menopausal gonadotrophins with or without LHRH analogues in a long protocol for in-vitro fertilization: a prospective randomized comparison. Human reproduction (Oxford, England). 1990; 5 (5): 565-9.	Old RCT comparing GnRHa vs no downregulation
Bahceci, M., Ulug, U., Ben-Shlomo, I., Erden, H. F. and Akman, M. A. Use of a GnRH antagonist in controlled ovarian hyperstimulation for assisted conception in women with polycystic ovary disease: a randomized, prospective, pilot study. J Reprod Med. 2005; 50 (2): 84-90.	Included for high responders – excluded here
Bechtejew TN, Nadai MN, Nastri CO, Martins WP. Clomiphene citrate and letrozole to reduce follicle-stimulating hormone consumption during ovarian stimulation: systematic review and meta-analysis. Ultrasound Obstet Gynecol. 2017;50(3):315-323.	Study population are not-poor responders. Not clear from individual studies if it are normal or possibly high responders
Blockeel, C., Polyzos, N. P., Derksen, L., De Brucker, M., Vloeberghs, V., van de Vijver, A., De Vos, M. and Tournaye, H. Administration of corifollitropin alfa on Day 2 versus Day 4 of the cycle in a GnRH antagonist protocol: a randomized controlled pilot study. Hum Reprod. 2014; 29 (7): 1500-7.	Included in meta-analysis: Lambalk 2017
Borm, G. and Mannaerts, B. The European Orgalutran Study Group. Treatment with the gonadotrophin-releasing hormone antagonist ganirelix in women undergoing ovarian stimulation with recombinant follicle stimulating hormone is effective, safe and convenient: results of a controlled, randomized, multicentre trial. The European Orgalutran Study Group. Hum Reprod. 2000; 15 (7): 1490-8.	Included in meta-analysis: Lambalk 2017
Depalo, R, Lorusso, F, Palmisano, M, Bassi, E, Totaro, I, Vacca, M, Trerotoli, P, Masciandaro, P and Selvaggi, L.. Gynecol endocrinol 2009; 25 (5): 328-34. (19340626)	Included in meta-analysis: Lambalk 2017
Fan, Y., Zhang, X., Hao, Z., Ding, H., Chen, Q. and Tian, L. Comparison of GnRH antagonist and agonist mini-dose long protocols in infertile cases undergoing controlled ovarian hyperstimulation. Gynecol Endocrinol. 2017; 33 (10): 746-756.	Mix of normal and POR study population
Ferraretti, A. P., Gianaroli, L., Magli, M. C. and Devroey, P. Mild ovarian stimulation with clomiphene citrate launch is a realistic option for in vitro fertilization. Fertil Steril. 2015; 104 (2): 333-8.	High risk of selection bias. No control group. Spuriously low miscarriage rates
Heijnen EM, Eijkemans MJ, De Klerk C, Polinder S, Beckers NG, Klinkert ER, Broekmans FJ, Passchier J, Te Velde ER, Macklon NS, Fauser BC. A mild treatment strategy for in-	One versus two embryos transferred

vitro fertilisation: a randomised non-inferiority trial. Lancet. 2007 Mar 3;369(9563):743-9.	
Hinduja, I., Mehta, R., Gopalkrishnan, K., Puri, C. P., Shah, J., Singh, V. and Kumar, T. C. Comparison of four different ovarian stimulation protocols in an in vitro fertilisation & embryo transfer programme. Indian J Med Res. 1991; 94 405-12.	Retrospective, old, low quality study
Hohmann, F. P., Laven, J. S., de Jong, F. H., Eijkemans, M. J. and Fauser, B. C. Low-dose exogenous FSH initiated during the early, mid or late follicular phase can induce multiple dominant follicle development. Hum Reprod. 2001; 16 (5): 846-54.	No GnRH analogue, comparison of mild stimulation protocols
Matsaseng, T., Kruger, T. and Steyn, W. Mild ovarian stimulation for in vitro fertilization: are we ready to change? A meta-analysis. Gynecol Obstet Invest. 2013; 76 (4): 233-40.	Combines studies with reduced dose gonadotropin and CC
Polinder S, Heijnen EM, Macklon NS, Habbema JD, Fauser BJ, Eijkemans MJ. Cost-effectiveness of a mild compared with a standard strategy for IVF: a randomized comparison using cumulative term live birth as the primary endpoint. Hum Reprod. 2008 Feb;23(2):316-23.	Cost-effectiveness analysis
Qiao, J., Lu, G., Zhang, H. W., Chen, H., Ma, C., Olofsson, J. I., Witjes, H., Heijnen, E. and Mannaerts, B. A randomized controlled trial of the GnRH antagonist ganirelix in Chinese normal responders: high efficacy and pregnancy rates. Gynecol Endocrinol. 2012; 28 (10): 800-4.	Included in meta-analysis: Lambalk 2017
Ron-El, R., Herman, A., Golan, A., van der Ven, H., Caspi, E. and Diedrich, K. The comparison of early follicular and midluteal administration of long-acting gonadotropin-releasing hormone agonist. Fertil Steril. 1990; 54 (2): 233-7.	Comparison of 2 long GnRH agonist protocols
Simon, C, Oberyé, J, Bellver, J, Vidal, C, Bosch, E, Horcajadas, Ja, Murphy, C, Adams, S, Riesewijk, A, Mannaerts, B and Pellicer, A. Similar endometrial development in oocyte donors treated with either high- or standard-dose GnRH antagonist compared to treatment with a GnRH agonist or in natural cycles. Human reproduction (Oxford, England). 2005; 20 (12): 3318-27.	Donor study
Tehraninejad, E., Ghahghaei Nezamabadi, A., Rashidi, B., Sohrabi, M., Bagheri, M., Haghollahi, F., Azimi Nekoo, E. and Jafarabadi, M. GnRH antagonist versus agonist in normoresponders undergoing ICSI: a randomized clinical trial in Iran. Iran J Reprod Med. 2011; 9 (3): 171-6.	Included in meta-analysis: Lambalk 2017
Toftager M, Bogstad J, Bryndorf T, Løssl K, Roskær J, Holland T, Prætorius L, Zedeler A, Nilas L, Pinborg A. Risk of severe ovarian hyperstimulation syndrome in GnRH antagonist versus GnRH agonist protocol: RCT including 1050 first IVF/ICSI cycles. Hum Reprod. 2016;31(6):1253-64.	Included in meta-analysis: Lambalk 2017
Toftager M, Bogstad J, Løssl K, Prætorius L, Zedeler A, Bryndorf T, Nilas L, Pinborg A. Cumulative live birth rates after one ART cycle including all subsequent frozen-thaw cycles in 1050 women: secondary outcome of an RCT comparing GnRH-antagonist and GnRH-agonist protocols. Hum Reprod. 2017; 32(3):556-567.	Included for Chapter 5 – excluded here
Xiao, J. S., Su, C. M. and Zeng, X. T. Comparisons of GnRH antagonist versus GnRH agonist protocol in supposed normal ovarian responders undergoing IVF: a systematic review and meta-analysis. PLoS One. 2014; 9 (9): e106854.	Replaced by a more recent meta-analysis: Lambalk 2017

C. Low responder

Flowchart



List of excluded papers

	Exclusion criterion
Aflatoonian, A., Hosseinisadat, A., Baradaran, R. and Farid Mojtahedi, M. Pregnancy outcome of "delayed start" GnRH antagonist protocol versus GnRH antagonist protocol in poor responders: A clinical trial study. Int J Reprod Biomed (Yazd). 2017; 15 (4): 231-238.	Oestrogen priming antagonist protocol vs. delayed-start GnRH antagonist protocol.
Akman, M. A., Erden, H. F., Tosun, S. B., Bayazit, N., Aksoy, E. and Bahceci, M. Comparison of agonistic flare-up-protocol and antagonistic multiple dose protocol in ovarian stimulation of poor responders: results of a prospective randomized trial. Hum Reprod. 2001; 16 (5): 868-70.	Included in meta-analysis: Xiao 2013
Aksoy, S., Yakin, K., Seyhan, A., Oktem, O., Alatas, C., Ata, B. and Urman, B. Does the use of gonadotropin-releasing hormone antagonists in natural IVF cycles for poor responder patients cause more harm than benefit? Hum Fertil (Camb). 2016; 19 (2): 97-101.	No baseline characteristics presented for both groups to allow comparisons. This does not allow interpretation of the results
Akman, M. A., Erden, H. F., Tosun, S. B., Bayazit, N., Aksoy, E. and Bahceci, M. Addition of GnRH antagonist in cycles of poor responders undergoing IVF. Hum Reprod. 2000; 15 (10): 2145-7.	No LH suppression in control group
Ashrafi, M, Ashtiani, Sk, Zafarani, F, Samani, Ro and Eshrati, B. Evaluation of ovulation induction protocols for poor responders undergoing assisted reproduction techniques. Saudi medical journal. 2005; 26 (4): 593-6.	Included in meta-analysis: Bechtejew 2017
Ata, B., Yakin, K., Balaban, B. and Urman, B. Embryo implantation rates in natural and stimulated assisted reproduction treatment cycles in poor responders. Reprod Biomed Online. 2008; 17 (2): 207-12.	Very small number of MNCs
Baerwald, A., Anderson, P., Yuzpe, A., Case, A. and Fluker, M. Synchronization of ovarian stimulation with follicle wave emergence in patients undergoing in vitro fertilization with a prior suboptimal response: a randomized, controlled trial. Fertil Steril. 2012; 98 (4): 881-7.e1-2.	Initiation of recombinant FSH/GnRH antagonist/recombinant LH/hCG on day 1 or day 4
Bar-Hava, I., Ferber, A., Ashkenazi, J., Dicker, D., Ben-Rafael, Z. and Orvieto, R. Natural-cycle in vitro fertilization in women aged over 44 years. Gynecol Endocrinol. 2000; 14 (4): 248-52.	No control group
Bassil, S., Godin, P. A. and Donnez, J. Outcome of in-vitro fertilization through natural cycles in poor responders. Hum Reprod. 1999; 14 (5): 1262-5.	Case-control study, high risk of bias
Bastu, E., Buyru, F., Ozsurmeli, M., Demiral, I., Dogan, M. and Yeh, J. A randomized, single-blind, prospective trial comparing three different gonadotropin doses with or without addition of letrozole during ovulation stimulation in patients with poor ovarian response. Eur J Obstet Gynecol Reprod Biol. 2016; 203 30-4.	Included in meta-analysis Bechtejew 2017 and Lensen 2018.
Berkkanoglu, M. and Ozgur, K. What is the optimum maximal gonadotropin dosage used in microdose flare-up cycles in poor responders? Fertil Steril. 2010; 94 (2): 662-5.	Pseudo-randomization
Cedrin-Durnerin, I, Bständig, B, Hervé, F, Wolf, J, Uzan, M and Hugues, J. A comparative study of high fixed-dose and decremental-dose regimens of gonadotropins in a minidose gonadotropin-releasing hormone agonist flare protocol for poor responders. Fertil steril. 2000; 73 (5): 1055-6.	No ITT analysis, primary outcome not stated, no sample size calculation
Cheung, L. P., Lam, P. M., Lok, I. H., Chiu, T. T., Yeung, S. Y., Tjer, C. C. and Haines, C. J. GnRH antagonist versus long GnRH agonist protocol in poor responders undergoing IVF: a randomized controlled trial. Hum Reprod. 2005; 20 (3): 616-21.	Included in meta-analysis: Lambalk 2017
Davar, R., Neghab, N. and Naghshineh, E. Pregnancy outcome in delayed start antagonist versus microdose flare GnRH agonist protocol in poor responders undergoing IVF/ICSI: An RCT. Int J Reprod Biomed (Yazd). 2018; 16 (4): 255-260.	Delayed start GnRH antagonist protocol

Davar, R., Oskouian, H., Ahmadi, S. and Firouzabadi, R. D. GnRH antagonist/letrozole versus microdose GnRH agonist flare protocol in poor responders undergoing in vitro fertilization. Taiwan J Obstet Gynecol. 2010; 49 (3): 297-301.	Quasi-randomization
De Placido, G., Mollo, A., Clarizia, R., Strina, I., Conforti, S. and Alviggi, C. Gonadotropin-releasing hormone (GnRH) antagonist plus recombinant luteinizing hormone vs. a standard GnRH agonist short protocol in patients at risk for poor ovarian response. Fertil Steril. 2006; 85 (1): 247-50.	Included in meta-analysis: Xiao 2013
Devesa, M., Martinez, F., Coroleu, B., Tur, R., Gonzalez, C., Rodriguez, I. Poor prognosis for ovarian response to stimulation: results of a randomised trial comparing the flare-up GnRH agonist protocol vs. the antagonist protocol. Gynecol Endocrinol. 2010; 26 (7): 509-15.	Included in meta-analysis: Xiao 2013
DiLuigi, A. J., Engmann, L., Schmidt, D. W., Benadiva, C. A. and Nulsen, J. C. A randomized trial of microdose leuprolide acetate protocol versus luteal phase ganirelix protocol in predicted poor responders. Fertil Steril. 2011; 95 (8): 2531-3.	Two interventions investigated
Dirnfeld, M., Fruchter, O., Yshai, D., Lissak, A., Ahdut, A. and Abramovici, H. Cessation of gonadotropin-releasing hormone analogue (GnRH-a) upon down-regulation versus conventional long GnRH-a protocol in poor responders undergoing in vitro fertilization. Fertil Steril. 1999; 72 (3): 406-11.	GnRH agonist cessation
Dirnfeld, M., Gonen, Y., Lissak, A., Goldman, S., Koifman, M., Sorokin, Y. and Abramovici, H. A randomized prospective study on the effect of short and long buserelin treatment in women with repeated unsuccessful in vitro fertilization (IVF) cycles due to inadequate ovarian response. J In Vitro Fert Embryo Transf. 1991; 8 (6): 339-43.	Old study
Eftekhar, M., Mohammadian, F., Yousefnejad, F. and Khani, P. Microdose GnRH Agonist Flare-Up versus Ultrashort GnRH Agonist Combined with Fixed GnRH Antagonist in Poor Responders of Assisted Reproductive Techniques Cycles. Int J Fertil Steril. 2013; 6 (4): 266-71.	Comparison of 2 GnRH agonist protocols
Elizur, S. E., Aslan, D., Shulman, A., Weisz, B., Bider, D. and Dor, J. Modified natural cycle using GnRH antagonist can be an optional treatment in poor responders undergoing IVF. J Assist Reprod Genet. 2005; 22 (2): 75-9.	Very small number of MNCs
Fan, Y., Zhang, X., Hao, Z., Ding, H., Chen, Q. and Tian, L. Gynecol Endocrinol. 2017; 33 (10): 746-756. (29714879)	Mix of normal and POR study population
Fouda, U. M. and Sayed, A. M. Extended high dose letrozole regimen versus short low dose letrozole regimen as an adjuvant to gonadotropin releasing hormone antagonist protocol in poor responders undergoing IVF-ET. Gynecol Endocrinol. 2011; 27 (12): 1018-22.	Short vs extended dose letrozole in GnRH antagonist protocol
Franco, J G, Baruffi, R L, Mauri, A L, Petersen, C G, Felipe, V, Cornicelli, J, Cavagna, M and Oliveira, J B. GnRH agonist versus GnRH antagonist in poor ovarian responders: a meta-analysis. Reprod BioMed Online. 2006; 13 (5): 618-627.	Replaced by more recent meta-analysis: Lambalk 2017
Garcia-Velasco, J. A., Isaza, V., Requena, A., Martinez-Salazar, F. J., Landazabal, A., Remohi, J., Pellicer, A. and Simon, C. High doses of gonadotrophins combined with stop versus non-stop protocol of GnRH analogue administration in low responder IVF patients: a prospective, randomized, controlled trial. Hum Reprod. 2000; 15 (11): 2292-6.	GnRH agonist cessation
Goswami, Sk, Das, T, Chattopadhyay, R, Sawhney, V, Kumar, J, Chaudhury, K, Chakravarty, Bn and Kabir, Sn. A randomized single-blind controlled trial of letrozole as a low-cost IVF protocol in women with poor ovarian response: a preliminary report. Hum reprod (Oxford, England). 2004; 19 (9): 2031-5.	Included in meta-analysis: Bechtejew 2017
Hosseini, Ma, Aleyasin, A, Saeedi, H and Mahdavi, A. Comparison of gonadotropin-releasing hormone agonists and antagonists in assisted reproduction cycles of polycystic ovarian syndrome patients. The journal of obstetrics and gynaecology research. 2010; 36 (3): 605-10.	Selection bias: difference in age between groups

Jeve, Y. B. and Bhandari, H. M. Effective treatment protocol for poor ovarian response: A systematic review and meta-analysis. J Hum Reprod Sci. 2016; 9 (2): 70-81.	Low-quality meta-analysis
Kahraman, K., Berker, B., Atabekoglu, C. S., Sonmezer, M., Cetinkaya, E., Aytac, R. and Satiroglu, H. Microdose gonadotropin-releasing hormone agonist flare-up protocol versus multiple dose gonadotropin-releasing hormone antagonist protocol in poor responders undergoing intracytoplasmic sperm injection-embryo transfer cycle. Fertil Steril. 2009; 91 (6): 2437-44.	Included in meta-analysis: Xiao 2013
Kamath, M. S., Maheshwari, A., Bhattacharya, S., Lor, K. Y. and Gibreel, A. Oral medications including clomiphene citrate or aromatase inhibitors with gonadotropins for controlled ovarian stimulation in women undergoing in vitro fertilisation. Cochrane Database of Systematic Reviews. 2017; (11): CD008528	Only one relevant study in the meta-analysis
Karimzadeh, M. A., Mashayekhy, M., Mohammadian, F. and Moghaddam, F. M. Comparison of mild and microdose GnRH agonist flare protocols on IVF outcome in poor responders. Arch Gynecol Obstet. 2011; 283 (5): 1159-64.	Combination CC+ GnRH antagonist vs short agonist. Not mild stimulation doses of FSH 225/300 from D5
Kedem, A., Tsur, A., Haas, J., Yerushalmi, G. M., Hourvitz, A., Machtinger, R. and Orvieto, R. Is the modified natural in vitro fertilization cycle justified in patients with "genuine" poor response to controlled ovarian hyperstimulation? Fertil Steril. 2014; 101 (6): 1624-8.	Very small number of MNCs
Kim, C. H., Jeon, G. H., Cheon, Y. P., Jeon, I., Kim, S. H., Chae, H. D. and Kang, B. M. Comparison of GnRH antagonist protocol with or without oral contraceptive pill pretreatment and GnRH agonist low-dose long protocol in low responders undergoing IVF/intracytoplasmic sperm injection. Fertil Steril. 2009; 92 (5): 1758-60.	Included in meta-analysis: Xiao 2013
Kim, C. H., Kim, S. R., Cheon, Y. P., Kim, S. H., Chae, H. D. and Kang, B. M. Minimal stimulation using gonadotropin-releasing hormone (GnRH) antagonist and recombinant human follicle-stimulating hormone versus GnRH antagonist multiple-dose protocol in low responders undergoing in vitro fertilization/intracytoplasmic sperm injection. Fertil Steril. 2009; 92 (6): 2082-4.	Not reduced dose (150IU is conventional dose)
Kim, Ch, You, Rm, Kang, Hj, Ahn, Jw, Jeon, I and Lee, Jw. GnRH antagonist multiple dose protocol with oral contraceptive pill pretreatment in poor responders undergoing IVF/ICSI. Clin Exp Reprod Med. 2011; 38 (4): 228-33.	Included in meta-analysis: Lambalk 2017
Klinkert, Er, Broekmans, Fj, Looman, Cw, Habbema, Jd and Velde, Er. Expected poor responders on the basis of an antral follicle count do not benefit from a higher starting dose of gonadotrophins in IVF treatment: a randomized controlled trial. Hum reprod (Oxford, England). 2005; 20 (3): 611-5.	Included in meta-analysis: Lensen 2018
Labarta, E., Marin, D., Remohi, J. and Bosch, E. Conventional versus minimal ovarian stimulation: an intra-patient comparison of ovarian response in poor-responder women according to Bologna Criteria. Reprod Biomed Online. 2018; 37(4):434-441.	Case-control study, high risk of bias
Lainas, T. G., Sfontouris, I. A., Venetis, C. A., Lainas, G. T., Zorzovilis, I. Z., Tarlatzis, B. C. and Kolibianakis, E. M. Live birth rates after modified natural cycle compared with high-dose FSH stimulation using GnRH antagonists in poor responders. Hum Reprod. 2015; 30 (10): 2321-30.	High risk of bias, validity of the regression model is uncertain
Lefebvre, J., Antaki, R., Kadoch, I. J., Dean, N. L., Sylvestre, C., Bissonnette, F., Benoit, J., Menard, S. and Lapensee, L. 450 IU versus 600 IU gonadotropin for controlled ovarian stimulation in poor responders: a randomized controlled trial. Fertil Steril. 2015; 104 (6): 1419-25.	Included in meta-analysis: Lensen 2018
Lin, Y. H., Seow, K. M., Hsieh, B. C., Huang, L. W., Chen, H. J., Huang, S. C., Chen, C. Y., Chen, P. H., Hwang, J. L. and Tzeng, C. R. Application of GnRH antagonist in combination with clomiphene citrate and hMG for patients with exaggerated ovarian response in previous IVF/ICSI cycles. J Assist Reprod Genet. 2007; 24 (8): 331-6. (17636445)	Unclear study design, high risk of selection and attrition bias

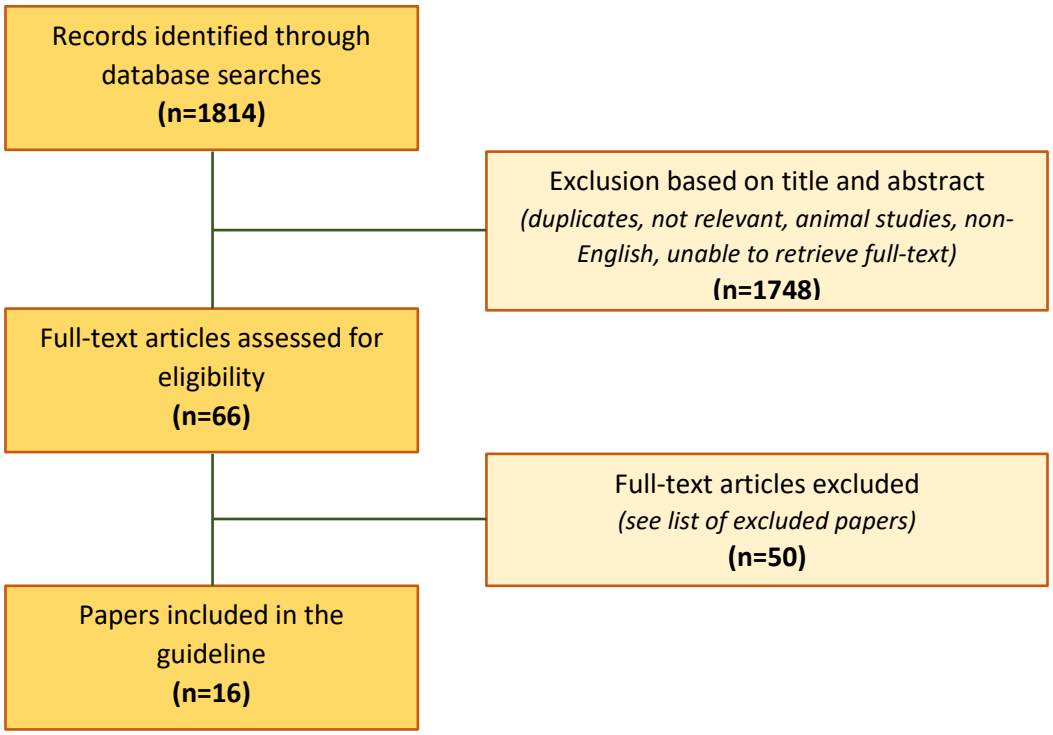
Maged, A. M., Nada, A. M., Abohamila, F., Hashem, A. T., Mostafa, W. A. and Elzayat, A. R. Delayed Start Versus Conventional GnRH Antagonist Protocol in Poor Responders Pretreated With Estradiol in Luteal Phase: A Randomized Controlled Trial. Reprod Sci. 2015; 22 (12): 1627-31.	Comparison of 2 GnRH antagonist protocols
Malmusi, S., La Marca, A., Giulini, S., Xella, S., Tagliasacchi, D., Marsella, T. and Volpe, A. Comparison of a gonadotropin-releasing hormone (GnRH) antagonist and GnRH agonist flare-up regimen in poor responders undergoing ovarian stimulation. Fertil Steril. 2005; 84 (2): 402-6.	Included in meta-analysis: Xiao 2013
Marci, R., Caserta, D., Dolo, V., Tatone, C., Pavan, A. and Moscarini, M. GnRH antagonist in IVF poor-responder patients: results of a randomized trial. Reprod Biomed Online. 2005; 11 (2): 189-93.	Included in meta-analysis: Lambalk 2017
Mohsen, I. A. and El Din, R. E. Minimal stimulation protocol using letrozole versus microdose flare up GnRH agonist protocol in women with poor ovarian response undergoing ICSI. Gynecol Endocrinol. 2013; 29 (2): 105-8.	Two interventions investigated
Nabati, A., Peivandi, S., Khalilian, A., Mirzaeirad, S. and Hashemi, S. A. Comparison of GnRh Agonist Microdose Flare Up and GnRh Antagonist/Letrozole in Treatment of Poor Responder Patients in Intra Cytoplaspic Sperm Injection: Randomized Clinical Trial. Glob J Health Sci. 2015; 8 (4): 166-71.	Two interventions investigated
Ozmen, B., Sonmezer, M., Atabekoglu, C. S. and Olmus, H. Use of aromatase inhibitors in poor-responder patients receiving GnRH antagonist protocols. Reprod Biomed Online. 2009; 19 (4): 478-85.	Included in meta-analysis: Bechtejew 2017
Pandian, Z., McTavish, A. R., Aucott, L., Hamilton, M. P. and Bhattacharya, S. Interventions for 'poor responders' to controlled ovarian hyper stimulation (COH) in in-vitro fertilisation (IVF). Cochrane Database Syst Rev. 2010; (1): Cd004379.	Replaced by more recent meta-analyses: Lambalk 2017 and Xiao 2013
Papathanasiou, A., Searle, B. J., King, N. M., Bhattacharya, S. Trends in 'poor responder' research: lessons learned from RCTs in assisted conception. Hum Reprod Update. 2016; (3): 306-19.	Review of literature without meta-analysis
Polyzos, N. P., Blockeel, C., Verpoest, W., De Vos, M., Stoop, D., Vloeberghs, V., Camus, M., Devroey, P. and Tournaye, H. Live birth rates following natural cycle IVF in women with poor ovarian response according to the Bologna criteria. Hum Reprod. 2012; 27 (12): 3481-6.	Incorrect comparison
Polyzos, N. P., De Vos, M., Corona, R., Vloeberghs, V., Ortega-Hrepich, C., Stoop, D. and Tournaye, H. Addition of highly purified HMG after corifollitropin alfa in antagonist-treated poor ovarian responders: a pilot study. Hum Reprod. 2013; 28 (5): 1254-60.	Small pilot study, low quality
Prapas, Y, Petousis, S, Dagklis, T, Panagiotidis, Y, Papatheodorou, A, Assunta, I and Prapas, N. GnRH antagonist versus long GnRH agonist protocol in poor IVF responders: a randomized clinical trial. Eur j obstet gynecol reprod biol. 2013; 166 (1): 43-6.	Included in meta-analysis: Lambalk 2017
Pu, D., Wu, J. and Liu, J. Comparisons of GnRH antagonist versus GnRH agonist protocol in poor ovarian responders undergoing IVF. Hum Reprod. 2011; 26 (10): 2742-9.	Replaced by a more recent meta-analysis: Xiao 2013
Revelli, A., Chiado, A., Dalmasso, P., Stabile, V., Evangelista, F., Basso, G. and Benedetto, C. "Mild" vs. "long" protocol for controlled ovarian hyperstimulation in patients with expected poor ovarian responsiveness undergoing in vitro fertilization (IVF): a large prospective randomized trial. J Assist Reprod Genet. 2014; 31 (7): 809-15.	Included in meta-analysis: Bechtejew 2017
Saleh, Se, Ismail, Mt and Elshmaa, Ns. The efficacy of converting high response - Ovulation induction cycles to in vitro fertilization in patients with PCOS. Middle East Fertility Society Journal. 2014; 19 (1): 51-6.	Prospective cohort study, no control group
Schimberni, M., Morgia, F., Colabianchi, J., Giallonardo, A., Piscitelli, C., Giannini, P., Montigiani, M. and Sbracia, M. Natural-cycle in vitro fertilization in poor responder patients: a survey of 500 consecutive cycles. Fertil Steril. 2009; 92 (4): 1297-301.	No control group

Shahrokh, Tehrani Nejad E, Attar, Shakeri B, Hoseini, Rashidi B, Ramezanzade, F and Shariat, M. GnRHa stop protocol versus long protocol in poor responder IVF patients Iranian J Reprod Med. 2008; 6 (1): 33-7.	GnRH agonist cessation
Shanbhag, S., Aucott, L., Bhattacharya, S., Hamilton, M. A. and McTavish, A. R. Interventions for 'poor responders' to controlled ovarian hyperstimulation (COH) in in-vitro fertilisation (IVF). Cochrane Database Syst Rev. 2007; (1): Cd004379.	Replaced by a more recent meta-analysis: Bechtejew 2017
Shaulov, T., Velez, M. P., Buzaglo, K., Phillips, S. J. and Kadoch, I. J. Outcomes of 1503 cycles of modified natural cycle in vitro fertilization: a single-institution experience. J Assist Reprod Genet. 2015; 32 (7): 1043-8.	No control group
Siristatidis, C., Salamalekis, G., Dafopoulos, K., Basios, G., Vogiatzi, P. and Papantoniou, N. Mild Versus Conventional Ovarian Stimulation for Poor Responders Undergoing IVF/ICSI. In Vivo. 2017; 31 (2): 231-237.	Different LH suppression in study and control group
Song D, Shi Y, Zhong Y, Meng Q, Hou S, Li H. Efficiency of mild ovarian stimulation with clomiphene on poor ovarian responders during IVF\ICSI procedures: a meta-analysis. Eur J Obstet Gynecol Reprod Biol. 2016; 204:36-43.	Replaced by a more recent meta-analysis: Bechtejew 2017
Stimpfel, M., Vrtacnik-Bokal, E., Pozlep, B., Kmecl, J. and Virant-Klun, I. Gonadotrophin-releasing hormone agonist protocol of controlled ovarian hyperstimulation as an efficient treatment in Bologna-defined poor ovarian responders. Syst Biol Reprod Med. 2016; 62 (4): 290-6.	Very small number of MNCs
Sunkara SK, Coomarasamy A, Faris R, Braude P, Khalaf Y. Long gonadotropin-releasing hormone agonist versus short agonist versus antagonist regimens in poor responders undergoing in vitro fertilization: a randomized controlled trial. Fertil Steril. 2014; 101:147–53.	Included in meta-analysis: Lambalk 2017
Sunkara, Sk, Pundir, J and Khalaf, Y. Effect of androgen supplementation or modulation on ovarian stimulation outcome in poor responders: a meta-analysis. Reprod BioMed Online. 2011; 22 (6): 545-555.	No separate meta-analysis for letrozole
Sunkara, S. K., Tuthill, J., Khairy, M., El-Toukhy, T., Coomarasamy, A., Khalaf, Y. and Braude, P. Reprod Biomed Online. 2007; 15 (5): 539-46. (18028745)	Replaced by a more recent meta-analysis: Xiao 2013
Tarlatzis, B. C., Zepiridis, L., Grimbizis, G. and Bontis, J. Clinical management of low ovarian response to stimulation for IVF: a systematic review. Hum Reprod Update. 2003; 9 (1): 61-76.	Replaced by a more recent meta-analysis: Lambalk 2017
Tazegul, A., Gorkemli, H., Ozdemir, S. and Aktan, T. M. Comparison of multiple dose GnRH antagonist and minidose long agonist protocols in poor responders undergoing in vitro fertilization: a randomized controlled trial. Arch Gynecol Obstet. 2008; 278 (5): 467-72.	Included in meta-analysis: Lambalk 2017
van Hooff, M. H., Alberda, A. T., Huisman, G. J., Zeilmaker, G. H. and Leerentveld, R. A. Doubling the human menopausal gonadotrophin dose in the course of an in-vitro fertilization treatment cycle in low responders: a randomized study. Hum Reprod. 1993; 8 (3): 369-73.	One patient particpated twice in the study
van Tilborg, T. C., Torrance, H. L., Oudshoorn, S. C., Eijkemans, M. J. C., Koks, C. A. M., Verhoeve, H. R., Nap, A. W., Scheffer, G. J., Manger, A. P., Schoot, B. C., Sluijmer, A. V., Verhoeff, A., Groen, H., Laven, J. S. E., Mol, B. W. J., Broekmans, F. J. M. Individualized versus standard FSH dosing in women starting IVF/ICSI: an RCT. Part 1: The predicted poor responder. Hum Reprod 2017; 32(12):2496-2505	Included in meta-analysis: Lensen 2018
Venetis, C. A., Kolibianakis, E. M., Tarlatzi, T. B. and Tarlatzis, B. C. Evidence-based management of poor ovarian response. Ann N Y Acad Sci. 2010; 1205 199-206.	Systematic review without complete meta-analytical approach
Youssef, M. A., van Wely, M., Al-Inany, H., Madani, T., Jahangiri, N., Khodabakhshi, S., Alhalabi, M., Akhondi, M., Ansaripour, S., Tokhmechy, R., Zarandi, L., Rizk, A., El-Mohamedy, M., Shaeer, E., Khattab, M., Mochtar, M. H. and van der Veen, F. A mild ovarian stimulation strategy in women with poor ovarian reserve undergoing IVF: a multicenter randomized non-inferiority trial. Hum Reprod. 2017; 32 (1): 112-118.	Not reduced dose (150IU is conventional dose). Study and Control groups had different GNRH protocols in addition to the gonadotrophin

	dose.
Youssef, M. A., van Wely, M., Mochtar, M., Fouda, U. M., Eldaly, A., El Abidin, E. Z., Elhalwagy, A., Mageed Abdallah, A. A., Zaki, S. S., Abdel Ghafar, M. S., Mohesen, M. N. and van der Veen, F. Low dosing of gonadotropins in in vitro fertilization cycles for women with poor ovarian reserve: systematic review and meta-analysis.Fertil Steril. 2018; 109 (2): 289-301.	Replaced by the Cochrane meta-analysis by Lensen 2018, which provides more detailed dose comparisons

5. LH suppression regimes

Flowchart



List of excluded papers

	Exclusion criterion
Comparable clinical outcome using the GnRH antagonist ganirelix or a long protocol of the GnRH agonist triptorelin for the prevention of premature LH surges in women undergoing ovarian stimulation. Hum Reprod. 2001; 16 (4): 644-51.	Included in meta-analysis: Al-Inany 2016
The European Orgalutran Study Group. Treatment with the gonadotrophin-releasing hormone antagonist ganirelix in women undergoing ovarian stimulation with recombinant follicle stimulating hormone is effective, safe and convenient: results of a controlled, randomized, multicentre trial. The European Orgalutran Study Group. Hum Reprod. 2000; 15 (7): 1490-8.	Included in meta-analysis: Al-Inany 2016
Barmat, L. I., Chantilis, S. J., Hurst, B. S. and Dickey, R. P. A randomized prospective trial comparing gonadotropin-releasing hormone (GnRH) antagonist/recombinant follicle-stimulating hormone (rFSH) versus GnRH-agonist/rFSH in women pretreated with oral contraceptives before in vitro fertilization. Fertil Steril. 2005; 83 (2): 321-30.	Included in meta-analysis: Al-Inany 2016
Bodri, D., Vernaeve, V., Guillen, J. J., Vidal, R., Figueras, F. and Coll, O. Comparison between a GnRH antagonist and a GnRH agonist flare-up protocol in oocyte donors: a randomized clinical trial. Hum Reprod. 2006; 21 (9): 2246-51.	Donor cycle
Cheung, L. P., Lam, P. M., Lok, I. H., Chiu, T. T., Yeung, S. Y., Tjer, C. C. and Haines, C. J. GnRH antagonist versus long GnRH agonist protocol in poor responders undergoing IVF: a randomized controlled trial. Hum Reprod. 2005; 20 (3): 616-21.	Included in meta-analysis: Al-Inany 2016
Cota, A. M., Oliveira, J. B., Petersen, C. G., Mauri, A. L., Massaro, F. C., Silva, L. F., Nicoletti, A., Cavagna, M., Baruffi, R. L. and Franco, J. G., Jr. GnRH agonist versus GnRH antagonist in assisted reproduction cycles: oocyte morphology. Reprod Biol Endocrinol. 2012; 10 33.	Outcomes not within scope
De Placido, G., Mollo, A., Clarizia, R., Strina, I., Conforti, S. and Alviggi, C. Gonadotropin-releasing hormone (GnRH) antagonist plus recombinant luteinizing hormone vs. a standard GnRH agonist short protocol in patients at risk for poor ovarian response. Fertil Steril. 2006; 85 (1): 247-50.	Included for chapter 4 – excluded here
Devesa, M., Martinez, F., Coroleu, B., Tur, R., Gonzalez, C., Rodriguez, I. and Barri, P. N. Poor prognosis for ovarian response to stimulation: results of a randomised trial comparing the flare-up GnRH agonist protocol vs. the antagonist protocol. Gynecol Endocrinol. 2010; 26 (7): 509-15.	Included for chapter 4 – excluded here
DiLuigi, A. J., Engmann, L., Schmidt, D. W., Benadiva, C. A. and Nulsen, J. C. A randomized trial of microdose leuprolide acetate protocol versus luteal phase ganirelix protocol in predicted poor responders. Fertil Steril. 2011; 95 (8): 2531-3.	Two interventions investigated
Dong, J., Wang, Y., Chai, W. R., Hong, Q. Q., Wang, N. L., Sun, L. H., Long, H., Wang, L., Tian, H., Lyu, Q. F., Lu, X. F., Chen, Q. J. and Kuang, Y. P. The pregnancy outcome of progestin-primed ovarian stimulation using 4 versus 10 mg of medroxyprogesterone acetate per day in infertile women undergoing in vitro fertilisation: a randomised controlled trial. Bjog. 2017; 124 (7): 1048-1055.	Not comparing a Progestins protocol vs a different or a non pituitary suppression protocol
Escudero, E., Bosch, E., Crespo, J., Simon, C., Remohi, J. and Pellicer, A. Comparison of two different starting multiple dose gonadotropin-releasing hormone antagonist protocols in a selected group of in vitro fertilization-embryo transfer patients. Fertil Steril. 2004; 81 (3): 562-6.	Not comparing a GnRH antagonist protocol vs a different or a non pituitary suppression protocol
Firouzabadi, R. D., Ahmadi, S., Oskouian, H. and Davar, R. Comparing GnRH agonist long protocol and GnRH antagonist protocol in outcome the first cycle of ART. Arch Gynecol Obstet. 2010; 281 (1): 81-5.	Included in meta-analysis: Al-Inany 2016
Hamdine, O., Broekmans, F. J., Eijkemans, M. J., Lambalk, C. B., Fauser, B. C., Laven, J. S. and Macklon, N. S. Early initiation of gonadotropin-releasing hormone antagonist treatment results in a more stable endocrine milieu during the mid- and late-follicular phases: a randomized controlled trial comparing gonadotropin-	Not comparing a GnRH antagonist protocol vs a different or a non pituitary suppression protocol

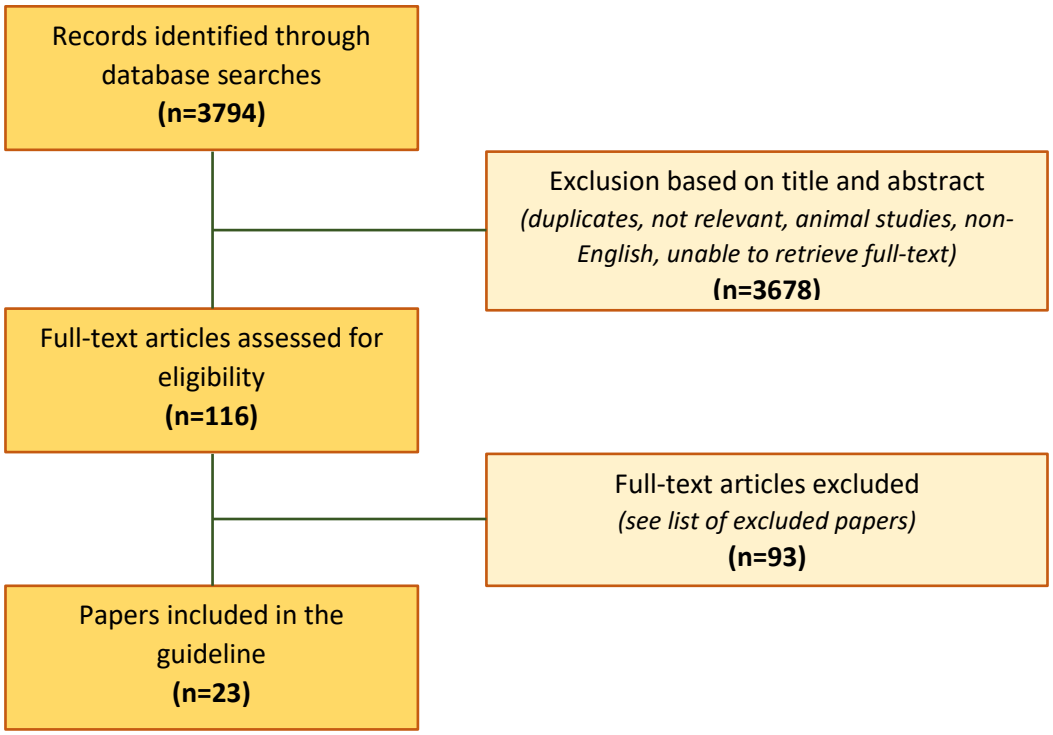
releasing hormone antagonist initiation on cycle day 2 or 6. Fertil Steril. 2013; 100 (3): 867-74.	
Hamdine, O., Macklon, N. S., Eijkemans, M. J., Laven, J. S., Cohlen, B. J., Verhoeff, A., van Dop, P. A., Bernardus, R. E., Lambalk, C. B., Oosterhuis, G. J., Holleboom, C. A., van den Dool-Maasland, G. C., Verburg, H. J., van der Heijden, P. F., Blankhart, A., Fauser, B. C. and Broekmans, F. J. Comparison of early versus late initiation of GnRH antagonist co-treatment for controlled ovarian stimulation in IVF: a randomized controlled trial. Hum Reprod. 2013; 28 (12): 3227-35.	Not comparing a GnRH antagonist protocol vs a different or a non pituitary suppression protocol
Hazout, A., de Ziegler, D., Cornel, C., Fernandez, H., Lelaidier, C. and Frydman, R. Comparison of short 7-day and prolonged treatment with gonadotropin-releasing hormone agonist desensitization for controlled ovarian hyperstimulation. Fertil Steril. 1993; 59 (3): 596-600.	Included in meta-analysis: Siristatidis 2015
Heijnen, E. M., Eijkemans, M. J., De Klerk, C., Polinder, S., Beckers, N. G., Klinkert, E. R., Broekmans, F. J., Passchier, J., Te Velde, E. R., Macklon, N. S. and Fauser, B. C. A mild treatment strategy for in-vitro fertilisation: a randomised non-inferiority trial. Lancet. 2007; 369 (9563): 743-9.	Included in meta-analysis: Al-Inany 2016
Hohmann, F. P., Macklon, N. S. and Fauser, B. C. A randomized comparison of two ovarian stimulation protocols with gonadotropin-releasing hormone (GnRH) antagonist cotreatment for in vitro fertilization commencing recombinant follicle-stimulating hormone on cycle day 2 or 5 with the standard long GnRH agonist protocol. J Clin Endocrinol Metab. 2003; 88 (1): 166-73.	Included in meta-analysis: Al-Inany 2016
Karimzadeh, M. A., Mashayekhy, M., Mohammadian, F. and Moghaddam, F. M. Comparison of mild and microdose GnRH agonist flare protocols on IVF outcome in poor responders. Arch Gynecol Obstet. 2011; 283 (5): 1159-64.	Combination CC+ GnRH antagonist vs short agonist. Not mild stimulation doses of FSH 225/300 from D5
Karimzadeh, M. A., Ahmadi, S., Oskouian, H. and Rahmani, E. Comparison of mild stimulation and conventional stimulation in ART outcome. Arch Gynecol Obstet. 2010; 281 (4): 741-6.	Included in meta-analysis: Al-Inany 2016
Kim, C. H., Jeon, G. H., Cheon, Y. P., Jeon, I., Kim, S. H., Chae, H. D. and Kang, B. M. Comparison of GnRH antagonist protocol with or without oral contraceptive pill pretreatment and GnRH agonist low-dose long protocol in low responders undergoing IVF/intracytoplasmic sperm injection. Fertil Steril. 2009; 92 (5): 1758-60.	Included in meta-analysis: Al-Inany 2016
Kolibianakis, E. M., Albano, C., Camus, M., Tournaye, H., Van Steirteghem, A. C. and Devroey, P. Initiation of gonadotropin-releasing hormone antagonist on day 1 as compared to day 6 of stimulation: effect on hormonal levels and follicular development in in vitro fertilization cycles. J Clin Endocrinol Metab. 2003; 88 (12): 5632-7	Not comparing a GnRH antagonist protocol vs a different or a non pituitary suppression protocol
Kolibianakis, E. M., Collins, J., Tarlatzis, B. C., Devroey, P., Diedrich, K. and Griesinger, G. Among patients treated for IVF with gonadotrophins and GnRH analogues, is the probability of live birth dependent on the type of analogue used? A systematic review and meta-analysis. Hum Reprod Update. 2006; 12 (6): 651-71	Replaced by a more recent meta-analysis: Al-Inany 2016
Lambalk CB, Banga FR, Huirne JA, Toftager M, Pinborg A, Homburg R, van der Veen F, van Wely M. GnRH antagonist versus long agonist protocols in IVF: a systematic review and meta-analysis accounting for patient type. Hum Reprod Update. 2017 Sep 1;23(5):560-579.	Included for chapter 4 – excluded here
Lin, H., Li, Y., Li, L., Wang, W., Yang, D. and Zhang, Q. Is a GnRH antagonist protocol better in PCOS patients? A meta-analysis of RCTs. PLoS One. 2014; 9 (3): e91796.	Replaced by a more recent meta-analysis: Al-Inany 2016
Loutradis, D., Stefanidis, K., Drakakis, P., Milingos, S., Antsaklis, A. and Michalas, S. A modified gonadotropin-releasing hormone (GnRH) antagonist protocol failed to increase clinical pregnancy rates in comparison with the long GnRH protocol. Fertil Steril. 2004; 82 (5): 1446-8.	Included in meta-analysis: Al-Inany 2016
Loumaye, E., Vankrieken, L., Depreester, S., Psalti, I., de Cooman, S. and Thomas, K. Hormonal changes induced by short-term administration of gonadotropin-releasing	Included in meta-analysis: Siristatidis 2015

hormone agonist during ovarian hyperstimulation for in vitro fertilization and their consequences for embryo development. Fertil Steril. 1989; 51 (1): 105-11.	
Ludwig, M., Katalinic, A., Felberbaum, R. E. and Diedrich, K. Safety aspects of gonadotrophin-releasing hormone antagonists in ovarian stimulation procedures: ovarian hyperstimulation syndrome and health of children born. Reprod Biomed Online. 2002; 5 Suppl 1 61-7.	Replaced by a more recent meta-analysis: Al-Inany 2016
Maged, A. M., Nada, A. M., Abohamila, F., Hashem, A. T., Mostafa, W. A. and Elzayat, A. R. Delayed Start Versus Conventional GnRH Antagonist Protocol in Poor Responders Pretreated With Estradiol in Luteal Phase: A Randomized Controlled Trial. Reprod Sci. 2015; 22 (12): 1627-31.	Not comparing a GnRH antagonist protocol vs a different or a non pituitary suppression protocol
Merviel, P., Cabry-Goubet, R., Lourdel, E., Devaux, A., Belhadri-Mansouri, N., Copin, H. and Benkhalifa, M. Comparative prospective study of 2 ovarian stimulation protocols in poor responders: effect on implantation rate and ongoing pregnancy. Reprod Health. 2015; 12 52.	Included for chapter 4 – excluded here
Malmusi, S., La Marca, A., Giulini, S., Xella, S., Tagliasacchi, D., Marsella, T. and Volpe, A. Comparison of a gonadotropin-releasing hormone (GnRH) antagonist and GnRH agonist flare-up regimen in poor responders undergoing ovarian stimulation. Fertil Steril. 2005; 84 (2): 402-6.	Included in meta-analysis: Siristatidis 2015
Polinder, S., Heijnen, E. M., Macklon, N. S., Habbema, J. D., Fauser, B. J. and Eijkemans, M. J. Cost-effectiveness of a mild compared with a standard strategy for IVF: a randomized comparison using cumulative term live birth as the primary endpoint. Hum Reprod. 2008; 23 (2): 316-23.	Cost-effectiveness study
Prapas, Y., Petousis, S., Dagklis, T., Panagiotidis, Y., Papatheodorou, A., Assunta, I. and Prapas, N. GnRH antagonist versus long GnRH agonist protocol in poor IVF responders: a randomized clinical trial. Eur J Obstet Gynecol Reprod Biol. 2013; 166 (1): 43-6.	Included in meta-analysis: Al-Inany 2016
Prapas, N., Prapas, Y., Panagiotidis, Y., Prapa, S., Vanderzwalmen, P., Schoysman, R. and Makedos, G. GnRH agonist versus GnRH antagonist in oocyte donation cycles: a prospective randomized study. Hum Reprod. 2005; 20 (6): 1516-20.	Donor study
Rezaeian, P, Esmaeilzadeh, S, Tajali, Z, Heidari, Fn and Golsorkhtabaramiri, M. Short, semi-short or long GnRH agonist treatment regimens in women ICSI candidate; which is proper in preventing premature LH surge? Middle east fertility society journal. 2016; 21 (3): 161-167.	Frozen embryo transfer
Rinaldi, L., Lisi, F. and Selman, H. Mild/minimal stimulation protocol for ovarian stimulation of patients at high risk of developing ovarian hyperstimulation syndrome. J Endocrinol Invest. 2014; 37 (1): 65-70.	Included in meta-analysis: Al-Inany 2016
Sbracia, M., Colabianchi, J., Giallonardo, A., Giannini, P., Piscitelli, C., Morgia, F., Montigiani, M. and Schimberni, M. Cetrorelix protocol versus gonadotropin-releasing hormone analog suppression long protocol for superovulation in intracytoplasmic sperm injection patients older than 40. Fertil Steril. 2009; 91 (5): 1842-7.	Included in meta-analysis: Al-Inany 2016
Simon, C., Oberye, J., Bellver, J., Vidal, C., Bosch, E., Horcajadas, J. A., Murphy, C., Adams, S., Riesewijk, A., Mannaerts, B. and Pellicer, A Similar endometrial development in oocyte donors treated with either high- or standard-dose GnRH antagonist compared to treatment with a GnRH agonist or in natural cycles. Hum Reprod. 2005; 20 (12): 3318-27.	Donor study
Smitz, J., Erard, P., Camus, M., Devroey, P., Tournaye, H., Wisanto, A. and Van Steirteghem, A. C. Pituitary gonadotrophin secretory capacity during the luteal phase in superovulation using GnRH-agonists and HMG in a desensitization or flare-up protocol. Hum Reprod. 1992; 7 (9): 1225-9.	The method of allocation to short or long GnRHa protocol was not stated. Pregnancy was not the outcome in this study because none of the participants had embryo transfer owing

	to complete failure of fertilisation
Sunkara, S. K., Coomarasamy, A., Faris, R., Braude, P. and Khalaf, Y. Long gonadotropin-releasing hormone agonist versus short agonist versus antagonist regimens in poor responders undergoing in vitro fertilization: a randomized controlled trial. Fertil Steril. 2014; 101 (1): 147-53.	Included in meta-analysis: Al-Inany 2016
Sunkara, S. K., Tuthill, J., Khairy, M., El-Toukhy, T., Coomarasamy, A., Khalaf, Y. and Braude, P. Pituitary suppression regimens in poor responders undergoing IVF treatment: a systematic review and meta-analysis. Reprod Biomed Online. 2007; 15 (5): 539-46.	Replaced by a more recent meta-analysis: Al-Inany 2016 and Siristatidis 2015
Tan, S. L., Kingsland, C., Campbell, S., Mills, C., Bradfield, J., Alexander, N., Yovich, J. and Jacobs, H. S. The long protocol of administration of gonadotropin-releasing hormone agonist is superior to the short protocol for ovarian stimulation for in vitro fertilization Fertil Steril. 1992; 57 (4): 810-4.	Included in meta-analysis: Siristatidis 2015
Tarlatzis, B. C., Pados, G., Bontis, J., Lagos, S., Grimbizis, G., Spanos, E. and Mantalenakis, S. Ovarian stimulation with buserelin/HMG/HCG: prospective randomized study of short versus long protocol. Hum Reprod. 1993; 8 (6): 807-12.	Randomization was incomplete
Tazegul, A., Gorkemli, H., Ozdemir, S. and Aktan, T. M. Comparison of multiple dose GnRH antagonist and minidose long agonist protocols in poor responders undergoing in vitro fertilization: a randomized controlled trial. Arch Gynecol Obstet. 2008; 278 (5): 467-72.	Included in meta-analysis: Al-Inany 2016
Vlaisavljevic, V., Reljic, M., Lovrec, V. G. and Kovacic, B. Comparable effectiveness using flexible single-dose GnRH antagonist (cetrorelix) and single-dose long GnRH agonist (goserelin) protocol for IVF cycles--a prospective, randomized study. Reprod Biomed Online. 2003; 7 (3): 301-8.	Inadequate randomization
Wang, Y., Chen, Q., Wang, N., Chen, H., Lyu, Q. and Kuang, Y. Controlled Ovarian Stimulation Using Medroxyprogesterone Acetate and hMG in Patients With Polycystic Ovary Syndrome Treated for IVF: A Double-Blind Randomized Crossover Clinical Trial. Medicine (Baltimore). 2016; 95 (9): e2939.	Same study population as Kuang et al. 2015
Wang, R., Lin, S., Wang, Y., Qian, W. and Zhou, L. Comparisons of GnRH antagonist protocol versus GnRH agonist long protocol in patients with normal ovarian reserve: A systematic review and meta-analysis. PLoS One. 2017; 12 (4): e0175985.	Replaced by a more recent meta-analysis: Al-Inany 2016
Xiao, J., Chang, S. and Chen, S. The effectiveness of gonadotropin-releasing hormone antagonist in poor ovarian responders undergoing in vitro fertilization: a systematic review and meta-analysis. Fertil Steril. 2013; 100 (6): 1594-601.e1-9.	Included for chapter 4 – excluded here
Xiao, J., Chen, S., Zhang, C. and Chang, S. Effectiveness of GnRH antagonist in the treatment of patients with polycystic ovary syndrome undergoing IVF: a systematic review and meta analysis. Gynecol Endocrinol. 2013; 29 (3): 187-91.	Replaced by a more recent meta-analysis: Al-Inany 2016
Zhang, J., Mao, X., Wang, Y., Chen, Q., Lu, X., Hong, Q. and Kuang, Y. Arch Gynecol Obstet. 2017; 296 (6): 1207-1217. (28948397)	Outcomes not within scope of the guideline
Zhu, X., Zhang, X. and Fu, Y. Utrogestan as an effective oral alternative for preventing premature luteinizing hormone surges in women undergoing controlled ovarian hyperstimulation for in vitro fertilization. Medicine (Baltimore). 2015; 94 (21): e909.	Same study population as Kuang et al. 2015

6. Types of gonadotropins

Flowchart



List of excluded papers

	Exclusion criterion
Corifollitropin Alfa Dose-finding Study Group. A randomized dose-response trial of a single injection of corifollitropin alfa to sustain multifollicular growth during controlled ovarian stimulation. Hum Reprod. 2008; 23 (11): 2484-92.	Dose finding study, using non commercially available doses of CA.
Corifollitropin alfa Ensure Study Group. Corifollitropin alfa for ovarian stimulation in IVF: a randomized trial in lower-body-weight women. Reprod Biomed Online. 2010; 21 (1): 66-76.	Included in meta-analysis: Griesinger 2016
European and Israeli Study Group on Highly Purified Menotropin versus Recombinant Follicle-Stimulating Hormone. Efficacy and safety of highly purified menotropin versus recombinant follicle-stimulating hormone in in vitro fertilization/intracytoplasmic sperm injection cycles: a randomized, comparative trial. Fertil Steril. 2002; 78 (3): 520-8.	Included in meta-analysis: van Wely 2011
Agrawal, R., Holmes, J. and Jacobs, H. S. Follicle-stimulating hormone or human menopausal gonadotropin for ovarian stimulation in in vitro fertilization cycles: a meta-analysis. Fertil Steril. 2000; 73 (2): 338-43.	Replaced by a more recent meta-analysis: van Wely 2011
Al-Inany, H., Aboulghar, M. A., Mansour, R. T. and Serour, G. I. Ovulation induction in the new millennium: recombinant follicle-stimulating hormone versus human menopausal gonadotropin. Gynecol Endocrinol. 2005; 20 (3): 161-9.	Replaced by a more recent meta-analysis: van Wely 2011
Al-Inany, H. G., Abou-Setta, A. M., Aboulghar, M. A., Mansour, R. T. and Serour, G. I. Efficacy and safety of human menopausal gonadotrophins versus recombinant FSH: a meta-analysis. Reprod Biomed Online. 2008; 16 (1): 81-8	Replaced by a more recent meta-analysis: van Wely 2011
Andersen, A. N., Devroey, P. and Arce, J. C. Clinical outcome following stimulation with highly purified hMG or recombinant FSH in patients undergoing IVF: a randomized assessor-blind controlled trial. Hum Reprod. 2006; 21 (12): 3217-27.	Included in meta-analysis: van Wely 2011
Baker, V. L., Fujimoto, V. Y., Kettel, L. M., Adamson, G. D., Hoehler, F., Jones, C. E. and Soules, M. R. Clinical efficacy of highly purified urinary FSH versus recombinant FSH in volunteers undergoing controlled ovarian stimulation for in vitro fertilization: a randomized, multicenter, investigator-blind trial. Fertil Steril. 2009; 91 (4): 1005-11.	Included in meta-analysis: van Wely 2011
Balasch, J., Creus, M., Fabregues, F., Civico, S., Carmona, F., Puerto, B., Casamitjana, R. and Vanrell, J. A. The effect of exogenous luteinizing hormone (LH) on oocyte viability: evidence from a comparative study using recombinant human follicle-stimulating hormone (FSH) alone or in combination with recombinant LH for ovarian stimulation in pituitary-suppressed women undergoing assisted reproduction. J Assist Reprod Genet. 2001; 18 (5): 250-6.	Included in meta-analysis: Mochtar 2017
Barrenetxea, G., Agirregoikoa, J. A., Jimenez, M. R., de Larruzea, A. L., Ganzabal, T. and Carbonero, K. Ovarian response and pregnancy outcome in poor-responder women: a randomized controlled trial on the effect of luteinizing hormone supplementation on in vitro fertilization cycles. Fertil Steril. 2008; 89 (3): 546-53.	Included in meta-analysis: Mochtar 2017
Baruffi, R. L., Mauri, A. L., Petersen, C. G., Felipe, V., Martins, A. M., Cornicelli, J., Cavagna, M., Oliveira, J. B. and Franco, J. G., Jr. Recombinant LH supplementation to recombinant FSH during induced ovarian stimulation in the GnRH-antagonist protocol: a meta-analysis. Reprod Biomed Online. 2007; 14 (1): 14-25.	Replaced by a more recent meta-analysis: Mochtar 2017
Bastu, E, Buyru, F, Ozsurmeli, M, Demiral, I, Dogan, M and Yeh, J. A randomized, single-blind, prospective trial comparing three different gonadotropin doses with or without addition of letrozole during ovulation stimulation in patients with poor ovarian response. Eur J Obstet Gynecol Reprod Biol. 2016; 203 30-4.	Different FSH doses are used in the three arms compared
Bechtejew, T. N., Nadai, M. N., Nastri, C. O. and Martins, W. P. Clomiphene citrate and letrozole to reduce follicle-stimulating hormone consumption during ovarian stimulation: systematic review and meta-analysis. Ultrasound Obstet Gynecol. 2017; 50 (3): 315-323.	Substitution rather than addition of letrozole, or FSH was used in different

	doses in both arms
Bentick, B., Shaw, R. W., Iffland, C. A., Burford, G. and Bernard, A A randomized comparative study of purified follicle stimulating hormone and human menopausal gonadotropin after pituitary desensitization with Buserelin for superovulation and in vitro fertilization. Fertil Steril. 1988; 50 (1): 79-84	Crossover study of 13 patients treated either by FSH-P or HMG
Bergh, C., Howles, C. M., Borg, K., Hamberger, L., Josefsson, B., Nilsson, L. and Wikland, M. Recombinant human follicle stimulating hormone (r-hFSH; Gonal-F) versus highly purified urinary FSH (Metrodin HP): results of a randomized comparative study in women undergoing assisted reproductive techniques. Hum Reprod. 1997; 12 (10): 2133-9.	Included in meta-analysis: van Wely 2011
Berkkanoglu, M., Isikoglu, M., Aydin, D. and Ozgur, K. Clinical effects of ovulation induction with recombinant follicle-stimulating hormone supplemented with recombinant luteinizing hormone or low-dose recombinant human chorionic gonadotropin in the midfollicular phase in microdose cycles in poor responders. Fertil Steril. 2007; 88 (3): 665-9.	Included in meta-analysis: Mochtar 2017
Boostanfar, R., Shapiro, B., Levy, M., Rosenwaks, Z., Witjes, H., Stegmann, B. J., Elbers, J., Gordon, K. and Mannaerts, B. Large, comparative, randomized double-blind trial confirming noninferiority of pregnancy rates for corifollitropin alfa compared with recombinant follicle-stimulating hormone in a gonadotropin-releasing hormone antagonist controlled ovarian stimulation protocol in older patients undergoing in vitro fertilization. Fertil Steril. 2015; 104 (1): 94-103.e1.	Included in meta-analysis: Griesinger 2016
Bosch, E., Labarta, E., Crespo, J., Simon, C., Remohi, J. and Pellicer, A. Impact of luteinizing hormone administration on gonadotropin-releasing hormone antagonist cycles: an age-adjusted analysis. Fertil Steril. 2011; 95 (3): 1031-6.	Included in meta-analysis: Mochtar 2017
Bosch, E., Vidal, C., Labarta, E., Simon, C., Remohi, J. and Pellicer, A. Highly purified hMG versus recombinant FSH in ovarian hyperstimulation with GnRH antagonists--a randomized study. Hum Reprod. 2008; 23 (10): 2346-51.	Included in meta-analysis: van Wely 2011
Caserta, D., Lisi, F., Marci, R., Ciardo, F., Fazi, A., Lisi, R. and Moscarini, M. Does supplementation with recombinant luteinizing hormone prevent ovarian hyperstimulation syndrome in down regulated patients undergoing recombinant follicle stimulating hormone multiple follicular stimulation for IVF/ET and reduces cancellation rate for high risk of hyperstimulation? Gynecol Endocrinol. 2011; 27 (11): 862-6	Included in meta-analysis: Mochtar 2017
Cedrin-Durnerin, I., Grange-Dujardin, D., Laffy, A., Parneix, I., Massin, N., Galey, J., Theron, L., Wolf, J. P., Conord, C., Clement, P., Jayot, S. and Hugues, J. N. Recombinant human LH supplementation during GnRH antagonist administration in IVF/ICSI cycles: a prospective randomized study. Hum Reprod. 2004; 19 (9): 1979-84.	Excluded from meta-analysis: Mochtar 2017 for pseudo-randomization
Check, J. H., O'Shaughnessy, A., Nazari, A. and Hoover, L. Comparison of efficacy of high-dose pure follicle-stimulating hormone versus human menopausal gonadotropins for in vitro fertilization. Gynecol Obstet Invest. 1995; 40 (2): 117-9.	Included in meta-analysis:
Cheon, K. W., Byun, H. K., Yang, K. M., Song, I. O., Choi, K. H. and Yoo, K. J. Efficacy of recombinant human follicle-stimulating hormone in improving oocyte quality in assisted reproductive techniques. J Reprod Med. 2004; 49 (9): 733-8.	Included in meta-analysis: van Wely 2011
Coomarasamy, A., Afnan, M., Cheema, D., van der Veen, F., Bossuyt, P. M. and van Wely, M. Urinary hMG versus recombinant FSH for controlled ovarian hyperstimulation following an agonist long down-regulation protocol in IVF or ICSI treatment: a systematic review and meta-analysis. Hum Reprod. 2008; 23 (2): 310-5.	Replaced by a more recent meta-analysis: van Wely 2011
Daya, S. Updated meta-analysis of recombinant follicle-stimulating hormone (FSH) versus urinary FSH for ovarian stimulation in assisted reproduction. Fertil Steril. 2002; 77 (4): 711-4.	Replaced by a more recent meta-analysis: van Wely 2011
Daya, S., Gunby, J., Hughes, E. G., Collins, J. A. and Sagle, M. A. Follicle-stimulating hormone versus human menopausal gonadotropin for in vitro fertilization cycles: a meta-analysis. Fertil Steril. 1995; 64 (2): 347-54	Replaced by a more recent meta-analysis: van Wely 2011

Daya, S., Gunby, J., Hughes, E. G., Collins, J. A. and Sagle, M. A. Randomized controlled trial of follicle stimulating hormone versus human menopausal gonadotrophin in in-vitro fertilization. Hum Reprod. 1995; 10 (6): 1392-6.	Included in meta-analysis: van Wely 2011
De Placido, G., Alviggi, C., Perino, A., Strina, I., Lisi, F., Fasolino, A., De Palo, R., Ranieri, A., Colacurci, N. and Mollo, A. Recombinant human LH supplementation versus recombinant human FSH (rFSH) step-up protocol during controlled ovarian stimulation in normogonadotrophic women with initial inadequate ovarian response to rFSH. A multicentre, prospective, randomized controlled trial. Hum Reprod. 2005; 20 (2): 390-6.	Included in meta-analysis: Mochtar 2017
Devroey, P., Boostanfar, R., Koper, N. P., Mannaerts, B. M., Ijzerman-Boon, P. C. and Fauser, B. C. A double-blind, non-inferiority RCT comparing corifollitropin alfa and recombinant FSH during the first seven days of ovarian stimulation using a GnRH antagonist protocol. Hum Reprod. 2009; 24 (12): 3063-72.	Included in meta-analysis: Griesinger 2016
Devroey, P., Fauser, B. C., Platteau, P., Beckers, N. G., Dhont, M. and Mannaerts, B. M. Induction of multiple follicular development by a single dose of long-acting recombinant follicle-Stimulating hormone (FSH-CTP, corifollitropin alfa) for controlled ovarian stimulation before in vitro fertilization. J Clin Endocrinol Metab. 2004; 89 (5): 2062-70.	Dose finding study, using non commercially available doses of CA.
Dhont, M., Onghena, A., Coetsier, T. and De Sutter, P. Prospective randomized study of clomiphene citrate and gonadotrophins versus goserelin and gonadotrophins for follicular stimulation in assisted reproduction. Hum Reprod. 1995; 10 (4): 791-6.	Participants may have had either GIFT or IVF and it was not possible to separate the outcomes of the two forms of assisted reproduction
Dickey, R. P., Nichols, J. E., Steinkampf, M. P., Gocial, B., Thornton, M., Webster, B. W., Bello, S. M., Crain, J. and Marshall, D. C. Highly purified human-derived follicle-stimulating hormone (Bravelle) has equivalent efficacy to follitropin-beta (Follistim) in infertile women undergoing in vitro fertilization. Reprod Biol Endocrinol. 2003; 1 63.	Included in meta-analysis: van Wely 2011
Dickey, R. P., Thornton, M., Nichols, J., Marshall, D. C., Fein, S. H. and Nardi, R. V. Comparison of the efficacy and safety of a highly purified human follicle-stimulating hormone (Bravelle) and recombinant follitropin-beta for in vitro fertilization: a prospective, randomized study. Fertil Steril. 2002; 77 (6): 1202-8.	Included in meta-analysis: van Wely 2011
Fabregues, F., Creus, M., Penarrubia, J., Manau, D., Vanrell, J. A. and Balasch, J. Effects of recombinant human luteinizing hormone supplementation on ovarian stimulation and the implantation rate in down-regulated women of advanced reproductive age. Fertil Steril. 2006; 85 (4): 925-31.	Included in meta-analysis: Mochtar 2017
Fan, W., Li, S., Chen, Q., Huang, Z., Ma, Q. and Wang, Y. Recombinant Luteinizing Hormone supplementation in poor responders undergoing IVF: a systematic review and meta-analysis. Gynecol Endocrinol. 2013; 29 (4): 278-84	Replaced by a more recent meta-analysis: Mochtar 2017
Fensore, S., Di Marzio, M. and Tiboni, G. M. Corifollitropin alfa compared to daily FSH in controlled ovarian stimulation for in vitro fertilization: a meta-analysis. J Ovarian Res. 2015; 8 33.	It sums all patients in the Devroey 2004 (3 doses) in one group although they were treated with different doses of CA. The same is true for the CA study group 2008
Ferraretti, A. P., Gianaroli, L., Magli, M. C., D'Angelo, A., Farfalli, V. and Montanaro, N. Exogenous luteinizing hormone in controlled ovarian hyperstimulation for assisted reproduction techniques. Fertil Steril. 2004; 82 (6): 1521-6.	Included in meta-analysis: Mochtar 2017
Ferrier, A, Rasweiler, Jj, Bedford, Jm, Prey, K and Berkeley, As. Evaluation of leuprolide acetate and gonadotropins versus clomiphene citrate and gonadotropins	Participants may have had either GIFT or IVF and the results

for in vitro fertilization or gamete intrafallopian transfer. Fertil steril. 1990; 54 (1): 90-5.	were analysed per cycle and it was not possible to get the results per woman randomised
Figueiredo, J. B., Nastri, C. O., Vieira, A. D. and Martins, W. P. Clomiphene combined with gonadotropins and GnRH antagonist versus conventional controlled ovarian hyperstimulation without clomiphene in women undergoing assisted reproductive techniques: systematic review and meta-analysis. Arch Gynecol Obstet. 2013; 287 (4): 779-90.	In only two studies GnRH antagonist was used in both arms, but FSH protocols used were different
Franco, J. G., Jr., Baruffi, R. L., Coelho, J., Mauri, A. L., Petersen, C. G. and Garbellini, E. A prospective and randomized study of ovarian stimulation for ICSI with recombinant FSH versus highly purified urinary FSH. Gynecol Endocrinol. 2000; 14 (1): 5-10.	Included in meta-analysis: van Wely 2011
Frydman, R., Howles, C. M. and Truong, F. A double-blind, randomized study to compare recombinant human follicle stimulating hormone (FSH; Gonal-F) with highly purified urinary FSH (Metrodin) HP) in women undergoing assisted reproductive techniques including intracytoplasmic sperm injection. The French Multicentre Trialists. Hum Reprod. 2000; 15 (3): 520-5.	Included in meta-analysis: van Wely 2011
Gerli, S., Bini, V., Favilli, A. and Di Renzo, G. C. Clinical efficacy and cost-effectiveness of HP-human FSH (Fostimon®) versus rFSH (Gonal-F®) in IVF-ICSI cycles: a meta-analysis. Gynecol Endocrinol. 2013; 29 (6): 520-9.	Replaced by a more complete meta-analysis: van Wely 2011
Gibreel, A., Maheshwari, A. and Bhattacharya, S. Clomiphene citrate in combination with gonadotropins for controlled ovarian stimulation in women undergoing in vitro fertilization. Cochrane Database Syst Rev. 2012; 11 Cd008528.	In the studies included CC is used without analogues or different LH suppression in both arms
Goswami, Sk, Das, T, Chattopadhyay, R, Sawhney, V, Kumar, J, Chaudhury, K, Chakravarty, Bn and Kabir, Sn. A randomized single-blind controlled trial of letrozole as a low-cost IVF protocol in women with poor ovarian response: a preliminary report. Hum reprod (Oxford, England). 2004; 19 (9): 2031-5.	different FSH doses are used in the two arms compared. Moreover, in the letrozole arm no GnRH analogue is used whereas this is present in the comparative arm
Griesinger, G., Schultze-Mosgau, A., Dafopoulos, K., Schroeder, A., Schroer, A., von Otte, S., Hornung, D., Diedrich, K. and Felberbaum, R. Recombinant luteinizing hormone supplementation to recombinant follicle-stimulating hormone induced ovarian hyperstimulation in the GnRH-antagonist multiple-dose protocol. Hum Reprod. 2005; 20 (5): 1200-6.	Included in meta-analysis: Mochtar 2017
Hedon, B., Out, H. J., Hugues, J. N., Camier, B., Cohen, J., Lopes, P., Zorn, J. R., van der Heijden, B. and Coelingh Bennink, H. J. Efficacy and safety of recombinant follicle stimulating hormone (Puregon) in infertile women pituitary-suppressed with triptorelin undergoing in-vitro fertilization: a prospective, randomized, assessor-blind, multicentre trial. Hum Reprod. 1995; 10 (12): 3102-6.	Included in meta-analysis: van Wely 2011
Hill, M. J., Levens, E. D., Levy, G., Ryan, M. E., Csokmay, J. M., DeCherney, A. H. and Whitcomb, B. W. The use of recombinant luteinizing hormone in patients undergoing assisted reproductive techniques with advanced reproductive age: a systematic review and meta-analysis. Fertil Steril. 2012; 97 (5): 1108-14.e1.	Replaced by a more recent meta-analysis: Mochtar 2017
Hompes, P. G., Broekmans, F. J., Hoozemans, D. A. and Schats, R. Effectiveness of highly purified human menopausal gonadotropin vs. recombinant follicle-stimulating hormone in first-cycle in vitro fertilization-intracytoplasmic sperm injection patients. Fertil Steril. 2008; 89 (6): 1685-93.	Included in meta-analysis: van Wely 2011

Hoomans, E. H., Andersen, A. N., Loft, A., Leerentveld, R. A., van Kamp, A. A. and Zech, H. A prospective, randomized clinical trial comparing 150 IU recombinant follicle stimulating hormone (Puregon((R))) and 225 IU highly purified urinary follicle stimulating hormone (Metrodin-HP((R))) in a fixed-dose regimen in women undergoing ovarian stimulation. Hum Reprod. 1999; 14 (10): 2442-7.	Included in meta-analysis: van Wely 2011
Hugues, J. N., Bry-Gauillard, H., Bstandig, B., Uzan, M. and Cedrin-Durnerin, I. Comparison of recombinant and urinary follicle-stimulating hormone preparations in short-term gonadotropin releasing hormone agonist protocol for in vitro fertilization-embryo transfer. J Assist Reprod Genet. 2001; 18 (4): 191-6.	Included in meta-analysis: van Wely 2011
Hugues, J. N., Soussis, J., Calderon, I., Balasch, J., Anderson, R. A. and Romeu, A. Does the addition of recombinant LH in WHO group II anovulatory women over-responding to FSH treatment reduce the number of developing follicles? A dose-finding study. Hum Reprod. 2005; 20 (3): 629-35.	Excluded from meta-analysis: Mochtar 2017 for inclusion of WHO II anovulatory women
Humaidan, P., Bungum, M., Bungum, L. and Yding Andersen, C. Effects of recombinant LH supplementation in women undergoing assisted reproduction with GnRH agonist down-regulation and stimulation with recombinant FSH: an opening study. Reprod Biomed Online. 2004; 8 (6): 635-43.	Included in meta-analysis: Mochtar 2017
Imthurn, B., Macas, E., Rosselli, M. and Keller, P. J. Nuclear maturity and oocyte morphology after stimulation with highly purified follicle stimulating hormone compared to human menopausal gonadotrophin. Hum Reprod. 1996; 11 (11): 2387-91.	10 of the patients in the study underwent crossover trials
Kamath, M. S., Maheshwari, A., Bhattacharya, S., Lor, K. Y. and Gibreel, A. Oral medications including clomiphene citrate or aromatase inhibitors with gonadotropins for controlled ovarian stimulation in women undergoing in vitro fertilisation. Cochrane Database Syst Rev. 2017; 11 Cd008528.	Substitution rather than addition of letrozole, or FSH was used in different doses in both arms
Karimzadeh, M. A., Ahmadi, S., Oskouian, H. and Rahmani, E. Comparison of mild stimulation and conventional stimulation in ART outcome. Arch Gynecol Obstet. 2010; 281 (4): 741-6.	CC with GnRH antagonists and in the gonadotrophin only arm GnRH agonist is used.
Kilani, Z., Dakkak, A., Ghunaim, S., Cognigni, G. E., Tabarelli, C., Parmegiani, L. and Filicori, M. A prospective, randomized, controlled trial comparing highly purified hMG with recombinant FSH in women undergoing ICSI: ovarian response and clinical outcomes. Hum Reprod. 2003; 18 (6): 1194-9.	Included in meta-analysis: van Wely 2011
Kolibianakis, E. M., Kalogeropoulou, L., Griesinger, G., Papanikolaou, E. G., Papadimas, J., Bontis, J. and Tarlatzis, B. C. Among patients treated with FSH and GnRH analogues for in vitro fertilization, is the addition of recombinant LH associated with the probability of live birth? A systematic review and meta-analysis. Hum Reprod Update. 2007; 13 (5): 445-52.	Replaced by a more recent meta-analysis: Mochtar 2017
Konig, T. E., van der Houwen, L. E., Overbeek, A., Hendriks, M. L., Beutler-Beemsterboer, S. N., Kuchenbecker, W. K., Renckens, C. N., Bernardus, R. E., Schats, R., Homburg, R., Hompes, P. G. and Lambalk, C. B. Recombinant LH supplementation to a standard GnRH antagonist protocol in women of 35 years or older undergoing IVF/ICSI: a randomized controlled multicentre study. Hum Reprod. 2013; 28 (10): 2804-12.	Included in meta-analysis: Mochtar 2017
Kovacs, P., Kovats, T. and Kaali, S. G. Results with early follicular phase recombinant luteinizing hormone supplementation during stimulation for in vitro fertilization. Fertil Steril. 2010; 93 (2): 475-9.	Included in meta-analysis: Mochtar 2017
Lehert P, Kolibianakis EM, Venetis CA, Schertz J, Saunders H, Arriagada P, Copt S, Tarlatzis B. Recombinant human follicle-stimulating hormone (r-hFSH) plus recombinant luteinizing hormone versus r-hFSH alone for ovarian stimulation during assisted reproductive technology: systematic review and meta-analysis. Reprod Biol Endocrinol. 2014;12:17	Includes unpublished data

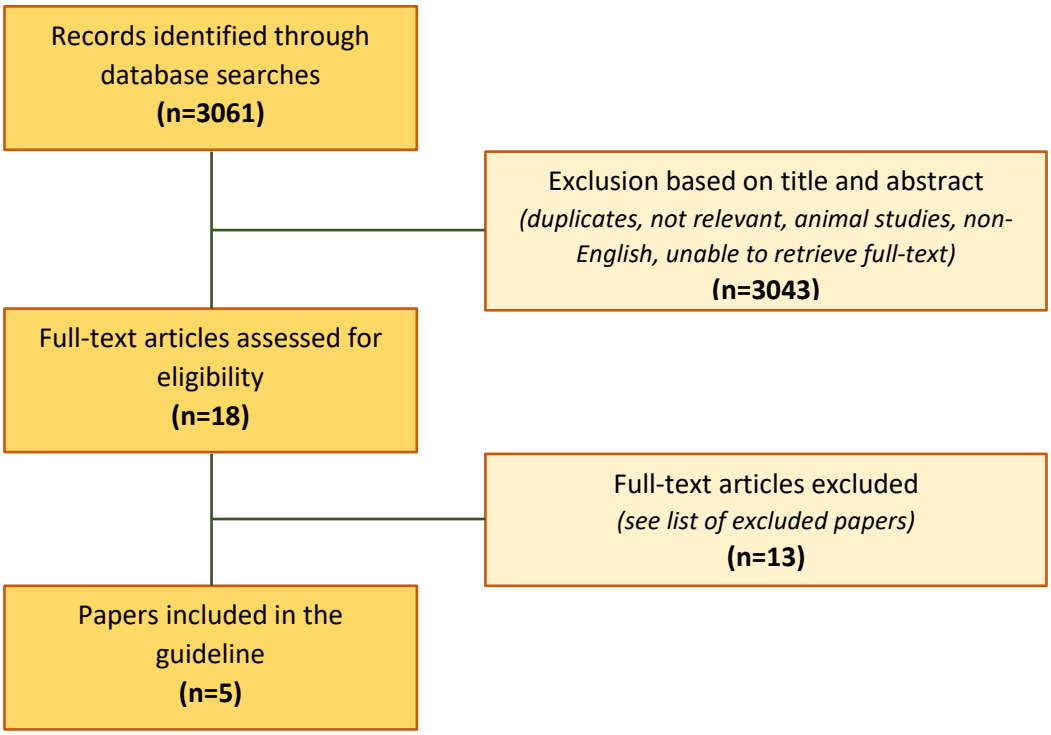
Lenton, E., Soltan, A., Hewitt, J., Thomson, A., Davies, W., Ashraf, N., Sharma, V., Jenner, L., Ledger, W. and McVeigh, E. Induction of ovulation in women undergoing assisted reproductive techniques: recombinant human FSH (follitropin alpha) versus highly purified urinary FSH (urofollitropin HP). Hum Reprod. 2000; 15 (5): 1021-7.	Included in meta-analysis: van Wely 2011
Levi-Setti, P. E., Cavagna, M. and Bulletti, C. Recombinant gonadotrophins associated with GnRH antagonist (cetrorelix) in ovarian stimulation for ICSI: comparison of r-FSH alone and in combination with r-LH. Eur J Obstet Gynecol Reprod Biol. 2006; 126 (2): 212-6.	Included in meta-analysis: Mochtar 2017
Lisi, F., Caserta, D., Montanino, M., Berlinghieri, V., Bielli, W., Carfagna, P., Carra, M. C., Costantino, A., Lisi, R., Poverini, R., Ciardo, F., Rago, R., Marci, R. and Moscarini, M. Recombinant luteinizing hormone priming in multiple follicular stimulation for in-vitro fertilization in downregulated patients. Gynecol Endocrinol. 2012; 28 (9): 674-7.	Included in meta-analysis: Mochtar 2017
Lisi, F., Rinaldi, L., Fishel, S., Lisi, R., Pepe, G. P., Picconeri, M. G. and Campbell, A. Use of recombinant LH in a group of unselected IVF patients. Reprod Biomed Online. 2002; 5 (2): 104-8.	Pseudo-randomized trial
Liu, X., Hao, C. and Wang, J. Efficacy of Highly Purified Urinary FSH versus Recombinant FSH in Chinese Women over 37 Years Undergoing Assisted Reproductive Techniques. Int J Fertil Steril. 2015; 8 (4): 385-92.	Co-admnistration of LH in both arms
Mahmoud Youssef, M. A., van Wely, M., Aboulfoutouh, I., El-Khyat, W., van der Veen, F. and Al-Inany, H. Is there a place for corifollitropin alfa in IVF/ICSI cycles? A systematic review and meta-analysis. Fertil Steril. 2012; 97 (4): 876-85.	Replaced by a more recent meta-analysis: Griesinger 2016
Marrs, R., Meldrum, D., Muasher, S., Schoolcraft, W., Werlin, L. and Kelly, E. Randomized trial to compare the effect of recombinant human FSH (follitropin alfa) with or without recombinant human LH in women undergoing assisted reproduction treatment. Reprod Biomed Online. 2004; 8 (2): 175-82.	Included in meta-analysis: Mochtar 2017
Meden-Vrtovec, H., Mocnik-Roznik, S., Tomazevic, T. and Virant-Klun, I. Recombinant FSH vs. urinary FSH for ovarian stimulation in in vitro fertilization. J Reprod Med. 2003; 48 (10): 799-803.	Included in meta-analysis: van Wely 2011
Melo, M., Bellver, J., Garrido, N., Meseguer, M., Pellicer, A. and Remohi, J. A prospective, randomized, controlled trial comparing three different gonadotropin regimens in oocyte donors: ovarian response, in vitro fertilization outcome, and analysis of cost minimization. Fertil Steril. 2010; 94 (3): 958-64.	Donor study
Mohsen, I. A. and El Din, R. E. Minimal stimulation protocol using letrozole versus microdose flare up GnRH agonist protocol in women with poor ovarian response undergoing ICSI. Gynecol Endocrinol. 2013; 29 (2): 105-8.	Different LH suppression and different dose of hMG I both groups
Musters, A. M., van Wely, M., Mastenbroek, S., Kaaijk, E. M., Repping, S., van der Veen, F. and Mochtar, M. H. The effect of recombinant LH on embryo quality: a randomized controlled trial in women with poor ovarian reserve. Hum Reprod. 2012; 27 (1): 244-50.	Included in meta-analysis: Mochtar 2017
Nakagawa, K, Ohgi, S, Kojima, R, Sugawara, K, Horikawa, T, Ito, M, Irahara, M and Saito, H. Recombinant-follicle stimulating hormone is more effective than urinary human menopausal gonadotropin in ovarian hyperstimulation for assisted reproductive technology treatment. Reproductive Medicine and Biology. 2007; 6 (1): 27-32.	Pseudo-randomized study
Nardo, Lg, Bellanca, Sa, Messina, K and Nardo, F. Efficacy of recombinant follicle stimulating hormone versus urinary follicle stimulating hormone in in-vitro fertilization: a prospective, randomized, assessor-blind study. Italian Journal of Gynaecology and Obstetrics. 2000; 12 (2): 49-53.	Included in meta-analysis: van Wely 2011
NyboeAndersen, A., Humaidan, P., Fried, G., Hausken, J., Antila, L., Bangsboll, S., Rasmussen, P. E., Lindenberg, S., Bredkjaer, H. E. and Meinertz, H. Recombinant LH supplementation to recombinant FSH during the final days of controlled ovarian stimulation for in vitro fertilization. A multicentre, prospective, randomized, controlled trial. Hum Reprod. 2008; 23 (2): 427-34.	Included in meta-analysis: Mochtar 2017

Oliveira, J. B., Mauri, A. L., Petersen, C. G., Martins, A. M., Cornicelli, J., Cavanha, M., Pontes, A., Baruffi, R. L. and Franco, J. G., Jr. Recombinant luteinizing hormone supplementation to recombinant follicle-stimulation hormone during induced ovarian stimulation in the GnRH-agonist protocol: a meta-analysis. J Assist Reprod Genet. 2007; 24 (2-3): 67-75.	Replaced by a more recent meta-analysis: Mochtar 2017
Ozmen, B, Sönmezer, M, Atabekoglu, Cs and Olmus, H. Use of aromatase inhibitors in poor-responder patients receiving GnRH antagonist protocols. Reprod biomed online. 2009; 19 (4): 478-85.	Different FSH protocol in both arms
Parinaud, J, Grandjean, H, Sarramon, Mf, Reme, Jm, Monrozies, X, Sarrazin, C and Pontonnier, G. Choice of an ovarian stimulation protocol according to the follicular puncture method in an in vitro fertilization programme. Eur j obstet gynecol reprod biol. 1987; 24 (4): 285-92.	Old study
Platteau, P., Nyboe Andersen, A., Loft, A., Smitz, J., Danglas, P. and Devroey, P. Highly purified HMG versus recombinant FSH for ovarian stimulation in IVF cycles. Reprod Biomed Online. 2008; 17 (2): 190-8.	Replaced by a more recent meta-analysis: van Wely 2011
Pouwer, A. W., Farquhar, C. and Kremer, J. A. Long-acting FSH versus daily FSH for women undergoing assisted reproduction. Cochrane Database Syst Rev. 2015; 14(7): Cd009577.	Includes studies with doses of CA that are not being used in the market
Razi, M. H., Mohseni, F., Dehghani Firouzabadi, R., Janati, S., Yari, N. and Etebary, S. Results from adding recombinant LH for assisted reproductive technology treatment: A randomized control trial. Iran J Reprod Med. 2014; 12 (2): 111-6	Included in meta-analysis: Mochtar 2017
Schats, R., Sutter, P. D., Bassil, S., Kremer, J. A., Tournaye, H. and Donnez, J. Ovarian stimulation during assisted reproduction treatment: a comparison of recombinant and highly purified urinary human FSH. On behalf of The Feronia and Apis study group. Hum Reprod. 2000; 15 (8): 1691-7.	Included in meta-analysis: van Wely 2011
Schimberni, M., Ciardo, F., Schimberni, M., Giallonardo, A., De Pratti, V. and Sbracia, M. Short gonadotropin-releasing hormone agonist versus flexible antagonist versus clomiphene citrate regimens in poor responders undergoing in vitro fertilization: a randomized controlled trial. Eur Rev Med Pharmacol Sci. 2016; 20 (20): 4354-4361.	The authors clearly mention that only rFSH was used for stimulation but in the tables, there is a row for IU of LH added
Selman, H. A., De Santo, M., Sterzik, K., Coccia, E. and El-Danasouri, I. Effect of highly purified urinary follicle-stimulating hormone on oocyte and embryo quality. Fertil Steril. 2002; 78 (5): 1061-7.	Included in meta-analysis: van Wely 2011
Sills, E. S., Levy, D. P., Moomjy, M., McGee, M. and Rosenwaks, Z. A prospective, randomized comparison of ovulation induction using highly purified follicle-stimulating hormone alone and with recombinant human luteinizing hormone in in-vitro fertilization. Hum Reprod. 1999; 14 (9): 2230-5.	Excluded from meta-analysis Mochtar 2017
Soderstrom-Anttila, V., Foudila, T. and Hovatta, O. A randomized comparative study of highly purified follicle stimulating hormone and human menopausal gonadotrophin for ovarian hyperstimulation in an oocyte donation programme. Hum Reprod. 1996; 11 (9): 1864-70.	Donor study
Song, Y., Li, Z., Wu, X., Wang, X., Xiao, J. and Wang, B. Effectiveness of the antagonist/letrozole protocol for treating poor responders undergoing in vitro fertilization/intracytoplasmic sperm injection: a systematic review and meta-analysis. Gynecol Endocrinol. 2014; 30 (5): 330-4.	Different GnRH analogues are used in the two arms compared in each of the RCTs included
Song, D., Shi, Y., Zhong, Y., Meng, Q., Hou, S. and Li, H. Efficiency of mild ovarian stimulation with clomiphene on poor ovarian responders during IVF\ICSI procedures: a meta-analysis. Eur J Obstet Gynecol Reprod Biol. 2016; 204 36-43.	In 3 out of 4 studies included, CC is used with GnRH antagonists and in the gonadotrophin only arm GnRH agonist is used. Moreover, in the

	study by Ragni in the CC arm no gonadotrophins are used.
Strehler, E., Abt, M., El-Danasouri, I., De Santo, M. and Sterzik, K. Impact of recombinant follicle-stimulating hormone and human menopausal gonadotropins on in vitro fertilization outcome. Fertil Steril. 2001; 75 (2): 332-6.	Included in meta-analysis: van Wely 2011
Tarlatzis, B., Tavmergen, E., Szamatowicz, M., Barash, A., Amit, A., Levitas, E. and Shoham, Z. The use of recombinant human LH (lutropin alfa) in the late stimulation phase of assisted reproduction cycles: a double-blind, randomized, prospective study. Hum Reprod. 2006; 21 (1): 90-4.	Included in meta-analysis: Mochtar 2017
Vuong, T. N., Phung, H. T. and Ho, M. T. Recombinant follicle-stimulating hormone and recombinant luteinizing hormone versus recombinant follicle-stimulating hormone alone during GnRH antagonist ovarian stimulation in patients aged ≥35 years: a randomized controlled trial. Hum Reprod. 2015; 30 (5): 1188-95.	Included in meta-analysis: Mochtar 2017
Yang, T. S., Wang, B. C., Chang, S. P. and Ng, H. T. Comparison of human menopausal gonadotropin and follicle-stimulating hormone with gonadotropin-releasing hormone agonist desensitization for controlled ovarian hyperstimulation in in vitro fertilization. Zhonghua Yi Xue Za Zhi (Taipei). 1995; 55 (6): 452-6.	Included in meta-analysis
Younis, J. S., Izhaki, I. and Ben-Ami, M. The effect of LH supplementation to the GnRH antagonist protocol in advanced reproductive ageing women: a prospective randomized controlled study. Clin Endocrinol (Oxf). 2016; 84 (1): 99-106.	Included in meta-analysis: Mochtar 2017 as an abstract with the same numbers as the full publication
Ziebe, S., Lundin, K., Janssens, R., Helmgaard, L. and Arce, J. C. Influence of ovarian stimulation with HP-hMG or recombinant FSH on embryo quality parameters in patients undergoing IVF. Hum Reprod. 2007; 22 (9): 2404-13.	Included in meta-analysis: van Wely 2011

7. Adjustment of gonadotropin dose

Flowchart

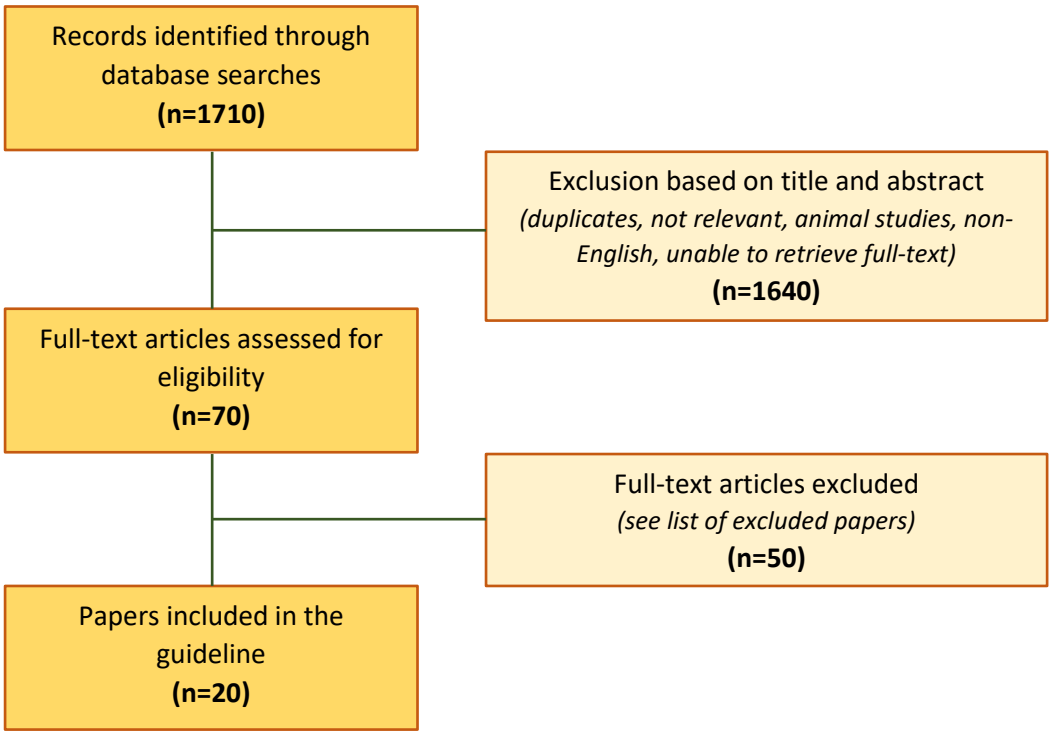


List of excluded papers

	Exclusion criterion
Anckaert, E., Smitz, J., Schiettecatte, J., Klein, B. M. and Arce, J. C. The value of anti-Mullerian hormone measurement in the long GnRH agonist protocol: association with ovarian response and gonadotrophin-dose adjustments. Hum Reprod. 2012; 27 (6): 1829-39.	Gonadotropin dose adjustment was not the research question.
Barker, M. A., Christianson, M. S., Schouweiler, C. M. and Lindheim, S. R. Clinical outcomes using a flexible regimen of GnRH-antagonists and a 'step-up' of additional gonadotropins in donor oocyte cycles. Curr Med Res Opin. 2007; 23 (9): 2297-302.	No information regarding the FSH dose adjustment in poor responders.
Dorn, C. FSH: what is the highest dose for ovarian stimulation that makes sense on an evidence-based level? Reprod Biomed Online. 2005; 11 (5): 555-61.	Only 1 study in this SR concerns dose adjustment.
Fauser, B. C., Donderwinkel, P. and Schoot, D. C. The step-down principle in gonadotrophin treatment and the role of GnRH analogues. Baillieres Clin Obstet Gynaecol. 1993; 7 (2): 309-30.	FSH dose was not adjusted during stimulation.
Haas, J., Zilberberg, E., Machtinger, R., Kedem, A., Hourvitz, A. and Orvieto, R. Do poor-responder patients benefit from increasing the daily gonadotropin dose during controlled ovarian hyperstimulation for IVF? Gynecol Endocrinol. 2015; 31 (1): 79-82.	Gonadotropin dose was not adjusted during stimulation.
Lauritsen, M. P., Loft, A., Pinborg, A., la Cour Freiesleben, N., Cohen, A., Petersen, J. H., Mikkelsen, A. L., Bjerge, M. R. and Nyboe Andersen, A. Individualised gonadotrophin ovulation induction in women with normogonadotrophic anovulatory infertility: A prospective, observational study. Eur J Obstet Gynecol Reprod Biol. 2016; 210 76-82.	Gonadotropin dose was not adjusted during stimulation.
Mahutte, N. G. and Arici, A. Poor responders: does the protocol make a difference? Curr Opin Obstet Gynecol. 2002; 14 (3): 275-81.	Gonadotropin dose was not adjusted during stimulation.
Olivennes, F., Howles, C. M., Borini, A., Germond, M., Trew, G., Wikland, M., Zegers-Hochschild, F., Saunders, H. and Alam, V. Individualizing FSH dose for assisted reproduction using a novel algorithm: the CONSORT study. Reprod Biomed Online. 2009; 18 (2): 195-204.	Gonadotropin dose was not adjusted during stimulation.
Pal, L., Jindal, S., Witt, B. R. and Santoro, N. Less is more: increased gonadotropin use for ovarian stimulation adversely influences clinical pregnancy and live birth after in vitro fertilization. Fertil Steril. 2008; 89 (6): 1694-701.	The study is dealing with the effect of higher but not increasingly adjusted gonadotropin levels.
Popovic-Todorovic, B., Loft, A., Bredkjaeer, H. E., Bangsboll, S., Nielsen, I. K. and Andersen, A. N. A prospective randomized clinical trial comparing an individual dose of recombinant FSH based on predictive factors versus a 'standard' dose of 150 IU/day in 'standard' patients undergoing IVF/ICSI treatment. Hum Reprod. 2003; 18 (11): 2275-82.	FSH dose was not adjusted during stimulation.
Simon, C., Garcia Velasco, J. J., Valbuena, D., Peinado, J. A., Moreno, C., Remohi, J. and Pellicer, A. Increasing uterine receptivity by decreasing estradiol levels during the preimplantation period in high responders with the use of a follicle-stimulating hormone step-down regimen. Fertil Steril. 1998; 70 (2): 234-9.	No outcome data are reported in patients with adjusted FSH dosage.
van Tilborg, T. C., Broekmans, F. J., Dolleman, M., Eijkemans, M. J., Mol, B. W., Laven, J. S. and Torrance, H. L. Individualized follicle-stimulating hormone dosing and in vitro fertilization outcome in agonist downregulated cycles: a systematic review. Acta Obstet Gynecol Scand. 2016; 95 (12): 1333-1344.	FSH dose was not adjusted during stimulation.
Yovich, J. L., Alsbjerg, B., Conceicao, J. L., Hinchliffe, P. M. and Keane, K. N. PIVET rFSH dosing algorithms for individualized controlled ovarian stimulation enables optimized pregnancy productivity rates and avoidance of ovarian hyperstimulation syndrome. Drug Des Devel Ther. 2016; 10 2561-73.	FSH dose was not adjusted during stimulation.

8. Adjuvant therapies

Flowchart



List of excluded papers

	Exclusion criterion
Artini PG, Simi G, Ruggiero M, Pinelli S, Di Berardino OM, Papini F, Papini S, Monteleone P, Cela V. DHEA supplementation improves follicular microenviroment in poor responder patients. Gynecol Endocrinol. 2012; 28(9):669-73.	Included in meta-analysis Nagels 2015
Bayoumi, Y. A., Dakhly, D. M., Bassiouny, Y. A. and Hashish, N. M. Addition of growth hormone to the microflare stimulation protocol among women with poor ovarian response. Int J Gynaecol Obstet. 2015; 131 (3): 305-8.	Included in meta-analysis Li 2017
Blumenfeld, Z., Amit, T., Barkey, R. J., Lunenfeld, B. and Brandes, J. M. Synergistic effect of growth hormone and gonadotropins in achieving conception in "clonidine-negative" patients with unexplained infertility. Ann N Y Acad Sci. 1991; 626 250-65.	Randomized cross-over trial; small number of patients.
Blumenfeld, Z. and Amit, T. The role of growth hormone in ovulation induction. Ann Med. 1994; 26 (4): 249-54.	Randomized cross-over trial
Blumenfeld, Z., Dirnfeld, M., Gonen, Y. and Abramovici, H. Growth hormone co-treatment for ovulation induction may enhance conception in the co-treatment and succeeding cycles, in clonidine negative but not clonidine positive patients. Hum Reprod. 1994; 9 (2): 209-13.	Randomized cross-over trial
Blumenfeld, Z. and Amit, T. The role of growth hormone (GH), GH-receptor and GH-binding protein in reproduction and ovulation induction. J Pediatr Endocrinol Metab. 1996; 9 (2): 145-62.	Randomized cross-over trial.
Bosdou, J. K., Venetis, C. A., Kolibianakis, E. M., Toulis, K. A., Goulis, D. G., Zepiridis, L. and Tarlatzis, B. C. The use of androgens or androgen-modulating agents in poor responders undergoing in vitro fertilization: a systematic review and meta-analysis. Hum Reprod Update. 2012; 18 (2): 127-45.	Replaced by a more recent meta-analysis: Nagels 2015
Costello, M. F., Chapman, M. and Conway, U. A systematic review and meta-analysis of randomized controlled trials on metformin co-administration during gonadotrophin ovulation induction or IVF in women with polycystic ovary syndrome. Hum Reprod. 2006; 21 (6): 1387-99.	Replaced by a more recent meta-analysis: Tso (2014)
Dentali, F., Ageno, W., Rezoagli, E., Rancan, E., Squizzato, A., Middeldorp, S., Margaglione, M. and Grandone, E. Low-dose aspirin for in vitro fertilization or intracytoplasmic sperm injection: a systematic review and a meta-analysis of the literature. J Thromb Haemost. 2012; 10 (10): 2075-85.	The meta-analysis included studies that did not use aspirin during stimulation for all outcomes.
Doan, H. T., Quan, L. H. and Nguyen, T. T. The effectiveness of transdermal testosterone gel 1% (androgel) for poor responders undergoing in vitro fertilization. Gynecol Endocrinol. 2017; 1-3.	Unclear study design
Doldi, N., Persico, P., Di Sebastiano, F., Marsiglio, E. and Ferrari, A. Gonadotropin-releasing hormone antagonist and metformin for treatment of polycystic ovary syndrome patients undergoing in vitro fertilization-embryo transfer. Gynecol Endocrinol. 2006; 22 (5): 235-8.	Included in meta-analysis Tso 2014
Dor, J., Seidman, D. S., Amudai, E., Bider, D., Levran, D. and Mashiach, S. Adjuvant growth hormone therapy in poor responders to in-vitro fertilization: a prospective randomized placebo-controlled double-blind study. Hum Reprod. 1995; 10 (1): 40-3.	Included in meta-analysis Li 2017
Eftekhar, M., Aflatoonian, A., Mohammadian, F. and Eftekhar, T. Adjuvant growth hormone therapy in antagonist protocol in poor responders undergoing assisted reproductive technology. Arch Gynecol Obstet. 2013; 287 (5): 1017-21.	Included in meta-analysis Li 2017
Fabregues, F., Penarrubia, J., Creus, M., Manau, D., Casals, G., Carmona, F. and Balasch, J. Hum Reprod. 2009; 24 (2): 349-59. (19054777)	Included in meta-analysis Nagels 2015
Fedorcsak, P., Dale, P. O., Storeng, R., Abyholm, T. and Tanbo, T. The effect of metformin on ovarian stimulation and in vitro fertilization in insulin-resistant	Randomized cross-over trial

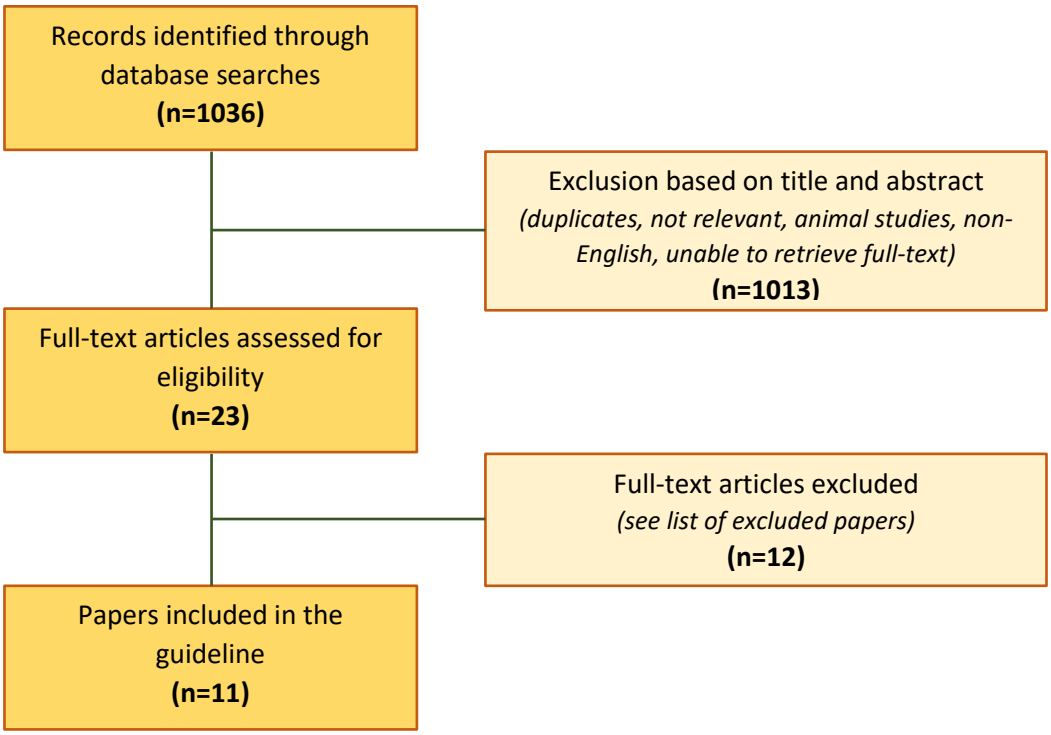
women with polycystic ovary syndrome: an open-label randomized cross-over trial. Gynecol Endocrinol. 2003; 17 (3): 207-14.	
Gelbaya, T. A., Kyrgiou, M., Li, T. C., Stern, C. and Nardo, L. G. Low-dose aspirin for in vitro fertilization: a systematic review and meta-analysis. Hum Reprod Update. 2007; 13 (4): 357-64.	Meta-analysis included studies starting aspiring both during ovarian stimulation and at embryo transfer
Groeneveld, E., Broeze, K. A., Lambers, M. J., Haapsamo, M., Dirckx, K., Schoot, B. C., Salle, B., Duvan, C. I., Schats, R., Mol, B. W. and Hompes, P. G. Is aspirin effective in women undergoing in vitro fertilization (IVF)? Results from an individual patient data meta-analysis (IPD MA). Hum Reprod Update. 2011; 17 (4): 501-9.	No separate subgroup analysis. No pooled analyses for ovarian stimulation and response related outcomes
Groeneveld, E., Lambers, M. J., Lambalk, C. B., Broeze, K. A., Haapsamo, M., de Sutter, P., Schoot, B. C., Schats, R., Mol, B. W. and Hompes, P. G. Preconceptional low-dose aspirin for the prevention of hypertensive pregnancy complications and preterm delivery after IVF: a meta-analysis with individual patient data. Hum Reprod. 2013; 28 (6): 1480-8.	No separate subgroup analysis. No pooled analyses for ovarian stimulation and response related outcomes
Guo, J. L., Zhang, D. D., Zhao, Y., Zhang, D., Zhang, X. M., Zhou, C. Q. and Yao, S. Z. Pharmacologic Interventions in Preventing Ovarian Hyperstimulation Syndrome: A Systematic Review and Network Meta-Analysis. Sci Rep. 2016; 6 19093.	Meta-analysis includes a study which had a co-intervention of prednisolone in addition to aspirin
Haapsamo, M., Martikainen, H. and Rasanen, J. Low-dose aspirin and uterine haemodynamics on the day of embryo transfer in women undergoing IVF/ICSI: a randomized, placebo-controlled, double-blind study. Hum Reprod. 2009; 24 (4): 861-6.	Unclear from full text whether there is overlap of participants with 2010 study.
Haapsamo, M., Martikainen, H., Tinkanen, H., Heinonen, S., Nuojua-Huttunen, S. and Rasanen, J. Low-dose aspirin therapy and hypertensive pregnancy complications in unselected IVF and ICSI patients: a randomized, placebo-controlled, double-blind study. Hum Reprod. 2010; 25 (12): 2972-7.	Included in meta-analysis Siristatidis 2016
Hart, R. J., Rombauts, L. and Norman, R. J. Growth hormone in IVF cycles: any hope? Curr Opin Obstet Gynecol. 2017; 29 (3): 119-125.	Replaced by a higher quality meta-analysis: Li 2017
Jeve, Y. B. and Bhandari, H. M. Effective treatment protocol for poor ovarian response: A systematic review and meta-analysis. J Hum Reprod Sci. 2016; 9 (2): 70-81.	Replaced by a higher quality meta-analysis: Li 2015
Jinno, M., Kondou, K. and Teruya, K. Low-dose metformin improves pregnancy rate in in vitro fertilization repeaters without polycystic ovary syndrome: prediction of effectiveness by multiple parameters related to insulin resistance. Hormones (Athens). 2010; 9 (2): 161-70.	Results were presented stratified by discriminant score
Kara, M., Aydin, T., Aran, T., Turktekin, N. and Ozdemir, B. Does dehydroepiandrosterone supplementation really affect IVF-ICSI outcome in women with poor ovarian reserve? Eur J Obstet Gynecol Reprod Biol. 2014; 173 63-5.	Included in meta-analysis Nagels 2015
Khairy, M., Banerjee, K., El-Toukhy, T., Coomarasamy, A. and Khalaf, Y. Aspirin in women undergoing in vitro fertilization treatment: a systematic review and meta-analysis. Fertil Steril. 2007; 88 (4): 822-31.	No separate subgroup analysis. No pooled analyses for ovarian stimulation and response related outcomes.
Kim, C. H., Howles, C. M. and Lee, H. A. The effect of transdermal testosterone gel pretreatment on controlled ovarian stimulation and IVF outcome in low responders. Fertil Steril. 2011; 95 (2): 679-83.	Included in meta-analysis Nagels 2015
Kolibianakis, E. M., Venetis, C. A., Diedrich, K., Tarlatzis, B. C. and Griesinger, G. Addition of growth hormone to gonadotrophins in ovarian stimulation of poor responders treated by in-vitro fertilization: a systematic review and meta-analysis. Hum Reprod Update. 2009; 15 (6): 613-22.	Replaced by a more recent meta-analysis: Li 2017

Kucuk, T., Kozinoglu, H. and Kaba, A. Growth hormone co-treatment within a GnRH agonist long protocol in patients with poor ovarian response: a prospective, randomized, clinical trial. J Assist Reprod Genet. 2008; 25 (4): 123-7.	Included in meta-analysis Li 2017
Kumbasar, S., Gul, O. and Sik, A. Evaluation of the effect of indomethacin and piroxicam administration before embryo transfer on pregnancy rate. Journal of obstetrics and gynaecology research. 2017; (no pagination)	Intervention administered 1-2 hours before embryo transfer
Kyrou, D., Kolibianakis, E. M., Venetis, C. A., Papanikolaou, E. G., Bontis, J. and Tarlatzis, B. C. How to improve the probability of pregnancy in poor responders undergoing in vitro fertilization: a systematic review and meta-analysis. Fertil Steril. 2009; 91 (3): 749-66.	Replaced by a more recent meta-analysis: Li 2017
Narkwichean, A., Maalouf, W., Campbell, B. K. and Jayaprakasan, K. Efficacy of dehydroepiandrosterone to improve ovarian response in women with diminished ovarian reserve: a meta-analysis. Reprod Biol Endocrinol. 2013; 11 44.	The pooled-analyses included 3 studies of which two are case control studies.
Owen, E. J., Shoham, Z., Mason, B. A., Ostergaard, H. and Jacobs, H. S. Cotreatment with growth hormone, after pituitary suppression, for ovarian stimulation in in vitro fertilization: a randomized, double-blind, placebo-control trial. Fertil Steril. 1991; 56 (6): 1104-10. (1743329)	Included in meta-analysis Li 2017
Palomba, S., Falbo, A., Carrillo, L., Villani, M. T., Orio, F., Russo, T., Di Cello, A., Cappiello, F., Capasso, S., Tolino, A., Colao, A., Mastrantonio, P., La Sala, G. B., Zullo, F. and Cittadini, E. Metformin reduces risk of ovarian hyperstimulation syndrome in patients with polycystic ovary syndrome during gonadotropin-stimulated in vitro fertilization cycles: a randomized, controlled trial. Fertil Steril. 2011; 96 (6): 1384-1390.e4. (21982727)	Included in meta-analysis Tso 2014
Palomba, S., Falbo, A., Di Cello, A., Cappiello, F., Tolino, A. and Zullo, F. Does metformin affect the ovarian response to gonadotropins for in vitro fertilization treatment in patients with polycystic ovary syndrome and reduced ovarian reserve? A randomized controlled trial. Fertil Steril. 2011; 96 (5): 1128-33. (21917254)	Excluded from meta-analysis Tso 2014 because of study population
Poustie, V. J., Dodd, S. and Drakeley, A. J. Low-dose aspirin for in vitro fertilisation. Cochrane Database Syst Rev. 2007; (4): Cd004832.	No separate subgroup analysis. No pooled analyses for ovarian stimulation and response related outcomes.
Qublan, H. S., Al-Khaderei, S., Abu-Salem, A. N., Al-Zpoon, A., Al-Khateeb, M., Al-Ibrahim, N., Megdadi, M. and Al-Ahmad, N. Metformin in the treatment of clomiphene citrate-resistant women with polycystic ovary syndrome undergoing in vitro fertilisation treatment: a randomised controlled trial. J Obstet Gynaecol. 2009; 29 (7): 651-5.	Included in meta-analysis Tso 2014
Ruopp, M. D., Collins, T. C., Whitcomb, B. W. and Schisterman, E. F. Evidence of absence or absence of evidence? A reanalysis of the effects of low-dose aspirin in in vitro fertilization. Fertil Steril. 2008; 90 (1): 71-6.	No separate subgroup analysis. No pooled analyses for ovarian stimulation and response related outcomes.
Suikkari, A., MacLachlan, V., Koistinen, R., Seppala, M. and Healy, D. Double-blind placebo controlled study: human biosynthetic growth hormone for assisted reproductive technology. Fertil Steril. 1996; 65 (4): 800-5.	Included in meta-analysis Li 2017
Sunkara, S. K., Pundir, J. and Khalaf, Y. Effect of androgen supplementation or modulation on ovarian stimulation outcome in poor responders: a meta-analysis. Reprod Biomed Online. 2011; 22 (6): 545-55.	The pooled-analyses included studies of DHEA and testosterone supplementation.
Tang, T., Glanville, J., Orsi, N., Barth, J. H. and Balen, A. H. The use of metformin for women with PCOS undergoing IVF treatment. Hum Reprod. 2006; 21 (6): 1416-25.	Included in meta-analysis Tso 2014

Tartagni, M., Cicinelli, M. V., Baldini, D., Tartagni, M. V., Alrasheed, H., DeSalvia, M. A., Loverro, G. and Montagnani, M. Dehydroepiandrosterone decreases the age-related decline of the in vitro fertilization outcome in women younger than 40 years old. Reprod Biol Endocrinol. 2015; 13 18.	Included in meta-analysis Nagels 2015
Tesarik, J., Hazout, A. and Mendoza, C. Improvement of delivery and live birth rates after ICSI in women aged >40 years by ovarian co-stimulation with growth hormone. Hum Reprod. 2005; 20 (9): 2536-41.	Included in meta-analysis Li 2017
Urman, B., Mercan, R., Alatas, C., Balaban, B., Isiklar, A. and Nuhoglu, A. Low-dose aspirin does not increase implantation rates in patients undergoing intracytoplasmic sperm injection: a prospective randomized study. J Assist Reprod Genet. 2000; 17 (10): 586-90.	Co-intervention methylprednisolone for 5 days after oocyte retrieval in both arms in addition to aspirin in the study arm.
Varnagy, A., Bodis, J., Manfai, Z., Wilhelm, F., Busznyak, C. and Koppan, M. Low-dose aspirin therapy to prevent ovarian hyperstimulation syndrome. Fertil Steril. 2010; 93 (7): 2281-4. (19261278)	Quasi-randomized study.
Wiser, A., Gonen, O., Ghetler, Y., Shavit, T., Berkovitz, A. and Shulman, A. Addition of dehydroepiandrosterone (DHEA) for poor-responder patients before and during IVF treatment improves the pregnancy rate: a randomized prospective study. Hum Reprod. 2010; 25 (10): 2496-500.	Included in meta-analysis Nagels 2015
Yeung, T. W., Chai, J., Li, R. H., Lee, V. C., Ho, P. C. and Ng, E. H. A randomized, controlled, pilot trial on the effect of dehydroepiandrosterone on ovarian response markers, ovarian response, and in vitro fertilization outcomes in poor responders. Fertil Steril. 2014; 102 (1): 108-115.e1.	Included in meta-analysis Nagels 2015
Younis, J. S., Simon, A., Koren, R., Dorembus, D., Schenker, J. G. and Laufer, N. The effect of growth hormone supplementation on in vitro fertilization outcome: a prospective randomized placebo-controlled double-blind study. Fertil Steril. 1992; 58 (3): 575-80.	Included in meta-analysis Li 2017
Zhang, M., Niu, W., Wang, Y., Xu, J., Bao, X., Wang, L., Du, L. and Sun, Y. Dehydroepiandrosterone treatment in women with poor ovarian response undergoing IVF or ICSI: a systematic review and meta-analysis. J Assist Reprod Genet. 2016; 33 (8): 981-91.	Included studies were RCTs as well as self-control studies, case-control studies, prospective cohort studies.
Zhang, H. H., Xu, P. Y., Wu, J., Zou, W. W., Xu, X. M., Cao, X. Y. and Wei, L. Z. Dehydroepiandrosterone improves follicular fluid bone morphogenetic protein-15 and accumulated embryo score of infertility patients with diminished ovarian reserve undergoing in vitro fertilization: a randomized controlled trial. J Ovarian Res. 2014; 7 93.	Included in meta-analysis Nagels 2015

9. Non-conventional start of ovarian stimulation

Flowchart

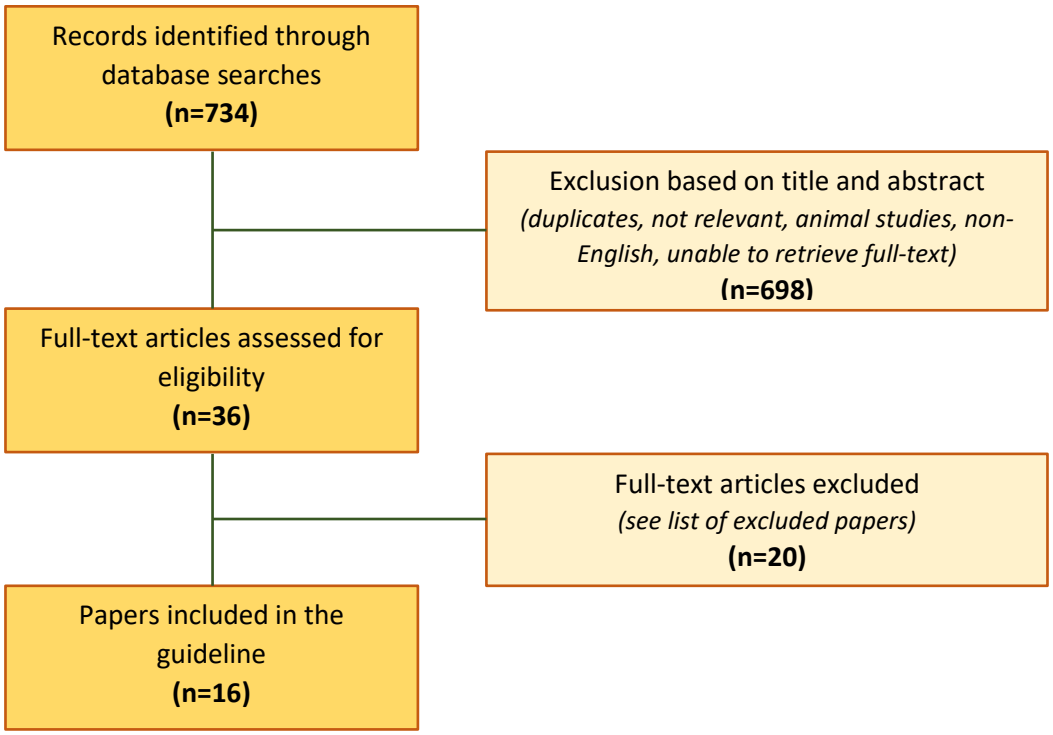


List of excluded papers

	Exclusion criterion
Buendgen, N. K., Schultze-Mosgau, A., Cordes, T., Diedrich, K. and Griesinger, G. Initiation of ovarian stimulation independent of the menstrual cycle: a case-control study. Arch Gynecol Obstet. 2013; 288 (4): 901-4.	Methodology Case-control; Very small number of patients
Cardoso, M. C. A., Evangelista, A., Sartorio, C., Vaz, G., Werneck, C. L. V., Guimaraes, F. M., Sa, P. G. and Erthal, M. C. Can ovarian double-stimulation in the same menstrual cycle improve IVF outcomes? JBRA Assist Reprod. 2017; 21 (3): 217-221.	Retrospective and small, mixed normal and poor ovarian response patients
Cimadomo, D., Vaiarelli, A., Colamaria, S., Trabucco, E., Alviggi, C., Venturella, R., Alviggi, E., Carmelo, R., Rienzi, L. and Ubaldi, F. M. Luteal phase anovulatory follicles result in the production of competent oocytes: intra-patient paired case-control study comparing follicular versus luteal phase stimulations in the same ovarian cycle. Hum Reprod. 2018; doi: 10.1093/humrep/dey217	No direct comparison with 2 cycles
Chen, H., Wang, Y., Lyu, Q., Ai, A., Fu, Y., Tian, H., Cai, R., Hong, Q., Chen, Q., Shoham, Z. and Kuang, Y. Comparison of live-birth defects after luteal-phase ovarian stimulation vs. conventional ovarian stimulation for in vitro fertilization and vitrified embryo transfer cycles. Fertil Steril. 2015; 103 (5): 1194-1201.e2.	Retrospective study, No comparison with GnRH antagonist or long GnRH agonist
Jin, B., Niu, Z., Xu, B., Chen, Q. and Zhang, A. Comparison of clinical outcomes among dual ovarian stimulation, mild stimulation and luteal phase stimulation protocols in women with poor ovarian response. Gynecol Endocrinol. 2018; 34 (8): 694-697.	Retrospective study; Other included studies also retrospective but with more patients
Li, Y., Yang, W., Chen, X., Li, L., Zhang, Q. and Yang, D. Comparison between follicular stimulation and luteal stimulation protocols with clomiphene and HMG in women with poor ovarian response. Gynecol Endocrinol. 2016; 32 (1): 74-7.	Retrospective study, high risk of bias
Lin, L. T., Vitale, S. G., Chen, S. N., Wen, Z. H., Tsai, H. W., Chern, C. U. and Tsui, K. H. Luteal Phase Ovarian Stimulation May Improve Oocyte Retrieval and Oocyte Quality in Poor Ovarian Responders Undergoing In Vitro Fertilization: Preliminary Results from a Single-Center Prospective Pilot Study. Adv Ther. 2018; 35 (6): 847-856.	Methodology: different Gonadotropin dose and regimen in both groups
Rashtian, J. and Zhang, J. Luteal-phase ovarian stimulation increases the number of mature oocytes in older women with severe diminished ovarian reserve. Syst Biol Reprod Med. 2018; 64 (3): 216-219.	No direct comparison with 2 cycles
Ubaldi, F. M., Capalbo, A., Vaiarelli, A., Cimadomo, D., Colamaria, S., Alviggi, C., Trabucco, E., Venturella, R., Vajta, G. and Rienzi, L. Follicular versus luteal phase ovarian stimulation during the same menstrual cycle (DuoStim) in a reduced ovarian reserve population results in a similar euploid blastocyst formation rate: new insight in ovarian reserve exploitation. Fertil Steril. 2016; 105 (6): 1488-1495.e1.	Replaced by Vaiarelli 2018
Vaiarelli, A., Venturella, R., Vizziello, D., Bulletti, F. and Ubaldi, F. M. Dual ovarian stimulation and random start in assisted reproductive technologies: from ovarian biology to clinical application. Curr Opin Obstet Gynecol. 2017; 29 (3): 153-159.	Replaced by Vaiarelli 2018
Wang, N., Wang, Y., Chen, Q., Dong, J., Tian, H., Fu, Y., Ai, A., Lyu, Q. and Kuang, Y. Luteal-phase ovarian stimulation vs conventional ovarian stimulation in patients with normal ovarian reserve treated for IVF: a large retrospective cohort study. Clin Endocrinol (Oxf). 2016; 84 (5): 720-8.	Retrospective study, high risk of bias
Wei, L. H., Ma, W. H., Tang, N. and Wei, J. H. Luteal-phase ovarian stimulation is a feasible method for poor ovarian responders undergoing in vitro fertilization/intracytoplasmic sperm injection-embryo transfer treatment compared to a GnRH antagonist protocol: A retrospective study. Taiwan J Obstet Gynecol. 2016; 55 (1): 50-4.	Retrospective study, mixed luteal and dual stimulation, more than 1 cycle for some patients included

10. Ovarian stimulation for fertility preservation

Flowchart



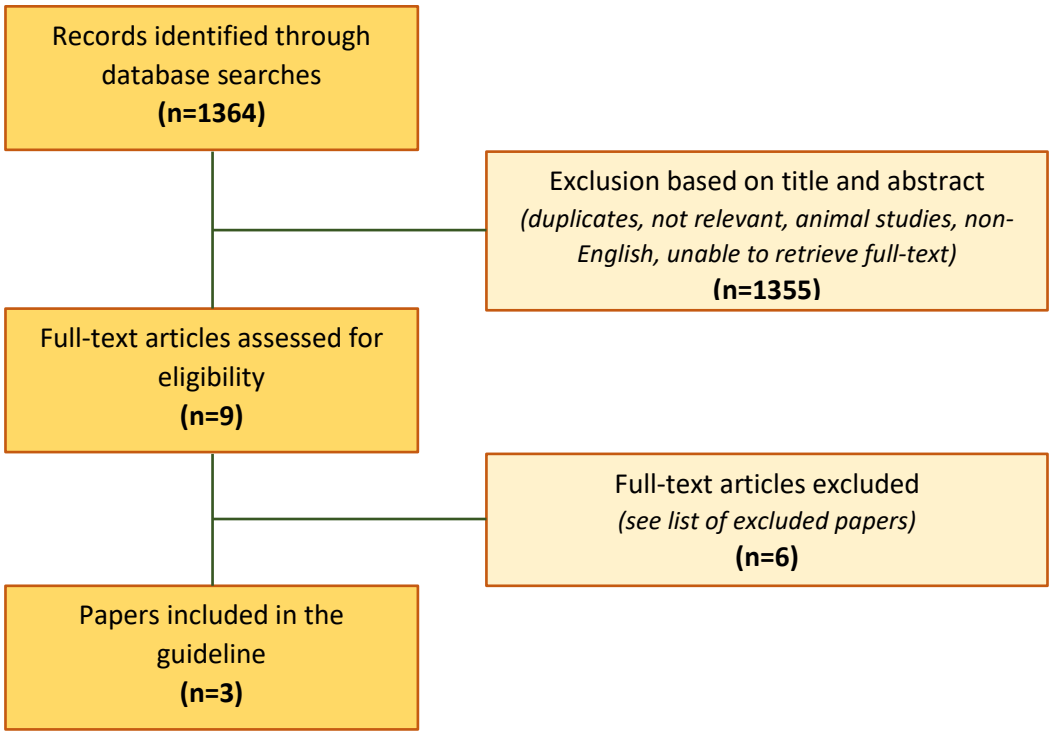
List of excluded papers

	Exclusion criterion
Azim AA, Costantini-Ferrando M, Lostritto K, Oktay K. Relative potencies of anastrozole and letrozole to suppress estradiol in breast cancer patients undergoing ovarian stimulation before in vitro fertilization. J Clin Endocrinol Metab. 2007; 92(6):2197-200.	Included in meta-analysis: Rodgers 2017
Azim AA, Costantini-Ferrando M, Oktay K. Safety of fertility preservation by ovarian stimulation with letrozole and gonadotropins in patients with breast cancer: a prospective controlled study. J Clin Oncol. 2008; 1;26(16):2630-5.	Overlapping study population with publication by Oktay 2005, which is included in the SR by Rodgers 2017
Cakmak H, Katz A, Cedars MI, Rosen MP. Effective method for emergency fertility preservation: random-start controlled ovarian stimulation. Fertil Steril. 2013; 100(6):1673-80.	Included in meta-analysis: Boots 2016
Courbiere, B., Decanter, C., Bringer-Deutsch, S., Rives, N., Mirallie, S., Pech, J. C., De Ziegler, D., Carre-Pigeon, F., May-Panloup, P., Sifer, C., Amice, V., Schweitzer, T., Porcu-Buisson, G. and Poirot, C. Emergency IVF for embryo freezing to preserve female fertility: a French multicentre cohort study. Hum Reprod. 2013; 28 (9): 2381-8.	Not a comparison between stimulation protocols
Dolmans, M. M., Marotta, M. L., Pirard, C., Donnez, J. and Donnez, O. Ovarian tissue cryopreservation followed by controlled ovarian stimulation and pick-up of mature oocytes does not impair the number or quality of retrieved oocytes. J Ovarian Res. 2014; 7 80.	Not a comparison between stimulation protocols
Dolmans, M. M., Hollanders de Ouderaen, S., Demylle, D. and Pirard, C. Utilization rates and results of long-term embryo cryopreservation before gonadotoxic treatment. J Assist Reprod Genet. 2015; 32 (8): 1233-7.	Not a comparison between stimulation protocols
Domingo J, Guillén V, Ayllón Y, Martínez M, Muñoz E, Pellicer A, Garcia-Velasco JA. Ovarian response to controlled ovarian hyperstimulation in cancer patients is diminished even before oncological treatment. Fertil Steril. 2012; 97(4):930-4.	Included in meta-analysis: Rodgers 2017
Kim, J., Turan, V. and Oktay, K. Long-Term Safety of Letrozole and Gonadotropin Stimulation for Fertility Preservation in Women With Breast Cancer.J Clin Endocrinol Metab. 2016; 101 (4): 1364-71.	Included in meta-analysis: Rodgers 2017
Lee, S. and Oktay, K. Does higher starting dose of FSH stimulation with letrozole improve fertility preservation outcomes in women with breast cancer? Fertil Steril. 2012; 98 (4): 961-4.e1.	Included in meta-analysis: Rodgers 2017
Meirow D, Raanani H, Maman E, Paluch-Shimon S, Shapira M, Cohen Y, Kuchuk I, Hourvitz A, Levron J, Mozer-Mendel M, Brengauz M, Biderman H, Manela D, Catane R, Dor J, Orvieto R, Kaufman B. Tamoxifen co-administration during controlled ovarian hyperstimulation for in vitro fertilization in breast cancer patients increases the safety of fertility-preservation treatment strategies. Fertil Steril. 2014; 102(2):488-495.e3.	Included in meta-analysis: Rodgers 2017
Oktay, K., Buyuk, E., Davis, O., Yermakova, I., Veeck, L. and Rosenwaks, Z. Fertility preservation in breast cancer patients: IVF and embryo cryopreservation after ovarian stimulation with tamoxifen. Hum Reprod. 2003; 18 (1): 90-5.	Included in meta-analysis: Rodgers 2017
Oktay, K., Buyuk, E., Libertella, N., Akar, M. and Rosenwaks, Z. Fertility preservation in breast cancer patients: a prospective controlled comparison of ovarian stimulation with tamoxifen and letrozole for embryo cryopreservation. J Clin Oncol. 2005; 23 (19): 4347-53.	Included in meta-analysis: Rodgers 2017
Oktay, K., Hourvitz, A., Sahin, G., Oktem, O., Safro, B., Cil, A. and Bang, H. Letrozole reduces estrogen and gonadotropin exposure in women with breast cancer undergoing ovarian stimulation before chemotherapy. J Clin Endocrinol Metab. 2006; 91 (10): 3885-90.	Included in meta-analysis: Rodgers 2017

Oktay, K., Turan, V., Bedoschi, G., Pacheco, F. S. and Moy, F. Fertility Preservation Success Subsequent to Concurrent Aromatase Inhibitor Treatment and Ovarian Stimulation in Women With Breast Cancer. J Clin Oncol. 2015; 33 (22): 2424-9.	No control group for the ovarian stimulation
Quinn MM, Cakmak H, Letourneau JM, Cedars MI, Rosen MP. Response to ovarian stimulation is not impacted by a breast cancer diagnosis. Hum Reprod. 2017; 32(3):568-574	No comment on COSTLES results
Quintero, R. B., Helmer, A., Huang, J. Q. and Westphal, L. M. Ovarian stimulation for fertility preservation in patients with cancer. Fertil Steril. 2010; 93 (3): 865-8.	Included in meta-analysis: Rodgers 2017
Revelli, A., Porcu, E., Levi Setti, P. E., Delle Piane, L., Merlo, D. F. and Anserini, P. Is letrozole needed for controlled ovarian stimulation in patients with estrogen receptor-positive breast cancer? Gynecol Endocrinol. 2013; 29 (11): 993-6.	Included in meta-analysis: Rodgers 2017
Simi, G., Obino, M. E., Casarosa, E., Litta, P., Artini, P. G. and Cela, V. Different stimulation protocols for oocyte cryropreservation in oncological patients: a retrospective analysis of single university centre. Gynecol Endocrinol. 2015; 31 (12): 966-70.	Poor methodology and small no of patients
Turan, V., Bedoschi, G., Moy, F. and Oktay, K. Safety and feasibility of performing two consecutive ovarian stimulation cycles with the use of letrozole-gonadotropin protocol for fertility preservation in breast cancer patients. Fertil Steril. 2013; 100 (6): 1681-5.e1.	Included in meta-analysis: Rodgers 2017
von Wolff, M., Thaler, C. J., Frambach, T., Zeeb, C., Lawrenz, B., Popovici, R. M. and Strowitzki, T. Ovarian stimulation to cryopreserve fertilized oocytes in cancer patients can be started in the luteal phase. Fertil Steril. 2009; 92 (4): 1360-5.	Included in meta-analysis: Boots 2016

11. Hormonal assessment during ovarian stimulation

Flowchart

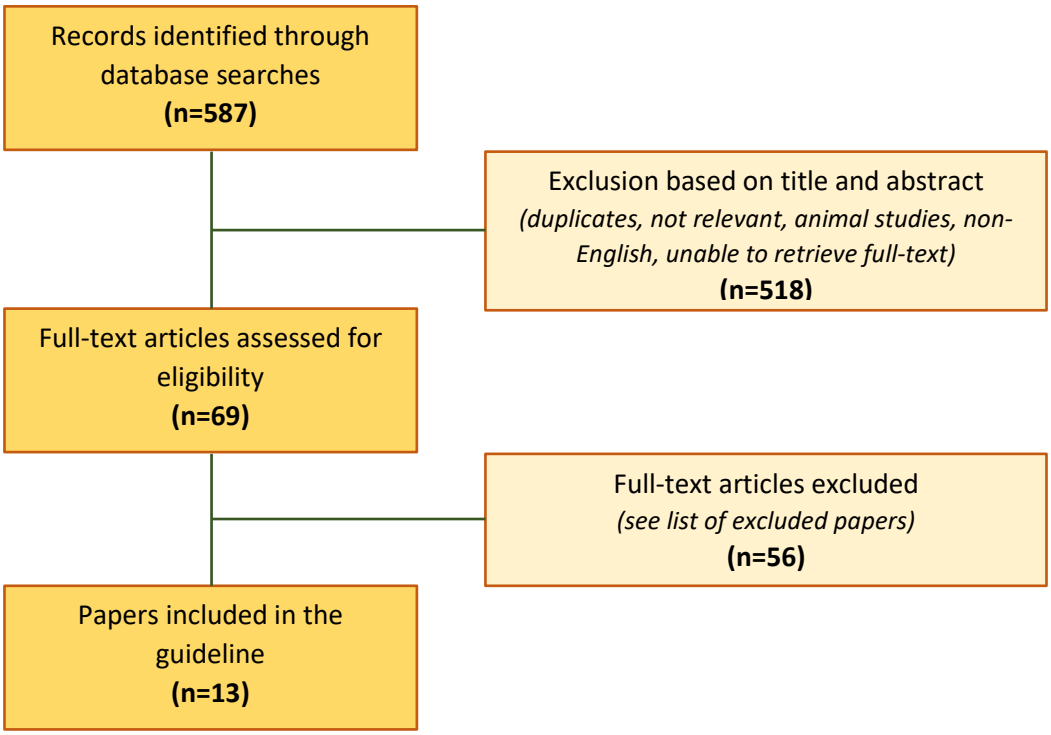


List of excluded papers

	Exclusion criterion
Aguirre SG, Hevia IG, García-Carpintero G, DelRosal Ma J. Measuring plasma estradiol levels in in vitro fertilization. Is it useful?. Revista Iberoamericana De Fertilidad y Reproduccion Humana 2010;27(1):43–9.	Included in meta-analysis: Kwan 2014
Ben-Shlomo, I., Geslevich, J. and Shalev, E. Can we abandon routine evaluation of serum estradiol levels during controlled ovarian hyperstimulation for assisted reproduction? Fertil Steril. 2001; 76 (2): 300-3.	Mistakes in the analysis (difference in COCs is significant, no adjustment for multiple cycles).
Lass, A. Monitoring of in vitro fertilization-embryo transfer cycles by ultrasound versus by ultrasound and hormonal levels: a prospective, multicenter, randomized study. Fertil Steril. 2003; 80 (1): 80-5.	Included in meta-analysis: Kwan 2014
Martins, W. P., Vieira, C. V., Teixeira, D. M., Barbosa, M. A., Dassuncao, L. A. and Nastri, C. O. Ultrasound for monitoring controlled ovarian stimulation: a systematic review and meta-analysis of randomized controlled trials. Ultrasound Obstet Gynecol. 2014; 43 (1): 25-33.	Replaced by more complete meta-analysis: Kwan 2014
Rongieres C. Monitoring ovarian stimulation: are hormonal assessments necessary?. Journal de Gynécologie, Obstétrique et Biologie de la Reproduction 2006;35:2S39–41.	Included in meta-analysis: Kwan 2014
Wikland, M., Borg, J., Hamberger, L. and Svalander, P. Simplification of IVF: minimal monitoring and the use of subcutaneous highly purified FSH administration for ovulation induction. Hum Reprod. 1994; 9 (8): 1430-6.	Inadequate analysis, no adjustments for multiple cycles or confounding variables

12. Endometrial thickness

Flowchart



List of excluded papers

	Exclusion criterion
Al-Ghamdi, A., Coskun, S., Al-Hassan, S., Al-Rejjal, R. and Awartani, K. The correlation between endometrial thickness and outcome of in vitro fertilization and embryo transfer (IVF-ET) outcome. Reprod Biol Endocrinol. 2008; 6 37.	Included in meta-analysis: Kasius 2014
Amir, W., Micha, B., Ariel, H., Liat, L. G., Jehoshua, D. and Adrian, S. Predicting factors for endometrial thickness during treatment with assisted reproductive technology. Fertil Steril. 2007; 87 (4): 799-804.	Included in meta-analysis: Kasius 2014
Baruffi, R. L., Contart, P., Mauri, A. L., Petersen, C., Felipe, V., Garbellini, E. and Franco, J. G. A uterine ultrasonographic scoring system as a method for the prognosis of embryo implantation. J Assist Reprod Genet. 2002; 19 (3): 99-102.	The comparison is biased.
Basir, G. S., O, W. S., So, W. W., Ng, E. H. and Ho, P. C. Evaluation of cycle-to-cycle variation of endometrial responsiveness using transvaginal sonography in women undergoing assisted reproduction. Ultrasound Obstet Gynecol. 2002; 19 (5): 484-9.	Included in meta-analysis: Kasius 2014
Bassil, S. Changes in endometrial thickness, width, length and pattern in predicting pregnancy outcome during ovarian stimulation in in vitro fertilization.Ultrasound Obstet Gynecol. 2001; 18 (3): 258-63.	Risk of bias due to lack of group comparability
Bohrer, M. K., Hock, D. L., Rhoads, G. G. and Kemmann, E. Sonographic assessment of endometrial pattern and thickness in patients treated with human menopausal gonadotropins. Fertil Steril. 1996; 66 (2): 244-7.	Outcomes, day of embryo transfer, and embryo number and quality not reported.
Bromer, J. G., Aldad, T. S. and Taylor, H. S. Defining the proliferative phase endometrial defect. Fertil Steril. 2009; 91 (3): 698-704.	IUI cycles were included
Chan, J. M., Sukumar, A. I., Ramalingam, M., Ranbir Singh, S. S. and Abdullah, M. F. The impact of endometrial thickness (EMT) on the day of human chorionic gonadotropin (hCG) administration on pregnancy outcomes: a 5-year retrospective cohort analysis in Malaysia. Fertil Res Pract. 2018; 4 5.	Treatment of women in both arms not the same
Check, J. H., Lurie, D., Dietterich, C., Callan, C. and Baker, A. Adverse effect of a homogeneous hyperechogenic endometrial sonographic pattern, despite adequate endometrial thickness on pregnancy rates following in-vitro fertilization. Hum Reprod. 1993; 8 (8): 1293-6.	Small number of patients in control group.
Check, J. H., Dietterich, C., Choe, J. K. and Cohen, R. Effect of triple line vs isoechogenic endometrial texture on pregnancy outcome following embryo transfer according to use of controlled ovarian stimulation (COH) or estrogen/progesterone replacement. Clin Exp Obstet Gynecol. 2013; 40 (1): 37-9.	HRT cycles are included (frozen ET, recipient)
Check, J. H., Dietterich, C. and Lurie, D. Non-homogeneous hyperechogenic pattern 3 days after embryo transfer is associated with lower pregnancy rates. Hum Reprod. 2000; 15 (5): 1069-74.	Small study groups.
Check, J. H., Nowroozi, K., Choe, J. and Dietterich, C. Influence of endometrial thickness and echo patterns on pregnancy rates during in vitro fertilization. Fertil Steril. 1991; 56 (6): 1173-5.	Small study groups.
Chen, S. L., Wu, F. R., Luo, C., Chen, X., Shi, X. Y., Zheng, H. Y. and Ni, Y. P. Combined analysis of endometrial thickness and pattern in predicting outcome of in vitro fertilization and embryo transfer: a retrospective cohort study. Reprod Biol Endocrinol. 2010; 8: 30.	Included in meta-analysis: Kasius 2014
De Geyter, C., Schmitter, M., De Geyter, M., Nieschlag, E., Holzgreve, W. and Schneider, H. P. Prospective evaluation of the ultrasound appearance of the endometrium in a cohort of 1,186 infertile women. Fertil Steril. 2000; 73 (1): 106-13.	Included in meta-analysis: Kasius 2014
Detti, L., Yelian, F. D., Kruger, M. L., Diamond, M. P. and Puscheck, E. E. Endometrial thickness dynamics and morphologic characteristics during pituitary	Small study group, more cycles than women

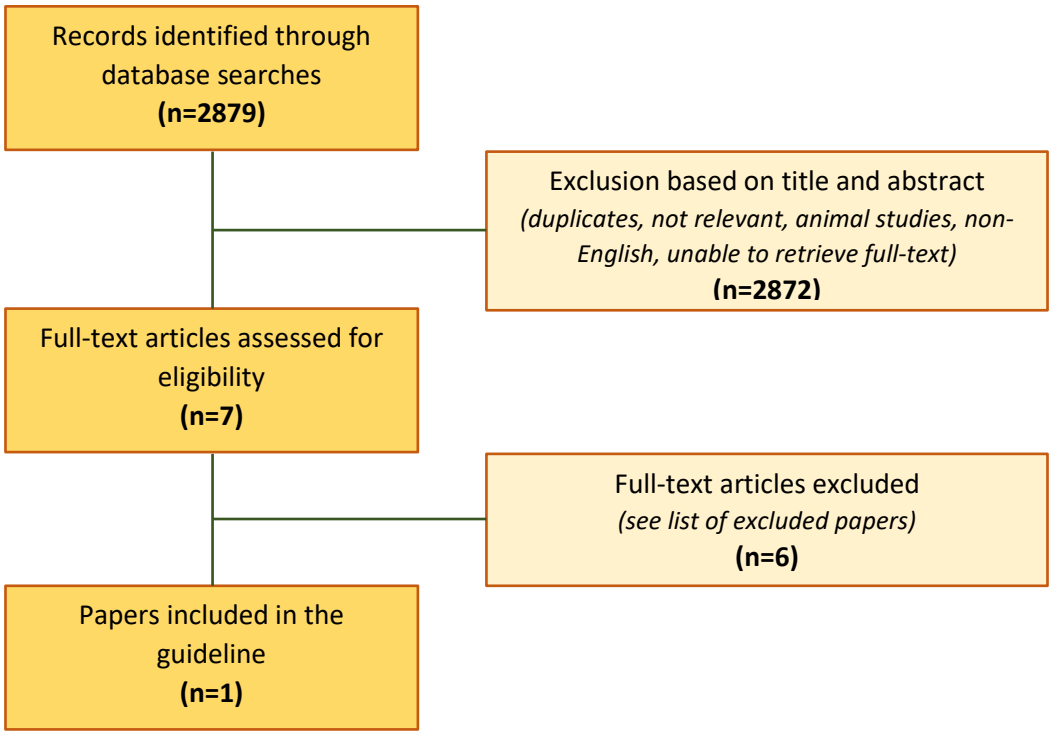
downregulation with antagonists in assisted reproductive technology cycles. J Ultrasound Med. 2008; 27 (11): 1591-6.	
Dickey, R. P., Olar, T. T., Curole, D. N., Taylor, S. N. and Rye, P. H. Endometrial pattern and thickness associated with pregnancy outcome after assisted reproduction technologies. Hum Reprod. 1992; 7 (3): 418-21.	The techniques used are outdated.
Dietterich, C., Check, J. H., Choe, J. K., Nazari, A. and Lurie, D. Increased endometrial thickness on the day of human chorionic gonadotropin injection does not adversely affect pregnancy or implantation rates following in vitro fertilization-embryo transfer. Fertil Steril. 2002; 77 (4): 781-6.	Included in meta-analysis: Kasius 2014
Dix, E. and Check, J. H. Successful pregnancies following embryo transfer despite very thin late proliferative endometrium. Clin Exp Obstet Gynecol. 2010; 37 (1): 15-6.	Small number of patients, large heterogeneity.
Eichler, C., Krampl, E., Reichel, V., Zegermacher, G., Obruca, A., Strohmer, H., Feldner-Busztin, M. and Feichtinger, W. The relevance of endometrial thickness and echo patterns for the success of in vitro fertilization evaluated in 148 patients. J Assist Reprod Genet. 1993; 10 (3): 223-7.	A different classification of endometrial pattern was used.
Fang, R., Cai, L., Xiong, F., Chen, J., Yang, W. and Zhao,X. The effect of endometrial thickness on the day of hCG administration on pregnancy outcome in the first fresh IVF/ICSI cycle. Gynecol Endocrinol. 2016; 32 (6): 473-6.	High risk of bias because of differences between study and control group
Fleischer, A. C., Herbert, C. M., Sacks, G. A., Wentz, A. C., Entman, S. S. and James, A. E., Jr. Sonography of the endometrium during conception and nonconception cycles of in vitro fertilization and embryo transfer. Fertil Steril. 1986; 46 (3): 442-7.	Very old study
Fleischer, A. C., Herbert, C. M., Hill, G. A., Kepple, D. M. and Worrell, J. A. Transvaginal sonography of the endometrium during induced cycles. J Ultrasound Med. 1991; 10 (2): 93-5.	Small number of patients.
Friedler, S., Schenker, J. G., Herman, A. and Lewin, A. The role of ultrasonography in the evaluation of endometrial receptivity following assisted reproductive treatments: a critical review. Hum Reprod Update. 1996; 2 (4): 323-35.	Replaced by a more recent meta-analysis: Kasius 2014
Giannaris, D., Zourla, A., Chrelias, C., Loghis, C. and Kassanos, D. Ultrasound assessment of endometrial thickness: correlation with ovarian stimulation and pregnancy rates in IVF cycles. Clin Exp Obstet Gynecol. 2008; 35 (3): 190-3.	The comparison of the patient groups is biased.
Glissant, A., de Mouzon, J. and Frydman, R. Ultrasound study of the endometrium during in vitro fertilization cycles. Fertil Steril. 1985; 44 (6): 786-90.	Very old study
Gonen, Y. and Casper, R. F. Prediction of implantation by the sonographic appearance of the endometrium during controlled ovarian stimulation for in vitro fertilization (IVF). J In Vitro Fert Embryo Transf. 1990; 7 (3): 146-52.	Very old study
Gonen, Y., Casper, R. F., Jacobson, W. and Blankier, J. Endometrial thickness and growth during ovarian stimulation: a possible predictor of implantation in in vitro fertilization. Fertil Steril. 1989; 52 (3): 446-50	Very old study
Idriss, W. K., Mohiuddin, M. A., Zachariah, M. and Sambasiva, K. Prognostic significance of endometrial evaluation by ultrasonography in ovulation induced cycles. Saudi Med J. 2000; 21 (11): 1059-64.	Small groups of patients, no statistical evaluation.
Isaacs, J. D., Jr., Wells, C. S., Williams, D. B., Odem, R. R., Gast, M. J. and Strickler, R. C. Fertil Steril. 1996; 65 (2): 262-6. (8566245)	Includes ovulation induction cycles
Kinay, T., Tasci, Y., Dilbaz, S., Cinar, O., Demir, B. and Haberal, A. The relationship between endometrial thickness and pregnancy rates in GnRH antagonist down-regulated ICSI cycles. Gynecol Endocrinol. 2010; 26 (11): 833-7.	Included in meta-analysis: Kasius 2014
Khalifa, E., Brzyski, R. G., Oehninger, S., Acosta, A. A. and Muasher, S. J. Sonographic appearance of the endometrium: the predictive value for the outcome of in-vitro fertilization in stimulated cycles. Hum Reprod. 1992; 7 (5): 677-80.	Small numbers of patients

Kovacs, P., Matyas, S., Boda, K. and Kaali, S. G. The effect of endometrial thickness on IVF/ICSI outcome. Hum Reprod. 2003; 18 (11): 2337-41.	Higher quality evidence available
Kuc, P., Kuczynska, A., Topczewska, M., Tadejko, P. and Kuczynski, W. The dynamics of endometrial growth and the triple layer appearance in three different controlled ovarian hyperstimulation protocols and their influence on IVF outcomes. Gynecol Endocrinol. 2011; 27 (11): 867-73.	Included in meta-analysis: Kasius 2014
Liu, K. E., Hartman, M., Hartman, A., Luo, Z. C. and Mahutte, N. The impact of a thin endometrial lining on fresh and frozen-thaw IVF outcomes: an analysis of over 40 000 embryo transfers. Hum Reprod. 2018; 33 (10): 1883-1888.	Risk of bias due to group heterogeneity
Ma, N. Z., Chen, L., Dai, W., Bu, Z. Q., Hu, L. L. and Sun, Y. P. Influence of endometrial thickness on treatment outcomes following in vitro fertilization/intracytoplasmic sperm injection. Reprod Biol Endocrinol. 2017; 15 (1): 5.	High risk of selection bias, and possible inter-observer bias
McWilliams, G. D. and Frattarelli, J. L. Changes in measured endometrial thickness predict in vitro fertilization success. Fertil Steril. 2007; 88 (1): 74-81.	Included in meta-analysis: Kasius 2014
Momeni, M., Rahbar, M. H. and Kovanci, E. A meta-analysis of the relationship between endometrial thickness and outcome of in vitro fertilization cycles. J Hum Reprod Sci. 2011; 4 (3): 130-7.	Replaced by a more recent meta-analysis: Kasius 2014
Okohue, J. E., Onuh, S. O., Ebeigbe, P., Shaibu, I., Wada, I., Ikimalo, J. I. and Okpere, E. E. The effect of endometrial thickness on in vitro fertilization (IVF)-embryo transfer/intracytoplasmic sperm injection (ICSI) outcome. Afr J Reprod Health. 2009; 13 (1): 113-21.	
Oliveira, J. B., Baruffi, R. L., Mauri, A. L., Petersen, C. G., Borges, M. C. and Franco, J. G., Jr. Endometrial ultrasonography as a predictor of pregnancy in an in-vitro fertilization programme after ovarian stimulation and gonadotrophin-releasing hormone and gonadotrophins. Hum Reprod. 1997; 12 (11): 2515-8.	Small number of patients in the comparison group.
Rabinowitz, R., Laufer, N., Lewin, A., Navot, D., Bar, I., Margalioth, E. J. and Schenker, J. J. The value of ultrasonographic endometrial measurement in the prediction of pregnancy following in vitro fertilization. Fertil Steril. 1986; 45 (6): 824-8.	Very old study
Rashidi, B. H., Sadeghi, M., Jafarabadi, M. and Tehrani Nejad, E. S. Relationships between pregnancy rates following in vitro fertilization or intracytoplasmic sperm injection and endometrial thickness and pattern. Eur J Obstet Gynecol Reprod Biol. 2005; 120 (2): 179-84.	Included in meta-analysis: Kasius 2014
Rinaldi, L., Lisi, F., Floccari, A., Lisi, R., Pepe, G. and Fishel, S. Endometrial thickness as a predictor of pregnancy after in-vitro fertilization but not after intracytoplasmic sperm injection. Hum Reprod. 1996; 11 (7): 1538-41.	Included in meta-analysis: Kasius 2014
Schild, R. L., Knobloch, C., Dorn, C., Fimmers, R., van der Ven, H. and Hansmann, M. Endometrial receptivity in an in vitro fertilization program as assessed by spiral artery blood flow, endometrial thickness, endometrial volume, and uterine artery blood flow. Fertil Steril. 2001; 75 (2): 361-6.	
Scioscia, M., Lamanna, G., Lorusso, F., Serrati, G., Selvaggi, L. E. and Depalo, R. Characterization of endometrial growth in proliferative and early luteal phase in IVF cycles. Reprod Biomed Online. 2009; 18 (1): 73-8.	Outcome pregnancy rate not reported.
Sher, G., Herbert, C., Maassarani, G. and Jacobs, M. H. Assessment of the late proliferative phase endometrium by ultrasonography in patients undergoing in-vitro fertilization and embryo transfer (IVF/ET). Hum Reprod. 1991; 6 (2): 232-7.	Old article
Singh, N., Bahadur, A., Mittal, S., Malhotra, N. and Bhatt, A. Predictive value of endometrial thickness, pattern and sub-endometrial blood flows on the day of hCG by 2D doppler in in-vitro fertilization cycles: A prospective clinical study from a tertiary care unit J Hum Reprod Sci. 2011; 4 (1): 29-33.	Included in meta-analysis: Kasius 2014
Strohmer, H., Obruca, A., Radner, K. M. and Feichtinger, W. Relationship of the individual uterine size and the endometrial thickness in stimulated cycles. Fertil Steril. 1994; 61 (5): 972-3.	Very old study

Thickman, D., Arger, P., Tureck, R., Blasco, L., Mintz, M. and Coleman, B. Sonographic assessment of the endometrium in patients undergoing in vitro fertilization. J Ultrasound Med. 1986; 5 (4): 197-201.	Very old study
Weissman, A., Gotlieb, L. and Casper, R. F. The detrimental effect of increased endometrial thickness on implantation and pregnancy rates and outcome in an in vitro fertilization program. Fertil Steril. 1999; 71 (1): 147-9.	Included in meta-analysis: Kasius 2014
Welker, B. G., Gembruch, U., Diedrich, K., al-Hasani, S. and Krebs, D. Transvaginal sonography of the endometrium during ovum pickup in stimulated cycles for in vitro fertilization. J Ultrasound Med. 1989; 8 (10): 549-53.	Small number of patients
Yalti, S., Gurbuz, B., Ficicioglu, C. and Canova, H. Doppler evaluation of the uterine, intraovarian, stromal and spiral arteries on the day of human chorionic gonadotrophin administration in controlled ovarian hyperstimulation. J Obstet Gynaecol. 2003; 23 (4): 402-6.	Small study population
Yang, W., Zhang, T., Li, Z., Ren, X., Huang, B., Zhu, G. and Jin, L. Combined analysis of endometrial thickness and pattern in predicting clinical outcomes of frozen embryo transfer cycles with morphological good-quality blastocyst: A retrospective cohort study. Medicine (Baltimore). 2018; 97 (2): e9577.	FET cycles using HRT were included
Zaidi, J., Campbell, S., Pittrof, R. and Tan, S. L. Endometrial thickness, morphology, vascular penetration and velocimetry in predicting implantation in an in vitro fertilization program. Ultrasound Obstet Gynecol. 1995; 6 (3): 191-8.	Old study, small study groups
Zhang, X., Chen, C. H., Confino, E., Barnes, R., Milad, M. and Kazer, R. R. Increased endometrial thickness is associated with improved treatment outcome for selected patients undergoing in vitro fertilization-embryo transfer. Fertil Steril. 2005; 83 (2): 336-40.	Included in meta-analysis: Kasius 2014
Zhang, T., Li, Z., Ren, X., Huang, B., Zhu, G., Yang, W. and Jin, L. Endometrial thickness as a predictor of the reproductive outcomes in fresh and frozen embryo transfer cycles: A retrospective cohort study of 1512 IVF cycles with morphologically good-quality blastocyst. Medicine (Baltimore). 2018; 97 (4): e9689.	FET cycles using spontaneous cycle or HRT were included
Zhao, J., Zhang, Q. and Li, Y. The effect of endometrial thickness and pattern measured by ultrasonography on pregnancy outcomes during IVF-ET cycles. Reprod Biol Endocrinol. 2012; 10 100.	Included in meta-analysis: Kasius 2014

13. Criteria for triggering

Flowchart

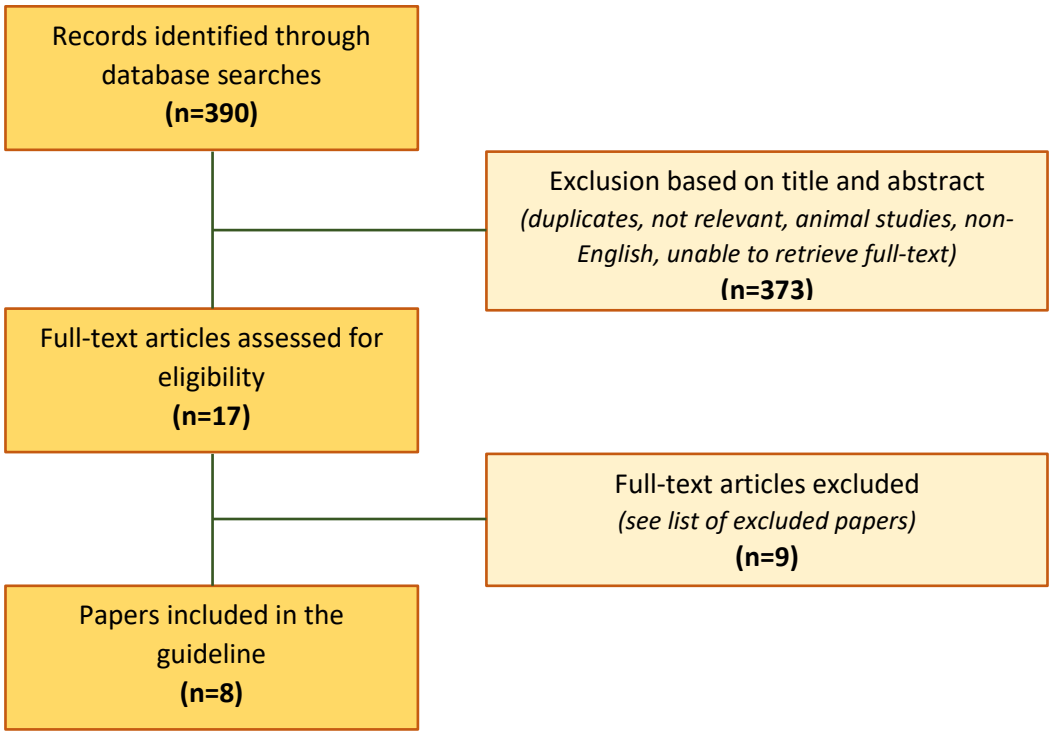


List of excluded papers

	Exclusion criterion
Clark L, Stanger J, Brinsmead M. Prolonged follicle stimulation decreases pregnancy rates after in vitro fertilization. Fertil Steril. 1991 Jun;55(6):1192-4.	Included in meta-analysis Chen 2014
Kolibianakis EM, Albano C, Camus M, Tournaye H, Van Steirteghem AC, Devroey P. Prolongation of the follicular phase in in vitro fertilization results in a lower ongoing pregnancy rate in cycles stimulated with recombinant follicle-stimulating hormone and gonadotropin-releasing hormone antagonists. Fertil Steril 2004 Jul;82(1):102-7.	Included in meta-analysis Chen 2014
Kyrou D, Kolibianakis EM, Fatemi HM, Tarlatzis BC, Tournaye H, Devroey P. Is earlier administration of human chorionic gonadotropin (hCG) associated with the probability of pregnancy in cycles stimulated with recombinant follicle-stimulating hormone and gonadotropin-releasing hormone (GnRH) antagonists? A prospective randomized trial. Fertil Steril. 2011 Nov;96(5):1112-5.	Included in meta-analysis Chen 2014
Mochtar MH, Custers IM, Koks CA, Bernardus RE, Verhoeve HR, Mol BW, van Wely M, van der Veen F. Timing oocyte collection in GnRH agonists down-regulated IVF and ICSI cycles: a randomized clinical trial. Hum Reprod. 2011 May;26(5):1091-6	Included in meta-analysis Chen 2014
Morley L, Tang T, Yasmin E, Hamzeh R, Rutherford AJ, Balen AH. Timing of human chorionic gonadotrophin (hCG) hormone administration in IVF protocols using GnRH antagonists: a randomized controlled trial. Hum Fertil (Camb). 2012 Sep;15(3):134-9.	Included in meta-analysis Chen 2014
Tan, S. L., Balen, A., el Hussein, E., Mills, C., Campbell, S., Yovich, J. and Jacobs, H. S. A prospective randomized study of the optimum timing of human chorionic gonadotropin administration after pituitary desensitization in in vitro fertilization. Fertil Steril. 1992; 57 (6): 1259-64.	Included in meta-analysis Chen 2014

14. Criteria for cycle cancellation

Flowchart

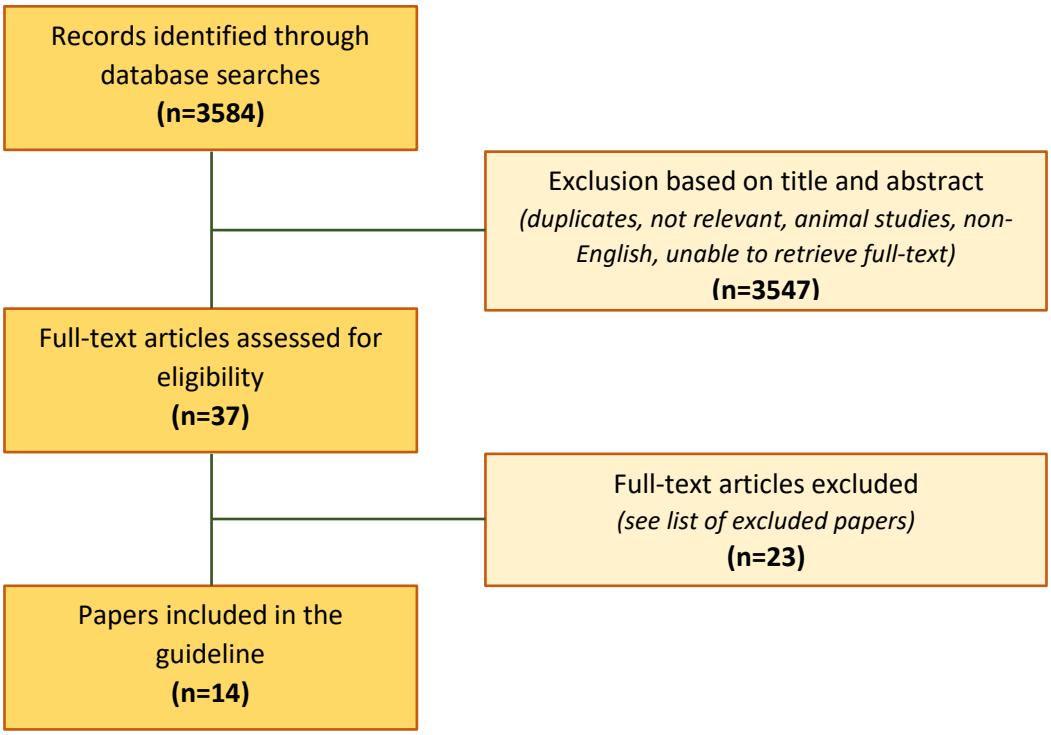


List of excluded papers

	Exclusion criterion
Asch, R. H., Li, H. P., Balmaceda, J. P., Weckstein, L. N. and Stone, S. C. Severe ovarian hyperstimulation syndrome in assisted reproductive technology: definition of high risk groups. Hum Reprod. 1991; 6 (10): 1395-9.	Old study
Baka, S., Makrakis, E., Tzanakaki, D., Konidaris, S., Hassiakos, D., Moustakarias, T. and Creatsas, G. Poor responders in IVF: cancellation of a first cycle is not predictive of a subsequent failure. Ann N Y Acad Sci. 2006; 1092 418-25.	Included in meta-analysis: Oudendijk 2012
Blankstein, J., Shalev, J., Saadon, T., Kukia, E. E., Rabinovici, J., Pariente, C., Lunenfeld, B., Serr, D. M. and Mashiach, S. Ovarian hyperstimulation syndrome: prediction by number and size of preovulatory ovarian follicles. Fertil Steril. 1987; 47 (4): 597-602.	Old study
Chen, C. D., Wu, M. Y., Chao, K. H., Chen, S. U., Ho, H. N. and Yang, Y. S. Serum estradiol level and oocyte number in predicting severe ovarian hyperstimulation syndrome. J Formos Med Assoc. 1997; 96 (10): 829-34.	Retrospective study
Luke, B., Brown, M. B., Morbeck, D. E., Hudson, S. B., Coddington, C. C., 3rd and Stern, J. E. Factors associated with ovarian hyperstimulation syndrome (OHSS) and its effect on assisted reproductive technology (ART) treatment and outcome. Fertil Steril. 2010; 94 (4): 1399-404.	No data available regarding number of follicles and their diameter
McAvey, B., Zapantis, A., Jindal, S. K., Lieman, H. J. and Polotsky, A. J. How many eggs are needed to produce an assisted reproductive technology baby: is more always better? Fertil Steril. 2011; 96 (2): 332-5.	Retrospective study
Morris, R. S., Paulson, R. J., Sauer, M. V. and Lobo, R. A. Predictive value of serum oestradiol concentrations and oocyte number in severe ovarian hyperstimulation syndrome. Hum Reprod. 1995; 10 (4): 811-4.	Retrospective study
Requena, A., Cruz, M., Bosch, E., Meseguer, M. and Garcia-Velasco, J. A. High progesterone levels in women with high ovarian response do not affect clinical outcomes: a retrospective cohort study. Reprod Biol Endocrinol. 2014; 12 69.	Retrospective study
Sher, G., Salem, R., Feinman, M., Dodge, S., Zouves, C. and Knutzen, V. Eliminating the risk of life-endangering complications following overstimulation with menotropin fertility agents: a report on women undergoing in vitro fertilization and embryo transfer. Obstet Gynecol. 1993; 81 (6): 1009-11.	Old study, small study groups

15. Triggering of final oocyte maturation

Flowchart



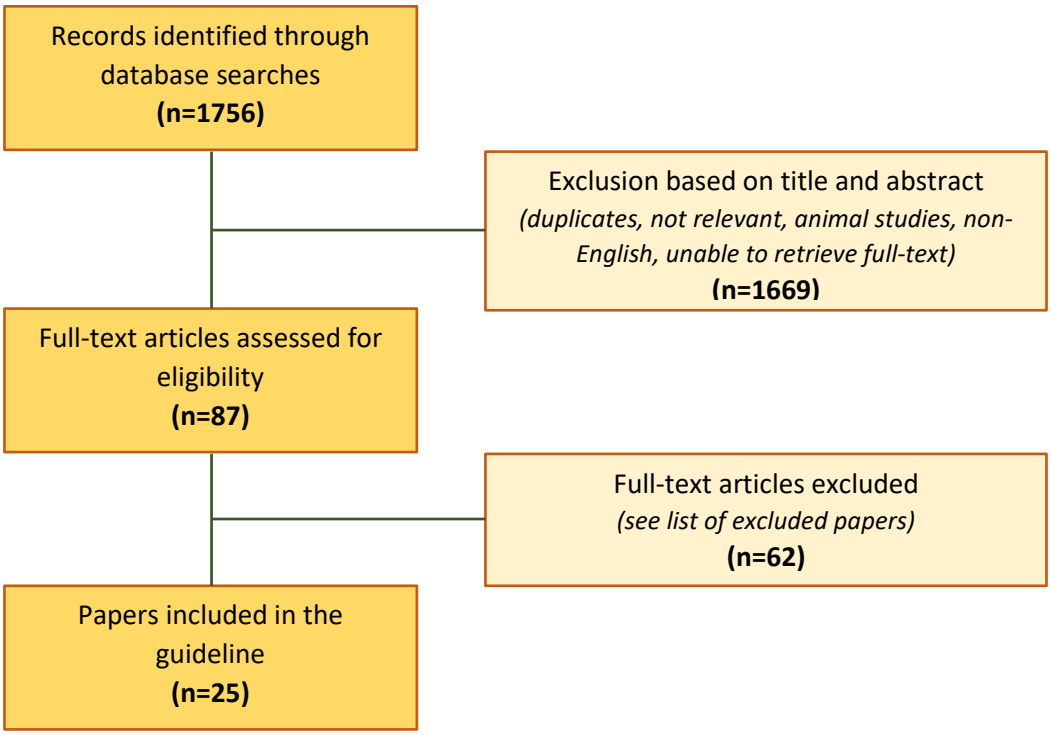
List of excluded papers

	Exclusion criterion
The European Recombinant Human Chorionic Gonadotrophin Study Group. Induction of final follicular maturation and early luteinization in women undergoing ovulation induction for assisted reproduction treatment--recombinant HCG versus urinary HCG. The European Recombinant Human Chorionic Gonadotrophin Study Group. Hum Reprod. 2000; 15 (7): 1446-51.	Included in meta-analysis: Youssef 2016
Human recombinant luteinizing hormone is as effective as, but safer than, urinary human chorionic gonadotropin in inducing final follicular maturation and ovulation in in vitro fertilization procedures: results of a multicenter double-blind study. J Clin Endocrinol Metab. 2001; 86 (6): 2607-18.	Included in meta-analysis: Youssef 2016
Abdalla, H. I., Ah-Moye, M., Brinsden, P., Howe, D. L., Okonofua, F. and Craft, I. The effect of the dose of human chorionic gonadotropin and the type of gonadotropin stimulation on oocyte recovery rates in an in vitro fertilization program. Fertil Steril. 1987; 48 (6): 958-63.	No LH suppression used, old study
Acevedo, B., Gomez-Palomares, J. L., Ricciarelli, E. and Hernandez, E. R. Triggering ovulation with gonadotropin-releasing hormone agonists does not compromise embryo implantation rates. Fertil Steril. 2006; 86 (6): 1682-7.	Included in meta-analysis: Youssef 2016
Al-Inany, H., Aboulghar, M. A., Mansour, R. T. and Proctor, M. Recombinant versus urinary gonadotrophins for triggering ovulation in assisted conception. Hum Reprod. 2005; 20 (8): 2061-73.	Replaced by a more recent meta-analysis: Youssef 2016
Alleyassin, A, Ghasemi, M, Aghahosseini, M, Safdarian, L, Sarvi, F, Almasi-Hashiani, A, Hosseinimousa, S, Najafian, A and Esmailzadeh, A. Final oocyte maturation with a dual trigger compared to human chorionic gonadotropin trigger in antagonist co-treated cycles: A randomized clinical trial Middle east fertility society journal. 2018; 23(3): 199-204.	Poor quality RCT
Bellavia, M., de Geyter, C., Streuli, I., Ibecheole, V., Birkhauser, M. H., Cometti, B. P. and de Ziegler, D. Randomized controlled trial comparing highly purified (HP-hCG) and recombinant hCG (r-hCG) for triggering ovulation in ART. Gynecol Endocrinol. 2013; 29 (2): 93-7.	Included in meta-analysis: Youssef 2016
Chen, C. H., Tzeng, C. R., Wang, P. H., Liu, W. M., Chang, H. Y., Chen, H. H. and Chen, C. H. Dual triggering with GnRH agonist plus hCG versus triggering with hCG alone for IVF/ICSI outcome in GnRH antagonist cycles: a systematic review and meta-analysis. Arch Gynecol Obstet. 2018	Replaced by meta-analysis: Ding 2017
Clua, E., Martinez, F., Tur, R., Sanmartin, P., Chueca, A. and Barri, P. N. Triggering ovulation with 250 µg or 500 µg of r-hCG in oocyte donors treated with antagonist protocol has no effect on the number of mature oocytes retrieved: a randomized clinical trial. Gynecol Endocrinol. 2012; 28 (9): 678-81.	Donor study
Decleer, W., Osmanagaoglu, K., Seynhave, B., Kolibianakis, S., Tarlatzis, B. and Devroey, P. Comparison of hCG triggering versus hCG in combination with a GnRH agonist: a prospective randomized controlled trial. Facts Views Vis Obgyn. 2014; 6 (4): 203-9.	Included in meta-analysis: Ding 2017
Driscoll, G. L., Tyler, J. P., Hangan, J. T., Fisher, P. R., Birdsall, M. A. and Knight, D. C. A prospective, randomized, controlled, double-blind, double-dummy comparison of recombinant and urinary HCG for inducing oocyte maturation and follicular luteinization in ovarian stimulation. Hum Reprod. 2000; 15 (6): 1305-10.	Included in meta-analysis: Youssef 2016
Engmann, L., DiLuigi, A., Schmidt, D., Nulsen, J., Maier, D. and Benadiva, C. The use of gonadotropin-releasing hormone (GnRH) agonist to induce oocyte maturation after cotreatment with GnRH antagonist in high-risk patients undergoing in vitro fertilization prevents the risk of ovarian hyperstimulation syndrome: a prospective randomized controlled study. Fertil Steril. 2008; 89 (1): 84-91.	Included in meta-analysis: Youssef 2014
Galindo, A., Bodri, D., Guillen, J. J., Colodron, M., Vernaeve, V. and Coll, O. Triggering with HCG or GnRH agonist in GnRH antagonist treated oocyte donation cycles: a randomised clinical trial. Gynecol Endocrinol. 2009; 25 (1): 60-6.	Donor study

Humaidan, P., Bredkjaer, H. E., Bungum, L., Bungum, M., Grondahl, M. L., Westergaard, L. and Andersen, C. Y. GnRH agonist (buserelin) or hCG for ovulation induction in GnRH antagonist IVF/ICSI cycles: a prospective randomized study. Hum Reprod. 2005; 20 (5): 1213-20.	Included in meta-analysis: Youssef 2014
Kim, C. H., Ahn, J. W., You, R. M., Kim, S. H., Chae, H. D. and Kang, B. M. Combined administration of gonadotropin-releasing hormone agonist with human chorionic gonadotropin for final oocyte maturation in GnRH antagonist cycles for in vitro fertilization. J Reprod Med. 2014; 59 (1-2): 63-8.	Included in meta-analysis: Ding 2017
Kolibianakis, E. M., Schultze-Mosgau, A., Schroer, A., van Steirteghem, A., Devroey, P., Diedrich, K. and Griesinger, G. A lower ongoing pregnancy rate can be expected when GnRH agonist is used for triggering final oocyte maturation instead of HCG in patients undergoing IVF with GnRH antagonists. Hum Reprod. 2005; 20 (10): 2887-92.	Included in meta-analysis: Youssef 2014
Lin, H., Wang, W., Li, Y., Chen, X., Yang, D. and Zhang, Q. Triggering final oocyte maturation with reduced doses of hCG in IVF/ICSI: a prospective, randomized and controlled study. Eur J Obstet Gynecol Reprod Biol. 2011; 159 (1): 143-7.	Dose comparisons not included in PICO
Mahajan, N., Sharma, S., Arora, P. R., Gupta, S., Rani, K. and Naidu, P. Evaluation of dual trigger with gonadotropin-releasing hormone agonist and human chorionic gonadotropin in improving oocyte maturity rates: A prospective randomized study. J Hum Reprod Sci. 2016; 9 (2): 101-6.	Included in meta-analysis: Ding 2017
Maislisch, L, Warne, D, Bologna, S, Loumaye, E, Bellaisch-Allart, J, Dellenbach, P, Leidenberger, Fa, Scholtes, M, Fischer, R, Fisch, B, Melis, Gb, Evers, Jlh, Wikland, M and Mills, J. Induction of final follicular maturation and early luteinization in women undergoing ovulation induction for assisted reproduction treatment--recombinant HCG versus urinary HCG. The European Recombinant Human Chorionic Gonadotrophin Study Group. Human reproduction (Oxford, England). 2000; 15 (7): 1446-1451.	Included in meta-analysis: Youssef 2016
Melo, M., Busso, C. E., Bellver, J., Alama, P., Garrido, N., Meseguer, M., Pellicer, A. and Remohi, J. GnRH agonist versus recombinant HCG in an oocyte donation programme: a randomized, prospective, controlled, assessor-blind study. Reprod Biomed Online. 2009; 19 (4): 486-92.	Donor study
Oliveira, S. A., Calsavara, V. F. and Cortes, G. C. Final Oocyte Maturation in Assisted Reproduction with Human Chorionic Gonadotropin and Gonadotropin-releasing Hormone agonist (Dual Trigger). JBRA Assist Reprod. 2016; 20 (4): 246-250.	Double trigger vs GnRH agonist trigger in high responders
Papanikolaou, E. G., Fatemi, H., Camus, M., Kyrou, D., Polyzos, N. P., Humaidan, P., Tarlatzis, B., Devroey, P. and Tournaye, H. Higher birth rate after recombinant hCG triggering compared with urinary-derived hCG in single-blastocyst IVF antagonist cycles: a randomized controlled trial. Fertil Steril. 2010; 94 (7): 2902-4.	Included in meta-analysis: Youssef 2016
Sismanoglu, A, Tekin, Hi, Erden, Hf, Ciray, Nh, Ulug, U and Bahceci, M. Ovulation triggering with GnRH agonist vs. hCG in the same egg donor population undergoing donor oocyte cycles with GnRH antagonist: a prospective randomized cross-over trial. Journal of assisted reproduction and genetics. 2009; 26 (5): 251-6.	Donor study

16. Luteal phase support (LPS)

Flowchart



List of excluded papers

	Exclusion criterion
Abate, A, Brigandi, A, Abate, Fg, Manti, F, Unfer, V and Perino, M. Luteal phase support with 17alpha-hydroxyprogesterone versus unsupported cycles in in vitro fertilization: a comparative randomized study. Gynecol Obstet Invest. 1999; 48(2):78-80.	Included in meta-analysis: van der Linden 2015
Aboulghar, M. A., Marie, H., Amin, Y. M., Aboulghar, M. M., Nasr, A., Serour, G. I. and Mansour, R. T. GnRH agonist plus vaginal progesterone for luteal phase support in ICSI cycles: a randomized study. Reprod Biomed Online. 2015; 30 (1): 52-6.	Included in meta-analysis: van der Linden 2015
Andersen, C. Y., Elbaek, H. O., Alsbjerg, B., Laursen, R. J., Povlsen, B. B., Thomsen, L. and Humaidan, P. Daily low-dose hCG stimulation during the luteal phase combined with GnRHa triggered IVF cycles without exogenous progesterone: a proof of concept trial. Hum Reprod. 2015; 30 (10): 2387-95.	hCG was already added in the stimulation phase in both arms
Ata, B., Yakin, K., Balaban, B. and Urman, B. GnRH agonist protocol administration in the luteal phase in ICSI-ET cycles stimulated with the long GnRH agonist protocol: a randomized, controlled double blind study. Hum Reprod. 2008; 23 (3): 668-73.	Included in meta-analysis: van der Linden 2015
Barbosa, M. W., Silva, L. R., Navarro, P. A., Ferriani, R. A., Nastri, C. O. and Martins, W. P. Dydrogesterone vs progesterone for luteal-phase support: systematic review and meta-analysis of randomized controlled trials. Ultrasound Obstet Gynecol. 2016; 48 (2): 161-70.	Replaced by the updated meta-analysis: Barbosa 2018
Beckers, N. G., Platteau, P., Eijkemans, M. J., Macklon, N. S., de Jong, F. H., Devroey, P. and Fauser, B. C. The early luteal phase administration of estrogen and progesterone does not induce premature luteolysis in normo-ovulatory women. Eur J Endocrinol. 2006; 155 (2): 355-63.	Excluded from meta-analysis: van der Linden 2015 because high doses of steroids administered after the LH surge in normo-ovulatory volunteers to investigate whether this would give rise to endocrine changes and shortening of the luteal phase
Benmachiche, A., Benbouhedja, S., Zoghmar, A., Boularak, A. and Humaidan, P. Impact of Mid-Luteal Phase GnRH Agonist Administration on Reproductive Outcomes in GnRH Agonist-Triggered Cycles: A Randomized Controlled Trial. Front Endocrinol (Lausanne). 2017; 8 124.	GnRH agonist trigger with modified LPS
Bergh, C. and Lindenberg, S. A prospective randomized multicentre study comparing vaginal progesterone gel and vaginal micronized progesterone tablets for luteal support after in vitro fertilization/intracytoplasmic sperm injection. Hum Reprod. 2012; 27 (12): 3467-73.	Included in meta-analysis: van der Linden 2015
Chakravarty, B. N., Shirazee, H. H., Dam, P., Goswami, S. K., Chatterjee, R. and Ghosh, S. Oral dydrogesterone versus intravaginal micronised progesterone as luteal phase support in assisted reproductive technology (ART) cycles: results of a randomised study. J Steroid Biochem Mol Biol. 2005; 97 (5): 416-20.	Included in meta-analysis: Barbosa 2018
Connell, M. T., Szatkowski, J. M., Terry, N., DeCherney, A. H., Propst, A. M. and Hill, M. J. Timing luteal support in assisted reproductive technology: a systematic review. Fertil Steril. 2015; 103 (4): 939-946.e3.	Systematic review without meta-analysis
Dal Prato, L., Bianchi, L., Cattoli, M., Tarozzi, N., Flamigni, C. and Borini, A. Vaginal gel versus intramuscular progesterone for luteal phase supplementation: a prospective randomized trial. Reprod Biomed Online. 2008; 16 (3): 361-7.	Included in meta-analysis: van der Linden 2015

Elgindy, E. A., El-Haieg, D. O., Mostafa, M. I. and Shafiek, M. Does luteal estradiol supplementation have a role in long agonist cycles? Fertil Steril. 2010; 93 (7): 2182-8.	Included in meta-analysis: van der Linden 2015
Escriba, M. J., Bellver, J., Bosch, E., Sanchez, M., Pellicer, A. and Remohi, J. Delaying the initiation of progesterone supplementation until the day of fertilization does not compromise cycle outcome in patients receiving donated oocytes: a randomized study. Fertil Steril. 2006; 86 (1): 92-7.	Donor study
Fatemi, H. M., Kolibianakis, E. M., Camus, M., Tournaye, H., Donoso, P., Papanikolaou, E. and Devroey, P. Addition of estradiol to progesterone for luteal supplementation in patients stimulated with GnRH antagonist/rFSH for IVF: a randomized controlled trial. Hum Reprod. 2006; 21 (10): 2628-32.	Included in meta-analysis: van der Linden 2015
Ganesh, A., Chakravorty, N., Mukherjee, R., Goswami, S., Chaudhury, K. and Chakravarty, B. Comparison of oral dydrogestrone with progesterone gel and micronized progesterone for luteal support in 1,373 women undergoing in vitro fertilization: a randomized clinical study. Fertil Steril. 2011; 95 (6): 1961-5.	Included in meta-analysis: Barbosa 2018
Garcia-Velasco, J. A., Motta, L., Lopez, A., Mayoral, M., Cerrillo, M. and Pacheco, A. Low-dose human chorionic gonadotropin versus estradiol/progesterone luteal phase support in gonadotropin-releasing hormone agonist-triggered assisted reproductive technique cycles: understanding a new approach. Fertil Steril. 2010; 94 (7): 2820-3.	Small study groups
Gelbaya, T. A., Kyrgiou, M., Tsoumpou, I. and Nardo, L. G. The use of estradiol for luteal phase support in in vitro fertilization/intracytoplasmic sperm injection cycles: a systematic review and meta-analysis. Fertil Steril. 2008; 90 (6): 2116-25.	Replaced by a more recent meta-analysis: van der Linden 2015
Germond, M., Capelli, P., Bruno, G., Vesnaver, S., Senn, A., Rouge, N. and Biollaz, J. Comparison of the efficacy and safety of two formulations of micronized progesterone (Ellios and Utrogestan) used as luteal phase support after in vitro fertilization. Fertil Steril. 2002; 77 (2): 313-7.	Excluded from meta-analysis: van der Linden 2015 for randomization
Ghanem, M. E., Sadek, E. E., Elboghdady, L. A., Helal, A. S., Gamal, A., Eldiasty, A., Bakre, N. I. and Houssen, M. The effect of luteal phase support protocol on cycle outcome and luteal phase hormone profile in long agonist protocol intracytoplasmic sperm injection cycles: a randomized clinical trial. Fertil Steril. 2009; 92 (2): 486-93.	Excluded from meta-analysis: van der Linden 2015 for randomization
Huang, N., Situ, B., Chen, X., Liu, J., Yan, P., Kang, X., Kong, S. and Huang, M. Meta-analysis of estradiol for luteal phase support in in vitro fertilization/intracytoplasmic sperm injection. Fertil Steril. 2015; 103 (2): 367-73.e5.	Replaced by the Cochrane meta-analysis: van der Linden 2015
Hubayter, Z. R. and Muasher, S. J. Luteal supplementation in in vitro fertilization: more questions than answers. Fertil Steril. 2008; 89 (4): 749-58.	Meta-analysis from old studies, medications not used in Europe.
Isik, A. Z., Caglar, G. S., Sozen, E., Akarsu, C., Tuncay, G., Ozbicer, T. and Vicdan, K. Single-dose GnRH agonist administration in the luteal phase of GnRH antagonist cycles: a prospective randomized study. Reprod Biomed Online. 2009; 19 (4): 472-7.	Included in meta-analysis: van der Linden 2015
Jee, B. C., Suh, C. S., Kim, S. H., Kim, Y. B. and Moon, S. Y. Effects of estradiol supplementation during the luteal phase of in vitro fertilization cycles: a meta-analysis. Fertil Steril. 2010; 93 (2): 428-36.	Replaced by a more recent meta-analysis: van der Linden 2015
Kleinstein, J. Efficacy and tolerability of vaginal progesterone capsules (Utrogest 200) compared with progesterone gel (Crinone 8%) for	Included in meta-analysis: van der Linden 2015

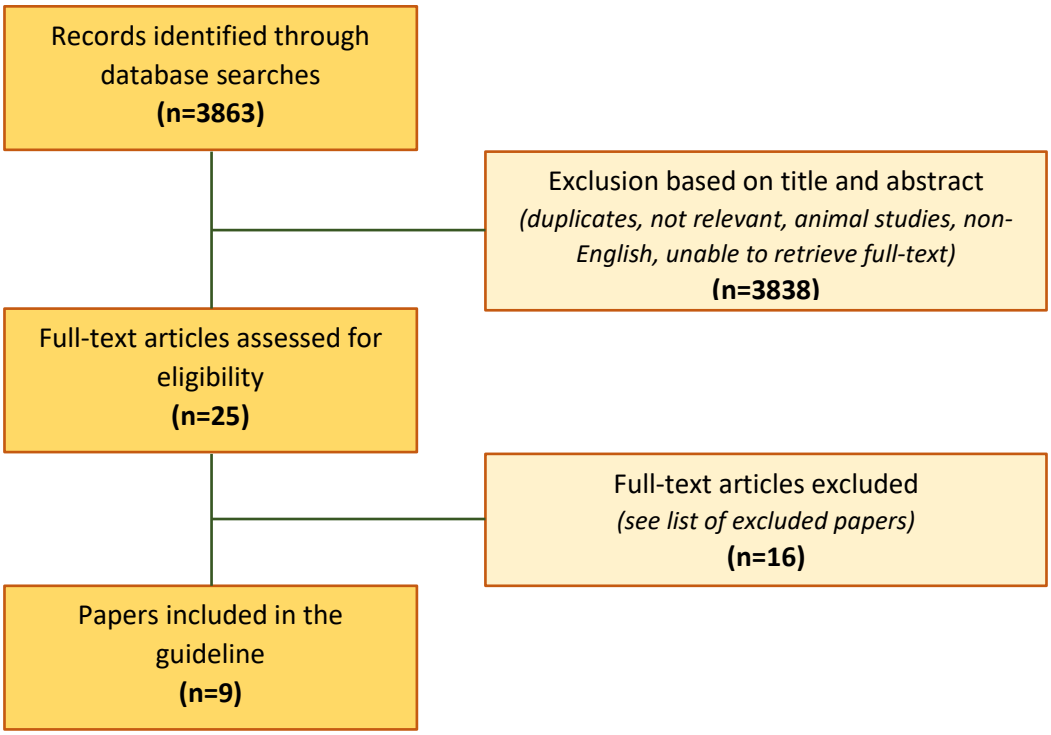
luteal phase support during assisted reproduction. Fertil Steril. 2005; 83 (6): 1641-9.	
Kohls, G., Ruiz, F., Martinez, M., Hauzman, E., de la Fuente, G., Pellicer, A. and Garcia-Velasco, J. A. Early progesterone cessation after in vitro fertilization/intracytoplasmic sperm injection: a randomized, controlled trial. Fertil Steril. 2012; 98 (4): 858-62.	Included in meta-analysis: van der Linden 2015
Kolibianakis, E. M., Venetis, C. A., Papanikolaou, E. G., Diedrich, K., Tarlatzis, B. C. and Griesinger, G. Estrogen addition to progesterone for luteal phase support in cycles stimulated with GnRH analogues and gonadotrophins for IVF: a systematic review and meta-analysis. Hum Reprod. 2008; 23 (6): 1346-54.	Replaced by a more recent meta-analysis: van der Linden 2015
Kupferminc, M. J., Lessing, J. B., Amit, A., Yovel, I., David, M. P. and Peyser, M. R. A prospective randomized trial of human chorionic gonadotrophin or dydrogesterone support following in-vitro fertilization and embryo transfer. Hum Reprod. 1990; 5 (3): 271-3	Included in meta-analysis: van der Linden 2015
Kyrou, D., Fatemi, H. M., Zepiridis, L., Riva, A., Papanikolaou, E. G., Tarlatzis, B. C. and Devroey, P. Does cessation of progesterone supplementation during early pregnancy in patients treated with recFSH/GnRH antagonist affect ongoing pregnancy rates? A randomized controlled trial. Hum Reprod. 2011; 26 (5): 1020-4.	Included in meta-analysis: van der Linden 2015
Kyrou, D., Kolibianakis, E. M., Fatemi, H. M., Tarlatzi, T. B., Devroey, P. and Tarlatzis, B. C. Increased live birth rates with GnRH agonist addition for luteal support in ICSI/IVF cycles: a systematic review and meta-analysis. Hum Reprod Update. 2011; 17 (6): 734-40.	No seperate meta-analysis for single/multiple GnRH agonist doses
Leeton, J., Trounson, A. and Jessup, D. Support of the luteal phase in in vitro fertilization programs: results of a controlled trial with intramuscular Proluton. J In Vitro Fert Embryo Transf. 1985; 2 (3): 166-9.	Old study
Lin, H., Li, Y., Li, L., Wang, W., Zhang, Q., Chen, X. and Yang, D. Oral oestradiol supplementation as luteal support in IVF/ICSI cycles: a prospective, randomized controlled study. Eur J Obstet Gynecol Reprod Biol. 2013; 167 (2): 171-5.	Included in meta-analysis: van der Linden 2015
Lockwood, G., Griesinger, G. and Cometti, B. Subcutaneous progesterone versus vaginal progesterone gel for luteal phase support in in vitro fertilization: a noninferiority randomized controlled study. Fertil Steril. 2014; 101 (1): 112-119.e3.	Included in meta-analysis: van der Linden 2015
Ludwig, M., Finas, A., Katalinic, A., Strik, D., Kowalcek, I., Schwartz, P., Felberbaum, R., Kupker, W., Schopper, B., Al-Hasani, S. and Diedrich, K. Prospective, randomized study to evaluate the success rates using hCG, vaginal progesterone or a combination of both for luteal phase support. Acta Obstet Gynecol Scand. 2001; 80 (6): 574-82.	Included in meta-analysis: van der Linden 2015
Ludwig, M., Schwartz, P., Babahan, B., Katalinic, A., Weiss, J. M., Felberbaum, R., Al-Hasani, S. and Diedrich, K. Luteal phase support using either Crinone 8% or Utrogest: results of a prospective, randomized study. Eur J Obstet Gynecol Reprod Biol. 2002; 103 (1): 48-52.	Included in meta-analysis: van der Linden 2015
Lukaszuk, K., Liss, J., Lukaszuk, M. and Maj, B. Optimization of estradiol supplementation during the luteal phase improves the pregnancy rate in women undergoing in vitro fertilization-embryo transfer cycles. Fertil Steril. 2005; 83 (5): 1372-6	Excluded from meta-analysis: van der Linden 2015 because it study included more cycles than women
Martinez, F., Coroleu, B., Parera, N., Alvarez, M., Traver, J. M., Boada, M. and Barri, P. N. Human chorionic gonadotropin and intravaginal natural progesterone are equally effective for luteal phase support in IVF. Gynecol Endocrinol. 2000; 14 (5): 316-20.	Pseudo-randomization, unequal study groups
Martins, W. P., Ferriani, R. A., Navarro, P. A. and Nastri, C. O. GnRH agonist during luteal phase in women undergoing assisted	No seperate meta-analysis for single/multiple GnRH agonist doses

reproductive techniques: systematic review and meta-analysis of randomized controlled trials. Ultrasound Obstet Gynecol. 2016; 47 (2): 144-51.	
Mui, Lam P, Chun, Cheung M, Ping, Cheung L, Ingrid, Lok H and John, Haines C. Effects of early luteal-phase vaginal progesterone supplementation on the outcome of in vitro fertilization and embryo transfer. Gynecol endocrinol 2008; 24 (12): 674-80.	Included in meta-analysis: van der Linden 2015
Ng, E. H., Chan, C. C., Tang, O. S. and Ho, P. C. A randomized comparison of side effects and patient convenience between Cyclogest suppositories and Endometrin tablets used for luteal phase support in IVF treatment. Eur J Obstet Gynecol Reprod Biol. 2007; 131 (2): 182-8.	Included in meta-analysis: van der Linden 2015
Nosarka, S., Kruger, T., Siebert, I. and Grove, D. Luteal phase support in in vitro fertilization: meta-analysis of randomized trials. Gynecol Obstet Invest. 2005; 60 (2): 67-74.	Replaced by a more recent meta-analysis van der Linden 2015
Nyboe, Andersen A, Popovic-Todorovic, B, Schmidt, Kt, Loft, A, Lindhard, A, Højgaard, A, Ziebe, S, Hald, F, Hauge, B and Toft, B. Progesterone supplementation during early gestations after IVF or ICSI has no effect on the delivery rates: a randomized controlled trial. Hum reprod 2002; 17 (2): 357-61.	Included in meta-analysis: van der Linden 2015
Oliveira, J. B., Baruffi, R., Petersen, C. G., Mauri, A. L., Cavagna, M. and Franco, J. G., Jr. Administration of single-dose GnRH agonist in the luteal phase in ICSI cycles: a meta-analysis. Reprod Biol Endocrinol. 2010; 8 107.	Replaced by a more recent meta-analysis: van der Linden 2015
Pirard, C., Donnez, J. and Loumaye, E. GnRH agonist as luteal phase support in assisted reproduction technique cycles: results of a pilot study. Hum Reprod. 2006; 21 (7): 1894-900.	Very small study groups
Pirard, C., Loumaye, E., Laurent, P. and Wyns, C. Contribution to More Patient-Friendly ART Treatment: Efficacy of Continuous Low-Dose GnRH Agonist as the Only Luteal Support-Results of a Prospective, Randomized, Comparative Study. Int J Endocrinol. 2015; 2015 727569.	Pilot study, sample size is small and on basis of this study conclusions cannot be made.
Polson, D. W., Rogers, P. A., Krapez, J. A. and Leeton, J. F. Vaginal progesterone as luteal phase support in an IVF/GIFT programme. Eur J Obstet Gynecol Reprod Biol. 1992; 46 (1): 35-8.	Old study
Polyzos, N. P., Messini, C. I., Papanikolaou, E. G., Mauri, D., Tzioras, S., Badawy, A. and Messinis, I. E. Vaginal progesterone gel for luteal phase support in IVF/ICSI cycles: a meta-analysis. Fertil Steril. 2010; 94 (6): 2083-7.	Replaced by a more recent meta-analysis: van der Linden 2015
Pritts, E. A. and Atwood, A. K. Luteal phase support in infertility treatment: a meta-analysis of the randomized trials. Hum Reprod. 2002; 17 (9): 2287-99.	Replaced by a more recent meta-analysis
Qublan, H., Amarin, Z., Al-Qudah, M., Diab, F., Nawasreh, M., Malkawi, S. and Balawneh, M. Luteal phase support with GnRH-a improves implantation and pregnancy rates in IVF cycles with endometrium of <or=7 mm on day of egg retrieval. Hum Fertil (Camb). 2008; 11 (1): 43-7.	Included in meta-analysis: van der Linden 2015
Saharkhiz, N., Zamaniyan, M., Salehpour, S., Zadehmodarres, S., Hoseini, S., Cheraghi, L., Seif, S. and Baheiraei, N. A comparative study of dydrogesterone and micronized progesterone for luteal phase support during in vitro fertilization (IVF) cycles. Gynecol Endocrinol. 2016; 32 (3): 213-7.	Included in meta-analysis: Barbosa 2018
Salehpour, S., Tamimi, M. and Saharkhiz, N. Comparison of oral dydrogesterone with suppository vaginal progesterone for luteal-phase support in in vitro fertilization (IVF): A randomized clinical trial. Iran J Reprod Med. 2013; 11 (11): 913-8.	Included in meta-analysis: Barbosa 2018

Serna, J., Cholquevilque, J. L., Cela, V., Martinez-Salazar, J., Requena, A. and Garcia-Velasco, J. A. Estradiol supplementation during the luteal phase of IVF-ICSI patients: a randomized, controlled trial. Fertil Steril. 2008; 90 (6): 2190-5.	Included in meta-analysis: van der Linden 2015
Simunic, V., Tomic, V., Tomic, J. and Nizic, D. Comparative study of the efficacy and tolerability of two vaginal progesterone formulations, Crinone 8% gel and Utrogestan capsules, used for luteal support. Fertil Steril. 2007; 87 (1): 83-7.	Excluded from meta-analysis: van der Linden 2015 for randomization
Soliman, S., Daya, S., Collins, J. and Hughes, E. G. The role of luteal phase support in infertility treatment: a meta-analysis of randomized trials. Fertil Steril. 1994; 61 (6): 1068-76.	Mixed comparison in meta-analysis and includes quasi-randomized studies.
Stadtmauer, L., Silverberg, K. M., Ginsburg, E. S., Weiss, H. and Howard, B. Progesterone vaginal ring versus vaginal gel for luteal support with in vitro fertilization: a randomized comparative study. Fertil Steril. 2013; 99 (6): 1543-9.	Included in meta-analysis: van der Linden 2015
Tesarik, J., Hazout, A., Mendoza-Tesarik, R., Mendoza, N. and Mendoza, C. Beneficial effect of luteal-phase GnRH agonist administration on embryo implantation after ICSI in both GnRH agonist- and antagonist-treated ovarian stimulation cycles. Hum Reprod. 2006; 21 (10): 2572-9.	Included in meta-analysis: van der Linden 2015
Tomic, V., Tomic, J., Klaic, D. Z., Kasum, M. and Kuna, K. Oral dydrogesterone versus vaginal progesterone gel in the luteal phase support: randomized controlled trial. Eur J Obstet Gynecol Reprod Biol. 2015; 186 49-53.	Included in meta-analysis: Barbosa 2018
Tournaye, H., Sukhikh, G. T., Kahler, E. and Griesinger, G. A Phase III randomized controlled trial comparing the efficacy, safety and tolerability of oral dydrogesterone versus micronized vaginal progesterone for luteal support in in vitro fertilization. Hum Reprod. 2017; 32 (5): 1019-1027.	Included in meta-analysis: Barbosa 2018
Var, T., Tonguc, E. A., Doganay, M., Gulerman, C., Gungor, T. and Mollamahmutoglu, L. A comparison of the effects of three different luteal phase support protocols on in vitro fertilization outcomes: a randomized clinical trial. Fertil Steril. 2011; 95 (3): 985-9.	Excluded from meta-analysis: van der Linden 2015 for randomization
Yanushpolsky, E., Hurwitz, S., Greenberg, L., Racowsky, C. and Hornstein, M. Crinone vaginal gel is equally effective and better tolerated than intramuscular progesterone for luteal phase support in in vitro fertilization-embryo transfer cycles: a prospective randomized study. Fertil Steril. 2010; 94 (7): 2596-9.	Included in meta-analysis: van der Linden 2015
Yanushpolsky, E., Hurwitz, S., Greenberg, L., Racowsky, C. and Hornstein, M. D. Comparison of Crinone 8% intravaginal gel and intramuscular progesterone supplementation for in vitro fertilization/embryo transfer in women under age 40: interim analysis of a prospective randomized trial. Fertil Steril. 2008; 89 (2): 485-7.	Included in meta-analysis: van der Linden 2015
Yildiz, G. A., Sukur, Y. E., Ates, C. and Aytac, R. The addition of gonadotrophin releasing hormone agonist to routine luteal phase support in intracytoplasmic sperm injection and embryo transfer cycles: a randomized clinical trial. Eur J Obstet Gynecol Reprod Biol. 2014; 182 66-70.	Included in meta-analysis: van der Linden 2015
Zhang, X. M., Lv, F., Wang, P., Huang, X. M., Liu, K. F., Pan, Y., Dong, N. J., Ji, Y. R., She, H. and Hu, R. Estrogen supplementation to progesterone as luteal phase support in patients undergoing in vitro fertilization: systematic review and meta-analysis. Medicine (Baltimore). 2015; 94 (8): e459.	Replaced by the Cochrane meta-analysis which is more complete and rigid.

17. GnRH agonist triggering

Flowchart



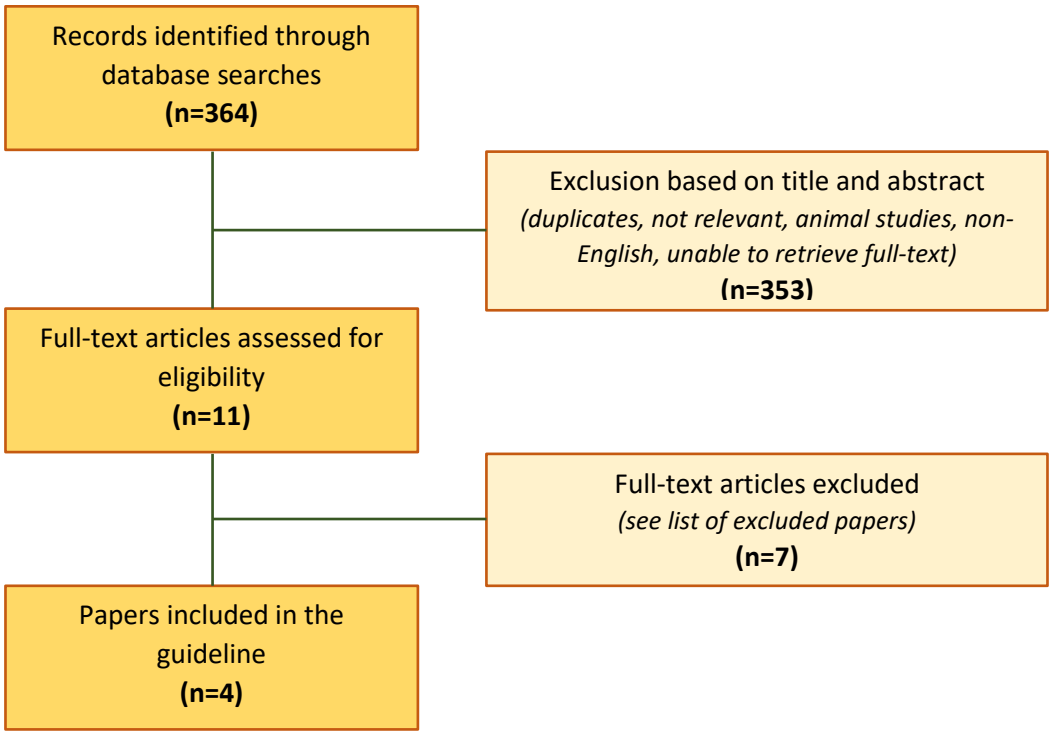
List of excluded papers

	Exclusion criterion
Abbara, A., Islam, R., Clarke, S. A., Jeffers, L., Christopoulos, G., Comninos, A. N., Salim, R., Lavery, S. A., Vuong, T. N. L., Humaidan, P., Kelsey, T. W., Trew, G. H. and Dhillo, W. S. Clinical parameters of ovarian hyperstimulation syndrome following different hormonal triggers of oocyte maturation in IVF treatment. Clin Endocrinol (Oxf). 2018; 88 (6): 920-927.	Significant imbalances between study groups, no evidence regarding pregnancy outcomes
Acevedo, B., Gomez-Palomares, J. L., Ricciarelli, E. and Hernandez, E. R. Triggering ovulation with gonadotropin-releasing hormone agonists does not compromise embryo implantation rates. Fertil Steril. 2006; 86 (6): 1682-7.	Donor study
Andersen, C. Y., Elbaek, H. O., Alsbjerg, B., Laursen, R. J., Povlsen, B. B., Thomsen, L. and Humaidan, P. Daily low-dose hCG stimulation during the luteal phase combined with GnRHa triggered IVF cycles without exogenous progesterone: a proof of concept trial. Hum Reprod. 2015; 30 (10): 2387-95.	Normal responders
Christopoulos, G., Vlismas, A., Carby, A., Lavery, S. and Trew, G. GnRH agonist trigger with intensive luteal phase support vs. human chorionic gonadotropin trigger in high responders: an observational study reporting pregnancy outcomes and incidence of ovarian hyperstimulation syndrome. Hum Fertil (Camb). 2016; 19 (3): 199-206.	Higher quality evidence available
Engmann, L., Siano, L., Schmidt, D., Nulsen, J., Maier, D. and Benadiva, C. GnRH agonist to induce oocyte maturation during IVF in patients at high risk of OHSS. Reprod Biomed Online. 2006; 13 (5): 639-44.	Different LH suppression regime in both arms.
Galindo, A., Bodri, D., Guillen, J. J., Colodron, M., Vernaeve, V. and Coll, O. Triggering with HCG or GnRH agonist in GnRH antagonist treated oocyte donation cycles: a randomised clinical trial. Gynecol Endocrinol. 2009; 25 (1): 60-6.	Donor study
Haahr T, Roque M, Esteves SC, Humaidan P. GnRH Agonist Trigger and LH Activity Luteal Phase Support versus hCG Trigger and Conventional Luteal Phase Support in Fresh Embryo Transfer IVF/ICSI Cycles-A Systematic PRISMA Review and Meta-analysis. Front Endocrinol (Lausanne). 2017 Jun 7;8:116. doi: 10.3389/fendo.2017.00116	Mix of studies including normal and high responders
Humaidan, P., Bungum, L., Bungum, M. and Yding Andersen, C. Rescue of corpus luteum function with peri-ovulatory HCG supplementation in IVF/ICSI GnRH antagonist cycles in which ovulation was triggered with a GnRH agonist: a pilot study. Reprod Biomed Online. 2006; 13 (2): 173-8.	Normal responders
Humaidan, P., Ejdrup Bredkjaer, H., Westergaard, L. G. and Yding Andersen, C. 1,500 IU human chorionic gonadotropin administered at oocyte retrieval rescues the luteal phase when gonadotropin-releasing hormone agonist is used for ovulation induction: a prospective, randomized, controlled study. Fertil Steril. 2010; 93 (3): 847-54.	Normal responders
Krishna, D., Dhoble, S., Praneesh, G., Rathore, S., Upadhaya, A., Rao, K. J Gonadotropin-releasing hormone agonist trigger is a better alternative than human chorionic gonadotropin in PCOS undergoing IVF cycles for an OHSS Free Clinic: A Randomized control trial. Hum Reprod Sci 2016; 9(3):164-172	Spuriously increased OHSS rate in the hCG group
Lewit, N., Kol, S., Manor, D. and Itskovitz-Eldor, J. Comparison of gonadotrophin-releasing hormone analogues and human chorionic gonadotrophin for the induction of ovulation and prevention of ovarian hyperstimulation syndrome: a case-control study. Hum Reprod. 1996; 11 (7): 1399-402.	No LH suppression in the study group.
Liang, I. T., Huang, H. Y., Wu, H. M., Wang, H. S., Yu, H. T., Huang, S. Y., Chang, C. L. and Soong, Y. K. A gonadotropin releasing hormone agonist trigger of ovulation with aggressive luteal phase support for patients at risk of ovarian	OHSS risk patients were defined prior to stimulation, based on AMH and AFC – and not on the day of trigger

hyperstimulation syndrome undergoing controlled ovarian hyperstimulation. Taiwan J Obstet Gynecol. 2015; 54 (5): 583-7.	
Melo, M., Busso, C. E., Bellver, J., Alama, P., Garrido, N., Meseguer, M., Pellicer, A. and Remohi, J. GnRH agonist versus recombinant HCG in an oocyte donation programme: a randomized, prospective, controlled, assessor-blind study. Reprod Biomed Online. 2009; 19 (4): 486-92.	Donor study
Orvieto, R., Rabinson, J., Meltzer, S., Zohav, E., Anteby, E. and Homburg, R. Substituting HCG with GnRH agonist to trigger final follicular maturation--a retrospective comparison of three different ovarian stimulation protocols. Reprod Biomed Online. 2006; 13 (2): 198-201.	Groups were not comparable in terms of risk of OHSS development
Papanikolaou, E. G., Verpoest, W., Fatemi, H., Tarlatzis, B., Devroey, P. and Tournaye, H. A novel method of luteal supplementation with recombinant luteinizing hormone when a gonadotropin-releasing hormone agonist is used instead of human chorionic gonadotropin for ovulation triggering: a randomized prospective proof of concept study. Fertil Steril. 2011; 95 (3): 1174-7.	Normal responders
Vanetik, S., Segal, L., Breizman, T., Kol, S. Day two post retrieval 1500 IUI hCG bolus, progesterone-free luteal support post GnRH agonist trigger - a proof of concept study. Gynecol Endocrinol 2018; 34(2):132-135	No mention of final follicle count on day of trigger – a mean of 12 oocytes retrieved indicates that this was not a population at risk of OHSS

18. Freeze-all

Flowchart



List of excluded papers

	Exclusion criterion
Chen, Z. J., Shi, Y., Sun, Y., Zhang, B., Liang, X., Cao, Y., Yang, J., Liu, J., Wei, D., Weng, N., Tian, L., Hao, C., Yang, D., Zhou, F., Shi, J., Xu, Y., Li, J., Yan, J., Qin, Y., Zhao, H., Zhang, H. and Legro, R. S. Fresh versus Frozen Embryos for Infertility in the Polycystic Ovary Syndrome. N Engl J Med. 2016; 375 (6): 523-33.	Included in meta-analysis: Wong 2017
Ferraretti, A. P., Gianaroli, L., Magli, C., Fortini, D., Selman, H. A. and Feliciani, E. Elective cryopreservation of all pronucleate embryos in women at risk of ovarian hyperstimulation syndrome: efficiency and safety. Hum Reprod. 1999; 14 (6): 1457-60.	Included in meta-analysis: Wong 2017
Shaker, A. G., Zosmer, A., Dean, N., Bekir, J. S., Jacobs, H. S. and Tan, S. L. Comparison of intravenous albumin and transfer of fresh embryos with cryopreservation of all embryos for subsequent transfer in prevention of ovarian hyperstimulation syndrome. Fertil Steril. 1996; 65 (5): 992-6.	Included in meta-analysis: D'Angelo 2007